ISSN-0976-0245 (Print) • ISSN-0976-5506 (Electronic)

Volume 10 | Number 7 | July 2019

Indian Journal of Public Health Research & Development

An International Journal

SCOPUS IJPHRD CITATION SCORE

Indian Journal of Public Health Research and Development Scopus coverage years: from 2010 to 2018 Publisher: R.K. Sharma, Institute of Medico-Legal Publications ISSN:0976-0245E-ISSN: 0976-5506 Subject area: Medicine: Public Health, Environmental and Occupational Health

Cite Score 2017- 0.03

SJR 2017- 0.108

SNIP 2017- 0.047

Covered by Scopus

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Print ISSN: 0976-0245, **Electronic ISSN:** 0976-5506, **Frequency:** Quarterly (Four issue per volume)

Indian Journal of Public Health Research & Development is a double blind peer reviewed international journal. The frequency is half yearly going to be quarterly by 2012. It deals with all aspects of Public Health including Community Medicine, Public Health, Epidemiology, Occupational Health, Environmental Hazards, Clinical Research, and Public Health Laws and covers all medical specialties concerned with research and development for the masses. The journal strongly encourages reports of research carried out within Indian continent and South East Asia.

The journal has been assigned International Standards Serial Number (ISSN)Print ISSN: 0976-0245, Online ISSN: 0976-5506 and is indexed with Index Copernicus (Poland). It is also brought to notice that the journal is being covered by many international databases. The journal is covered by EBSCO (USA), Embase, EMCare & Scopus database. The journal is now part of DST, CSIR, and UGC consortia.

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Dr R K Sharma
Institute of Medico-Legal Publications
Logix Office Tower, Unit No. 1704, Logix City Centre Mall
Sector- 32, Noida - 201 301 (Uttar Pradesh)

Printed, Published and Owned by

Institute of Medico-Legal Publications
Logix Office Tower, Unit No. 1704, Logix City Centre Mall
Sector- 32, Noida - 201 301 (Uttar Pradesh)

Published at

Institute of Medico-Legal Publications
Logix Office Tower, Unit No. 1704, Logix City Centre Mall
Sector- 32, Noida - 201 301 (Uttar Pradesh)

Indian Journal of Public Health Research & Development

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Effect of Therapeutic Exercises on Pre-Menopausal Symptoms in Sedentary Life Style Women

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ABSTRACT

Objectives: The purpose of this study was to check the effect of therapeutic exercises on pre- menopausal symptoms in sedentary life style women.

Method: 65 subjects were included who were having pre- menopausal symptoms with age group between 35-55 years were included in study. These subjects were allocated by simple random technique. During Pre -treatment and post treatment assessment severity of pre- menopausal symptoms assessed by menopausal rating scale and quality of life assessed by SF- 36 questionnaire. These outcome measures were analyzed.

Result: Pre and post treatment protocol was analyzed by using ANOVA test. Data analysis showed extremely significance in menopausal rating scale (p=0.0001) and SF-36 (p=0.0001).

Conclusion: The effect of therapeutic exercise protocol has shown significant improvement in pre-menopausal sedentary life style women with the help of menopausal rating scale and SF-36 questionnaire.

Keywords: *Pre–menopausal symptoms, sedentary life style women, therapeutic exercises.*

Introduction

Menopause: Menopause is defined as a time of cessation of ovarian function resulting in permanent amenorrhea.[1] [2] menopause commonly occurs above the age of 40 years.[2,3] In India 60 millions of women are above the age of 40 years.[2] Many of them menstruate well beyond the age of 50 also.[1] If the Menopause occurs before the age of 40 then it is known as premature menopause.[1] Menopause age not depend upon her menarche, number of pregnancies and lactation or taking oral contraceptives and socio-economic status It may depend upon her nutritional, environmental as well as on genetic factors.[4,5]

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Pre–menopause and its symptoms: The phase of Pre-menopause is of 3-4 years before menopause.[1,3] In this period almost 60-70% women go through various pre-menopausal physiological changes such as gradual decrease in the amount of blood loss with each period, gradual increase in the spacing of periods. The most common and noticeable symptoms are hot flushes and sweating which are the main symptom of the climacteric period in 85% women. Hot flushes are commonly seen on face and neck region and these last for 2-5 min each. Headache and severe sweating, disturbed sleep, Palpitation and angina pains may be additional features. In some women mental depression, irritability, and lack of concentration are noticed. Neurological, vasomotor symptoms and paraesthesia take the form of sensation of pins and needles in the extremities. With regard to Urinary tract - deficiency of oestrogen leads to urethral caruncles, dysuria with or without infection, urge and stress incontinence. Genital-Atrophic vagina reduces the vaginal secretion, and dry vagina can cause dyspareunia. Imbalance of Libido (sexual feeling) may increase in some women but in some women it is decreased. [1, 6,7,8,9.]

Physiology of exercise: Exercises help to maintain physical fitness. The physiological effect of exercise is depends on intensity, duration and frequency as well as environmental factors. During exercise there is increased demand of circulatory systems to meet this need of oxygen and nutrients improving metabolism with removal of carbon dioxide. Due to these demands chemical, mechanical, and thermal stimuli affect alterations in metabolic, cardiovascular and ventilatory functions. A recent study on Exercise training has shown significant results with regard to the self - reported frequency and severity of hot flushes.[10]

Thus, it is essential to study effect of therapeutic exercises on pre – menopausal symptoms in sedentary life style women. Also there is a need of study to find out the effect of therapeutic exercise programme on pre–menopausal symptoms as well as to promote women with sedentary life style towards adherence to physical exercises and its effects on health status during their pre–menopausal period.

Method

Population: The subjects which willing to participate in the study was taken. The criteria for inclusion were: Age: 35 to 55 years with pre-menopausal symptoms, non-exercising women excluding daily routine house hold work. Exclusion criteria: Subject associated problem with gynecological conditions such as - Uterine fibroids, Carcinoma, Uterine cyst, Subject undergone with any surgery in past 6 months and any disabled female.

65 pre- menopausal sedentary life style women were selected from Krad. And written consent form was taken. All the subjects were informed about the protocol and gave written consent before their participation. The protocol and the consent form were previously approved by protocol and ethical committee.

Interventions: In this study total 65 subjects were included who were having pre- menopausal symptoms which was confirmed by gynaecology department and those subjects satisfying inclusion criteria with age group between 35-55 years were included in study. The nature of study and interventions was explained to the subjects and those who were willing to participate were included in the study. Before proceeding to intervention, a written consent was taken from individual participant. Pre-treatment outcome measures of menopausal rating scale and SF-36 questionnaire will be recorded on first day. The procedure of therapeutic exercise protocol which includes with warm up exercises, stretching, strengthening exercises, aerobic exercises, relaxation technique and cool down exercises are advised and made to be performed by the subjects under the supervision as per the protocol. Consecutive outcome measures was done every month to know the progress for a period of four months. Pre and consecutive post- test measures was recorded for statistical analysis.

Exercise protocol:

1. **Warm-up:** Low intensity free exercises for upper limb, lower limb and trunk for 8-10 minutes.
2. **Stretching exercises:** Self –stretching was given after instruction and supervision for 30 sec hold and 3 repetition for each.[11]

   Upper limb: Bicep stretch, Triceps stretch,

   Lower limb: Quadriceps stretch, Hamstring stretch, Hip flexor stretch, Gluteus stretch, Hip adductor stretch, Calf stretch.

   Neck muscle: Trapezius stretch.
3. **Strengthening exercises:** Strengthening exercise was given with resistance band for upper limb and lower limb flexors, extensors, adductors, abductors for 3 sets and 3 repetition for each.[11]
4. **Aerobic training:** Brisk walk was given to the subjects for 15 minutes.[11]
5. **Relaxation technique:** Jacobson relaxation technique- Instruct subject to contract any group or series of muscles as strongly as possible and then tell to let go and continue to let go.[12]
6. **Cool down:** Cool down period includes with low intensity free exercises for 5 - 8 minutes.

This exercise programme was given for 4 days per week for 16 weeks.

Measurement Procedure:

Menopausal rating scale (MRS): The MRS scale contains 11 items, with a scores from 0 (none) to 4 (extremely severe). Each subject was asked to mark the box according to severity of their symptoms. The total score of the MRS ranged between 0 (asymptomatic) and 44 (highest degree of complain).The minimal/maximal scores vary between the three dimensions of depending on the number of complaints allocated to the respective dimension of symptoms.

Quality of life (SF – 36): SF-36 which is a self- reported questionnaire consisting of 36 items but in that only 2 domains are taken in this study which includes physical role and functions. Each subject was asked to mark the box according to severity of their problems and the domains are scored separately, and accordingly total score is provided.

Result

Women with sedentary life style having pre - menopausal symptoms and who have undergone a therapeutic exercise protocol showed significant decrease in the severity of pre- menopausal symptoms, with p value was <0.0001 which is statistically significant.

In addition, Post intervention results of quality of life among sedentary life style women has been found significant with p value <0.0001 which is statistically significant.

Statistical analysis: The data was entered into Microsoft office excels 2007 and analyzed using instat software. Descriptive statistics were used to analyze for demographic data: Pre and post treatment protocol was analyzed by using ANOVA test and p value <0.0001 was considered to be statistically significant.

As per the inclusion criteria 65 subjects were included in the study. During 16 weeks of protocol which includes with warm up exercises, stretching, strengthening exercises, aerobic exercises, relaxation technique and cool down exercises was given and Pre and post analysis was done for 65 subjects. In Table.1 and Table. 2

Table 1: Comparison of mean Pre- treatment and post treatment MRS score

Sr. No.	Duration	Mean	SD	Median	F value	p value	Significance
1.	Pre- day 1	31.69	5.33	31	213.5	<0.0001	Extremely significant.
2.	Post- 4 week	31.41	5.33	31			
3.	Post- 8 week	30.72	5.28	31			
4.	Post-12 week	29.93	5.35	30			
5.	Post- 16 week	29.07	5.26	30			

The above table shows comparison of mean values and standard deviation of menopausal rating scores. The values were compared by applying Friedman test. The pre and post treatment values shows that there was extremely significant difference in menopausal rating score after 8 weeks. (p = <0.0001.)

Table 2: Comparison of mean pre-treatment and post-treatment SF-36 score

Sr. No.	Duration	Mean	SD	Median	P value	F value	Significance
1.	Pre- day 1	49.62	11.72	50.00	<0.0001	91.794	Extremely significant.
2.	Post- 4 week	49.89	11.68	50.00			
3.	Post- 8 week	51.10	11.69	50.00			
4.	Post- 12 week	54.17	11.95	53.57			
5.	Post- 16 week	56.25	12.06	53.57			

The above table shows comparison of mean values and standard deviation of SF- 36 (Quality of life). The values were compared by applying tukey Kramer multiple comparison test. Pre and post treatment values shows that there was extremely significant difference in SF- 36 after 12 weeks. (p = <0.001).

Discussion

Pre-menopausal women suffer with many health issues due to various hormonal changes/physiological responses on endocrinal and reproductive systems and they influence the women's quality of life. To overcome this problem a therapeutic exercise protocol was designed to the subjects with reference to their Pre - menopausal risk factors.[13]

This research was conducted with the aim to study the effectiveness of therapeutic exercises on pre-menopausal symptoms in sedentary life style women. 65 participants with the age group of 35-55 years participated in the study. The conclusion was drawn

by the outcome measures which showed significant improvement in their pre- menopausal symptoms and in quality of life.

Outcome measures were taken pre and post interventions of therapeutic exercise program in pre - menopausal sedentary life style women. The following are the outcome measures which were used in this study.

- Menopausal rating scale (MRS).
- SF-36 questionnaire.

The menopausal rating scale is consist with 11 questions scale which was categorized from none to extremely severe score. The correlation of coefficient of the sum score was r = 0.82.

In menopausal rating scale, symptoms such as heart discomfort, sexual problems, bladder problems and dryness of vagina there was no significant changes seen. But in other symptoms such as hot flushes, sweating, sleep problems, depressive mood, irritability, anxiety and musculo - skeletal discomfort there was significant improvement recorded.

The second outcome measure is SF-36 which is a self- reported questionnaire consisting of 36 items out of which 2 domains were considered in the study which includes physical role and functions. The domains are scored separately and accordingly total score is provided. The overall Cranach's α coefficient of the SF-36 questionnaire was 0.791.

The physical activity component of SF-36 is categorized according to intensity of exercises i.e., vigorous activities, moderate activities and daily activities. The results have shown no significant changes recorded in vigorous activities but there was significant changes recorded in moderate and daily living activities.

The pre and post data was analyzed statistically using Friedman test and tukey krammer multiple comparison test. The pre and post intervention values of menopausal rating scale of the group compared by applying Friedman test. The results have shown significant difference in post treatment values (p value <0.0001).

The pre and post intervention values of SF-36 questionnaire of the group compared by applying tukey krammer multiple comparison test. The results have shown significant difference in post treatment values (p value <0.0001).

After giving therapeutic exercise protocol there was significant improvement in both MRS and SF-36. (Pre intervention scores: Mean of MRS - 31.69 and SF-36 - 49.62 & Post intervention scores: Mean of MRS - 29.07 and SF-36 - 56.25).

The results showed that there is significant improvement in menopausal symptoms and quality of life post intervention of therapeutic exercise protocol among females with sedentary life style undergoing the climacteric period towards menopause.

The result of one study reinforce that short term exercise approach is effective on menopausal symptoms, psychological health, and quality of life in post - menopausal women. (Aysegil agil et al., 2010).[14]

Related studies showed that exercise training helps to reduce the acute physiological severity post-menopausal hot flushes with 16 week exercise protocol (Tom G. Baily, et al, 2015).[10]

Effectiveness of a modified version of the applied relaxation technique in treatment 0f premenopausal and postmenopausal symptoms which depicts that 12 week exercise programme of relaxation techniques help to reduce severity of pre-menopausal and post- menopausal symptoms. (Saensak et al 2013).[15]

The study on Effects of Aerobic Exercise on Estrogen Metabolism in Healthy Premenopausal Women has proved that exercise intervention resulted in a significant increase in the 2-OHE1/16αOHE1 ratio, but no differences in other estrogen metabolites or ratios. (Alma J. Smith1, William R. Phipps2 2013 May.)[16]

The impact of exercise protocol was positive among all the participants in the study. Hence the therapeutic exercise protocol was effective to decrease the pre-menopausal symptoms as per their severity status thereby improving quality of life too.

Conclusion

The study concludes that subjects doing regular prescribed therapeutic exercise protocol had significant improvement clinically and shown statistically significant results in sedentary life style women with decrease in severity of pre-menopausal symptoms according to menopausal rating scale and improvement in functional status according to SF- 36(Quality of life).

Hence the alternate hypothesis was accepted.

Conflicts of interest: There were no conflicts of interest in this study.

Source of Funding: This study was funded by Krishna Institute of Medical sciences Deemed to Be University, Karad.

REFERENCES

1. Howkins and bourne shows textbook of gynaecology 2011.
2. Maninder Ahuja, age of menopause and determinants of menopause age: A PAN India survey by IMS, journal of Mid - Life health.
3. R. Sapsford, Women's Health A textbook for physiotherapists (1997).
4. Saseendran Pallikadavath (et. Al.), Natural menopause among women below 50 years in India: A- population – based study, the Indian journal of Medical research.
5. Torgerson DJ, (et. Al.), Factors associate with onset of menopause in women aged with 45 – 49, Maturities. 1994; 19:83 – 92.
6. Christan Nordqvist, Everyting you need to know about menopause, 2017.
7. Nanette Santoro, menopausal symptoms and their management.
8. Deborah Grady, management of menopausal symptoms, the New England journal of medicine, 2006.
9. Juan Enrique M Blumel, relationship between psychological complaints and vasomotor symptoms during climacteric, maturities 49 (3), 2004.
10. Tom G. Bailey1 (et. al), Exercise training reduces the acute physiological severity of post-menopausal hot flushes, J Physiological 594.3 (2016) pp 657–667.
11. Carolyn Kisner, Lynn Allen Colby. Therapeutic exercises 2007 by FA Davis Company.
12. M. Deena Gardiner, fourth edition, the principles of exercise therapy.
13. ACSM, guidelines for exercise testing and prescription, American college of sports medicine; senior editor Linda S (2011).
14. Aysegil Agil (et al), short term exercise approaches on menopausal symptoms, psychological health, and quality of life in post- menopausal women. Received 23 March 2010; accepted 13 July 2010.
15. Asuprawita Saensak1 (et. al), Article was published in international journal of women health, Effectiveness of a modified version of the applied relaxation technique in treatment of pre-menopausal and postmenopausal symptoms. 4 November 2013.
16. Alma J. Smith1 (et. al), The Effects of Aerobic Exercise on Oestrogen Metabolism in Healthy Premenopausal Women, Cancer Epidemiological Biomarkers 2013 May.

Does Commercially Available Tooth Brushes in India follow Recommended American Dental Association (ADA) Norms?

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ABSTRACT

Objective: To evaluate whether various brands of tooth brushes available in the Indian market adhere to ADA specified tooth brush design norms.

Methodology: 13 brands of tooth brushes which are commercially available in the Indian market were selected for the study purpose. Each single tooth brush was compared for the length of the head, width of the head, number of tufts, number of bristles, diameter of the bristles, and surface area of the brushes with the standard ADA (American Dental Association) specifications.

Result: Tooth brushes which are classified under soft, medium, hard and extra soft tooth brushes did not meet the given specifications.10 out of 13 tooth brushes are in accordance with ADA specification related to length and 1 out of 13 tooth brushes are following related to width, while coming for the number of rows 11 out of 13 are satisfied and 10 out of 13 are satisfied related to number of tufts per row .Finally 13 out of brushes are not in accordance with ADA when compared to number of bristles/tufts. Some manufactures did not even provide with the proper type of bristles as per labelling.

Conclusion: There has been a large violation due to improper quality and worst manufacturing of tooth brushes. Public should get aware of about ADA specifications for the proper tooth brush to purchase and use by them. 99% of the surveyed brushes did not meet the ADA specifications.

Keywords: *ADA specification, Tooth brush design, Oral hygiene.*

Introduction

In the remote past, man needed to find out ways innovatively to clean his teeth and make his breath pleasant to loved ones. It is not known actually who initially developed the idea of tooth cleaning, despite the fact that markings on teeth found in caves going back to the Stone Age put forward the thought that primeval man utilized alternative toothpicks possibly made from wood or bone that helps to be clear out seeds and bone sections from between his teeth. The growth of the initial toothbrush likely goes back to around 3550BC, when the Babylonians and Egyptians created the primary toothbrush by utilizing threadbare twigs [1] As per another source, around 1600 BC, the Chinese arranged "chew sticks" that were produced using the twigs of sweet-smelling trees for refreshing their breaths.

Toothbrush is described as the most classic and principle method in the oral hygiene practice, since ancient times. Chewing sticks were mostly the first tooth brush designed which were manufactured by Babylonians as early as 3500 BC.[1].The predecessor of the toothbrush is the "chew stick". Chew sticks were twigs with frayed ends used to brush the teeth while the other end was used as toothpick. The earliest chew sticks were discovered in 3550 BC and mentioned in Chinese records dating from 1600BC. The Greeks and Romans used toothpicks to clean their teeth and toothpick like twigs have been excavated in 'Qin Dynasty' tombs. Chew sticks remain common in Africa and the rural Southern Indian states till recent past. Modern toothbrush has been originated

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in China. The first bristle toothbrush consists of hog bristles. They were attached to a handle manufactured from bamboo or bone, forming a toothbrush.

At present, the market is crowded with multiple varieties of toothbrushes. Some with effective advertising which overstates the size, shape and other features comparing, each superiority over another, which leaves all the consumers in a state of dilemma to purchase and buy which brand of tooth brush. Thus it is very essential to ensure the correct guidelines to both toothbrush manufacturer as well as consumer, so that it will help the public to select a proper toothbrush which helps to maintain a good oral hygiene.

Toothbrushes vary in size, design, length, hardness and arrangement of the bristles. There are several studies, which reports that due to improper tooth brushing technique and improper toothbrush design there is an increase in cervical abrasion of teeth[2,3] and gingival trauma[4]. Toothbrush design is a very important key factor in the maintenance of oral hygiene. If the design is not satisfactory there will be improper cleaning of tooth surface areas which will affect the teeth and periodontal health[5]. Bristles on the other hand , also play a very important role in the function that,if the bristles of the toothbrush are very hard it will lead to bleeding of gums[4,5]. ADA specifications are used for testing the tooth brush quality for the safety use of the tooth brush so that will help to maintain good oral hygiene[6].

Although several studies[1,7] have been done related to tooth brushes, yet there is no confirmation of the toothbrush whether they are following the ADA specification or not. The main objective of the study is to evaluate the commercially available various brands of toothbrushes in the Indian market are similar to the specifications which are advised by ADA.

Methodology

The current study was conducted in the Department of Public health Dentistry, Sathyabama Dental College and Hospital, Chennai. 13 tooth brushes from 4 commonly available brands , which are commercially available in the Indian market were selected for the study purpose. All the tooth brushes have been coded from 1 to 13. The study of tooth brushes consists of soft, medium, hard, and very hard varieties of tooth brushes. Each single tooth brush was compared for the Length of the head (brushing surface), Width of head (using vernier callipers): three trials each, Number of tufts per row, Number of bristles per tuft, Diameter of the bristles-(soft=0.007inch, medium =0.012inch, hard=0.014inch), Surface area of the brushes, with the Standard ADA specifications[8].

The tooth brush was divided into 3 parts - head, shank and handle. The length of head was measured by using the divider, by placing one end of the divider on top of the head and the other end at the bottom of the head. Then the distance between the two end points were transferred on to metal scale for the measurement of length of the head. The width of the head was measured by using the divider method and it was measured horizontally from one end to another end.

The diameter of the bristle was measured by using the vernier callipers and it was set in accordance with the error ±0.1mm. Single bristle from the tooth brush head was taken from the group of tufts and that single bristle was hold in between the upper arm and lower arm of vernier callipers. Now the reading was evaluated. Rows of each tooth brush were calculated for three trails and mean of the three trails was recorded. Group of tufts which is present in the rows was calculated.

The surface area of each tooth brush was calculated by using the formula relating to the shape of the tooth brush design. For the brush code 10,11,12,13 the shape of the head is in oval shape - the formulae used for calculating the surface area is $A = \pi r^2$ where the value of π is taken as 3.14.cFor the brush codes 1, 4 the shape of the head is oval and with rectangle- the formulae used for calculating the surface area is $\pi r^2 + l \times b$. For the brush codes 2,6 the shape of the head is in triangular – the formulae used for calculating the surface area is $2A = \pi r^2 + \frac{1}{2} b \times h$. For the brush codes 3, 5 the shape of the head is triangular - the formulae used for calculating the surface area is $l \times b + \frac{1}{2} b \times h$. For the brush codes 7, 8, 9 the shape of the head is rectangular – the formulae used for calculating the surface area is $A = \pi r^2 + 2 \times \frac{1}{2b} \times h$

The method for calculating the surface is done by observing the tooth brush head and by noting down the related the formulas. Thus the recorded data was noted down in the excel sheet. Average mean and the standard deviation of all the recorded values are then calculated and noted down. The values thus obtained are compared with the ADA specification[8].

Results

Evaluation of bristle diameter gives the information that out of 3only 1 extra soft toothbrushing accordance with ADA specification no(table-2); out of 5 soft tooth brushes none is with the accordance of ADA specification no(table-3); out of 4 toothbrushes in medium none is satisfying(table -4).The ADA standard specification out of 1 hard toothbrush is also not with the accordance with ADA specification(table-5).

On measuring the length and width of toothbrush head in the order of soft ,medium and hard variety(table-1),it was found that 10 out of 13 toothbrushes relating to length meet the ADA specifications, while considering the width 3 out of 13 tooth brushes alone meet the ADA specification. While considering the no.of rows-11 brushes out of13 are following the ADA standard specification. While comparing the tufts only 11 out of 13 met with the ADA specification number and while comparing the no. of bristles only 1 out of 13 follows the ADA standard specification (table-1)

Table 1: Specifications of commercially available tooth brushes

Tooth Brush Code	Length of Head		Width of Head		No of Rows	No of Tufts/Row	No of Bristles/Tuft
			Avg. of 3 trials inches	SD (standard deviation) inches			
1.	1.1333*	1.117*	0.3666	0.42	4*	13	95
2.	1.1*	0.609*	0.4	1.52	4*	11*	50
3.	1.2*	0.09	0.4	0.381*	4*	11*	32
4.	1.366*	0.23	0.4	0.186	4*	12*	55
5.	1.1*	0.0013	0.7	0.54	4*	11*	45
6.	1*	0.3	0.4	0.65	5	11*	52
7.	1.555	5.08	0.5	2.54	4*	11*	50
8.	0.7874	0.55	0.3346*	0.18	3*	9	60
9.	1.1*	0.254	0.5	0.512	5	1	53
10.	1.0143*	1.117	0.444	0.25	4*	10*	54
11.	0.9672	0.41	0.4265	0.72	4*	9*	56
12.	1.0271*	0.28	0.4571	0.16	4*	9*	54
13.	1.0*	0.23	0.4428	0.21	4*	9*	55
Standard ADA specifications	1inches	1.41inch	0.315inch	0.303inch	2-4	5-12	80-86

*In accordance with ADA specification.

Table 2: Diameter of "Extra soft" Toothbrush

Toothbrush Code	Average Diameter of 3 Bristles Inch	Standard Deviation(SD)
2	0.007	2.478
5	0.002	1.590
8	0.005*	0.323
*ADA specification no 0.005 inch		
*In Accordance with ADA specification		

Table 3:Diameter of "Soft" Tooth Brushes

Toothbrush code	Average diameter of 3 bristles (inch)	Standard deviation(SD)
1	0.009	1.345
4	0.005	3.678
7	0.004	2.517
11	0.008	0.967
12	0.010	2.678
*ADA specification no 0.007 inch		
*In accordance with ADA specification		

Table 4: Diameter of "Medium" Toothbrushes

Toothbrush code	Average diameter of 3 bristles(inch)	Standard deviation(SD)
3	0.006	2.286
6	0.005	2.184
9	0.014	1.212
13	0.008	0.456
*ADA specification no 0.012 inch		
*In accordance with ADA specification		

Table 5: Diameter of "Hard" Toothbrush

Toothbrush code	Average diameter of 3 bristles(inch)	Standard deviation(SD)
10	0.007	1.345
*ADA specification no 0.014 inch		
*In accordance with ADA specification		

Discussion

This study has been conducted to compare whether the toothbrushes which are commercially available in the market are meeting the standards which are set by ADA specifications given for toothbrush. Toothbrushes which are classified under soft, medium, hard and extra soft toothbrushes did not meet the specification given by ADA. Few brands failed to reach approximate specifications of ADA. The greatest disparity was seen with regards to diameter and no of bristles.99% of surveyed brushes had less bristles than specification, since it is known that plaque removal procedure is carried out with the brushing technique i.e more based on technique rather than type of bristles and if bristles are not satisfactory adverse changes are observed with brushing like abrasion of tooth surface, Traumatizing the gingival margin, so the need of hand bristled tooth brushes in the market is doubtful. Many toothbrushes did not follow the ADA specification for length ,width of head, all being larger than norms. Small head toothbrushes help in improving plaque removal. Astonishingly none of the evaluated toothbrushes totally satisfied the specifications of ADA. Detailed descriptions of the toothbrushes available in the market are given in this study which is deviated from the normal existing specifications. This findings is similar to studies done by Bhat MK(2006)[1] and Singh Walia S(2016)[8].

Majority of the manufacturers did not specify about bristles per tuft. Some manufacturers did not even provide with proper type of bristles as per labelling. There has been a large violation from ADA specifications due to improper quality check by manufacturers' leading to worst manufacturing of toothbrushes. There are different varieties of toothbrushes available in many colours, designs, packages each claimed to be better than other .The main purpose of using tooth brush with simple design which is following ADA specification is to obtain the best result during brushing. Public should get aware about the ADA specification for the proper toothbrush to follow according to the individual. By proper usage of toothbrush one can avoid many problems faced by the people in day to day life. Good oral health begins from oneself. Good oral health isn't hard to achieve but it does take discipline. Brush your teeth every day to keep the dentist away. But to maintain proper oral condition visiting dentist regularly is not wide of the mark. The main reason for going to the dentist regularly every 6 months is prevention. The goal is to prevent tooth decay, gum disease, and other disorders that put the health of your teeth and mouth at risk. Every tooth in a man's mouth is a diamond. Hence the manufacturer of tooth brushes, despite of business purpose, should keep in mind the ADA specifications while producing toothbrushes and ultimately extend a moral support to the people by showing great concern for their oral health. There should be a regular check and necessary measurements should be taken by the government by seeking the help from the Public Health Dentistry side to have an inspection regarding the manufactures.

Ethical Clearence: This study does not involve any human sample.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Bhat MK, Dhiraj.S, Thomas.B. Tooth brush a dilemma, Indian Journal of Dentistry 2006;17(4): 167-170.
2. Dickson WJ, Vandewalle KS, Lien W, Dixon SA, Summitt JB. Effects of cyclic loading and toothbrush abrasion on cervical lesion formation. J Acad Gen Dent. 2015;63:e1-5.
3. Hakeem S, Baqar A, Mohsin A, Ilyas F, Monpuri A, Hassan F. Investigation of abrasion related

tooth surface loss and its association with oral hygiene behaviours. Pakistan Oral & Dental Journal. 2017 Dec 1;37(4).

4. Heasman PA, Holliday R, Bryant A, Preshaw PM. Evidence for the occurrence of gingival recession and non-carious cervical lesions as a consequence of traumatic toothbrushing. Journal of clinical periodontology. 2015 Apr 1;42(S16).
5. Hoogteijling FC, Hennequin-Hoenderdos NL, Van der Weijden GA, Slot DE. The effect of tapered toothbrush filaments compared to end-rounded filaments on dental plaque, gingivitis and gingival abrasion: a systematic review and meta-analysis. International journal of dental hygiene. 2018 Feb;16(1):3-12.
6. Nayak GD, Ashita Uppoor. Periodontology and Oral Implantology; 2nd edition :356
7. Singh Walia S, Randhawa AK, Malhotra S, Multani K, Kaur G. Comparison Of Commercially Marketed Toothbrushes In Amritsar-In Accordance To Ada Specification. Indian Journal of Comprehensive Dental Care (IJCDC). 2016 Jan 1;6(1).
8. Saunders, Carranza FA; Clinical Periodontology:, 2005, 11th edition:, 651-654.

Maternal Mortality at a Tertiary Care Hospital in North India: a 4 Year Review

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ABSTRACT

Worldwide, almost half a million maternal deaths occur every year. Most of these deaths (99%) occur in developing countries. South Asian countries which includes India. Most maternal deaths are preventable as the medical interventions necessary to treat or prevent complications are well established. Even then, the progress made in maternal health so far is unsatisfactory. This study was conducted to determine the causes and epidemiological factors that lead to maternal deaths at a Tertiary care hospital in North India, and henceforth, suggest measures to reduce maternal mortality in the region. It was a retrospective study. The female deaths at the Institution which met the WHO Criteria for Maternal Death during the year 2013-2016, were analyzed for epidemiological factors and causes of maternal deaths. During the study period there were 364 maternal deaths. Maternal mortality ratio in the study period was 358.73, 273.30, 371.45 and 436.61 in the year 2013, 2014, 2015 and 2016, respectively. Majority of the women who died (73.07%) were in the age group of 21-30 yrs. Most of the women (70.32%) were multipara (56.59%) and grand-multipara (13.73%). Most of the women were un-booked(88.46%).Direct causes still contributed to majorly of maternal deaths [hypertensive disorders (28.02%), pregnancy related infections (20.87%), and hemorrhage (12.36%)]. Among indirect causes, anemia and hepatitis were most common (15.93% & 11.53%, respectively). Promoting good quality antenatal care for all, universal iron supplementation, strengthening the infrastructure of peripheral Health facilities and forming a referral network are some of the measures that may help reduce maternal mortality.

Keywords: *Maternal mortality review, retrospective study, tertiary care hospital, North India.*

Introduction

Worldwide, approximately 830 women die every day due to complications of pregnancy or childbirth[1]. This amounts to almost half a million maternal deaths every year. Most of these deaths (99%) occur in developing countries. South Asian countries which includes India, accounts for nearly one- third of the global burden of maternal deaths.[2]

Most maternal deaths are preventable as the medical interventions necessary to treat or prevent complications are well established. Even then, the progress made in maternal health so far is unsatisfactory. United Nation (UN) report card on Millennium Development Goal-5 concluded that the progress shown by the South Asian countries including India is unsatisfactory. These countries have achieved a decline of MMR by around 20 percent against a target of reducing MMR by 75 per cent between 1990 and 2015[2]. For India, it implied that it should have achieved the target of reducing maternal deaths to 109 by 2015. However, it failed to achieve its target, and has only achieved an MMR of 174.[1]

This study, was conducted to determine the causes and epidemiological factors of maternal deaths at a Tertiary care hospital in North India, and henceforth, suggest measures to reduce maternal mortality in the region.

Aims & Objectives

1. To determine & compare the Maternal Mortality ratio at the Tertiary care Hospital for a period of four years.

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2. To identify the causes that led to maternal deaths at the Institution.
3. To suggest measures to reduce maternal mortality.

Materials & Method

It was a retrospective study conducted in a tertiary care hospital, in north India, with an annual delivery rate of around 26-27,000. The hospital receives several un-booked patients and referral cases from private and public maternity homes, hospitals and Medical colleges across Delhi and neighboring states. The hospital runs 3 ICU's, an Obstetric HDU. It also has blood bank facility and 2 emergency operation theatres, functional round the clock to provide emergency obstetric services to its patients.

The female deaths at the Institution which met the WHO Criteria for Maternal Death[1] were included in this study: All female deaths, while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by pregnancy or its management but not from accidental or incidental causes [1].

The details of all the maternal deaths for a period of four years, from January 2013 to December 2016 were collected from the Maternal mortality register and the case sheets. This data was analyzed with respect to the following parameters:- age, parity, socioeconomic status, residence, booking status, condition on admission, prevalence of anemia, admission death interval, causes of death and type of delays identified.

Maternal mortality ratio was calculated by using the formula-

$$\text{MMR} = \frac{\text{Total no. of maternal deaths} \times 100,000}{\text{Total no. of live births}}$$

Types of delay according to WHO[3] is summarized as follows-

- **Type I delay:** delay in the decision to access care
- **Type II delay:** delay in the identification of and transport to a medical facility
- **Type III:** delay to the receipt of adequate and appropriate treatment

Results

During the study period, from January 2013 to December 2016 there were 100,631 live births and total of 364 maternal deaths. Maternal mortality ratio in the study period was was 358.73, 273.30, 371.45 and 436.61 in the year 2013, 2014, 2015 and 2016, respectively.

The epidemiological characteristics of the maternal death cases are shown in **Table 1**.

Majority of the women who died (73.07%) were in the age group of 21-30 yrs. Adolescent pregnancy attributed to 3.29% (n=12) of maternal deaths. Most of the women (70.32%) were multipara (56.59%) and grand-multipara (13.73%). Nearly two- thirds of the women (68.68%) belonged to lower socioeconomic strata. Most of the women were un-booked, an alarmingly 88.46%. Nearly 2/3rd of these un-booked cases (64.9%) were referred from other centers, often after life-threatening complications. Many of these women were brought to the hospital in critical (94, 29.12%) and serious (102, 31.67%) conditions, respectively.

Type I (64.28%) and type II (49.45%) delay were the most common delays identified in this study

The causes of maternal deaths were classified according to the WHO Application of ICD-10 to deaths during pregnancy, childbirth and puerperium[4] and summarized in Table 2.

Table 1: Socio-demographic characteristics of women who died

Socio-demographic character	No. of women (%)
Age	
≤ 20 years	46 (12.63%)
20-30 years	266 (73.07%)
31-40 years	46 (12.63%)
> 40 years	06 (1.64%)
Booking status	
Unbooked	322 (88.46%)
Booked	29 (7.96%)
Registered	13 (3.54%)
Status on admission (AHA)[21]	
Good	19 (5.21%)
Fair	54 (14.83%)
Serious	171 (46.97%)
Critical	120 (32.96%)
Prevalence of Anemia	
Severe (<7 gm%)	133 (36.53%)
Moderate (7-9.9 gm%)	129 (35.43%)
Mild/ No (≥10 gm%)	112 (30.76%)
Referral	
Referral	211 (57.96%)
No Referral	153 (42.03%)
Duration of Hospital stay	
≤24 hours	164 (45.05%)
24-48 hours	72 (19.78%)
> 48 hours	128 (35.16%)

Table 2: Causes of Maternal Deaths

Groups according to ICD-10 Code[4]	Type and Group	No. of Maternal Deaths (%)
1	Direct: Pregnancies with abortive outcome	10 (2.74%)
2	Direct: Hypertensive disorders	102 (28.02%)
3	Direct: Obstetric hemorrhage	45 (12.36%)
4	Direct: Pregnancy related infections	76 (20.87%)
5	Direct: Other obstetric complications	
	Obstructed labor	08 (2.19%)
6	Direct: Unanticipated complications of management (eg. pulmonary embolism)	13 (3.57%)
7	Indirect: Non obstetric complications	
	Anemia	58 (15.93)
	Heart disease (with or without pre existing hypertension)	12 (3.29%)
	Gastrointestinal complications	55 (15.10%)
	Respiratory diseases/ARDS/TB	20 (5.49%)
	Neoplasm	02 (0.54%)
	Infections, not direct result of pregnancy	02 (0.54%)
	Epilepsy	02 (0.54%)
8	Unspecified: Unknown/Undetermined	03 (0.82%)
9	Coincidental causes	0

Table 3: Review of literature: Causes of maternal deaths in different studies

Author	MMR	Direct cause	Hemorrhage	Sepsis	Hypertensive disorders of pregnancy	Indirect	Anemia	Jaundice	Heart Disease	Miscellaneous
Murthy et al [16](2013)	302.23	72.5%	26.66%	18.33%	26.66%	27.5%	10%	9.16%	3.33%	5%
Vidyadhar et al[14] (2011)	302.9	50%	21.05%	7.89%	10.52%	50%	2.63%	21.05%	13.15%	13.15%
Jadhav et al [15](2013)	395	43.64%	27.84%	3.16%	10.75%	56.36%	33.33%	7.59%	10.75%	4.69%
Das R al [17] (2014)	518.48	81.64%	21.87%	13.28 %	16.3%	18.35%	2.74%		6.64%	
Puri et al [19] (2011)	690	55.38%	12%	24%	18%	14%	13%	14%		
V Saini et al[20](2014)	471.54-225.57	60.5%	23.9%	21.1%	7%	39.43%	8.4%	9.8%	2.8%	9.8%
V P Paily et al.[10] (2014)	33.9-31.3	48.90%	22.55%	8.38%	15.57%	51.1%	1.20%	6.79%	6.39%	
Mittal et al (2017)	361.71	69.81%	12.36%	20.87%	28.02%	30.19%	15.93%			

Discussion

Maternal mortality is an index of quality of Maternal Health services and the socio-economic status of a community or a nation. Hence, a high maternal mortality not only reflects poor quality of Health services and referral linkages, but also a lack in the Socio-economic development and infrastructure of a community.

The Maternal mortality ratio in the study period was 358.73, 273.30, 371.45 and 436.61 in the year 2013, 2014, 2015 and 2016, respectively. MMR in our study still remains quite high, more than our national average (174/100,000 live births[1]. Similar high maternal mortality has been reported by other Indian studies as well (Nishu Priya et al[5] at 270/1,00,000 live births, Ashok et al[6] at 345.9/1,00,000 live births, VB Bangal et al[7] at 302.9/1,00,000 live births, Purandare et al[8] at 113/1,00,000 live births, Sundari KPM et al[9] at 559-802/1,00,000 live births.). Only, one Indian study from Kerala has reported a very low MMR of 33.9/100,000 live birth [10]. This is because, Kerala state has the lowest maternal mortality in the country. On analysis of the data, the high maternal mortality in the study, can be explained by the fact that the health facility being a Tertiary care center, receives referrals of several un-booked patients, often with life threatening complications from various hospitals (public and private) in and around Delhi. Pathak et al[11] also reported a high MMR of 428-869.6/ 100,000 live births also due to large number of referral cases. Majority of the women in the study, were un-booked (322, 88.46%) and most of them referred from other public/private facility. Many presented to us in serious (31.67%) or critical condition (29.12%) often with multiple complications and expired within 24 hours of admission to the hospital (45.05%). Also, with the establishment of an Obstetric HDU in the Department, in 2016, there was a significant rise in the number of referred cases from 49.47% in 2015 to 59.48% in 2016. Moreover, the number of patients who presented in a Critical condition at admission, increased from 32.63% in 2015 to 50% in 2016. Many were transferred 62 (29.38%) without adequate life support measures, further aggravating their moribund state. Hence, explaining the rise in Maternal Mortality in 2016.

Many of these patients could have been saved by timely and early access to Health care services. The most common delays identified in this study were Type I and Type II delays. No ANC and delay in deciding to seek care (234, 64.28%) and delay in reaching tertiary care center (180, 49.45%). Another Indian study [12] also reported a high type I (85.89%) and type II delay (10.25%).

Also, lack of availability of blood and blood components/ blood bank, emergency obstetric care facility, trained manpower, ICU facility at various centers across the state and neighboring states have been identified. This often leads to patient being referred from one facility to the other without receiving appropriate medical care. No proper referral linkages also lead to delay in a women receiving access to a referral center.

Most of the women in our study were in the age group of 21-30 years (73.07%); similar to other studies across India[6,7,13] . Adolescent maternal death were seen in 12 cases (3.29% of total maternal deaths), as against a total occurrence of 7% adolescent pregnancies in this Institution. Other Indian studies have reported a higher incidence of mortality in adolescent girls (Vidhyadhar et al.[14] : 15.79%, Jadhav et al[15]: 9.49%, Murthy et al : 5.83%[16],Das R et al.[17] : 30.85%). UN statistics division reported adolescent pregnancy in India as 86/1000 (1995-2010), which is very high as compared 49 globally and 53 in less developed countries. The main causes for teenage maternal deaths in this study were septic abortion (41.66%), pre eclampsia and eclampsia (33.33%), sepsis (23.91%), anemia (16.66%).

Majority of the women who died in this study were multipara and grand-multipara comprised 56.59% and 13.73%, respectively. Hence, highlighting the need to strengthen family planning services. In grand multipara group, 20% deaths were due to hypertensive disorders, anemia and respiratory diseases each.

Majority (69.81%) of maternal deaths were due to direct obstetric causes; Hypertensive disorders (28.02%), pregnancy related infections/sepsis (20.87%), hemorrhage (12.36%), and abortion (2.74%). Other studies from across India have also reported a high incidence of Maternal deaths due to direct causes (Table 3)[,15,16,17,18]. As per WHO (2007 & 2010) 25% of all maternal deaths world-wide are due to hemorrhage. In our study obstetric hemorrhage contributed to only 12.36% of cases, much lower than other Indian studies (Murthy BK et al[16] 26.66%, Ann L. Montgomery et al[18] 27%, Nishu Priya et al[8] 35.05%). This is probably, because the hospital runs blood bank facilities round the

clock with availability of various blood components. Anemia was significant co morbid factor (71.97%) and an indirect cause of maternal mortality in 15.93% in this study which is comparable to study done by Khandale SN et al[12] (14.10%).

Conclusion

Most of the maternal deaths in this study were observed in women from rural areas who were less educated, with no antenatal coverage and belonged to lower socioeconomic status. Maternal death is an avoidable tragedy and most of the causative factors can be prevented to a large extent.

From this study it was c oncluded that Direct causes like Hemorrhage, sepsis & hypertensive disorders of pregnancy, still contribute to majority of maternal deaths. Anemia, Heart disease and Jaundice were the major medical causes of Maternal deaths in this study. Hence, the following measures are suggested to reduce the National MMR to achieve the desired MMR of 100 by the year 2020.

1. Ensuring 100% antenatal coverage for all pregnant women & promoting institutional deliveries.
2. Promoting oral iron supplementation along with dietary advice for correction and prevention of anemia.
3. Measurement of Blood pressure at each antenatal visit to ensure early identification and management of pre-eclampsia.
4. Initiation of Anti-hypertensives at BP above 150/100mmHg and timely referral of these patients to tertiary care facility.
5. Training ANMs at CHC, PHC, to administer intramuscular Magnesium sulfate for prevention/ treatment of ecclampsia
6. Provision of safe abortion services.
7. Strengthening of existing Emergency obstetric care (EmOC) facilities.
8. Implementing Active management of 3rd stage of labor and systematically observing the 4th stage of labor.
9. Promotion of family planning services and spacing of births.
10. Maternal death review and audit
11. Identifying Maternal Early Warning Signs in mothers at referring Centres, (MEOWS Score) to ensure early and timely referrals, easy transport and with adequate life support measures.
12. Sex education to teenagers.

Source of Funding: No funding sources

Conflict of Interest: None declared

Ethical Approval: The study was approved by the Institutional Ethics committee

REFERENCES

1. World health statistics 2017: monitoring health for the SDGs, Sustainable Development Goals
2. The Millennium Development Goals Report 2009. New York: United Nations; 2009. Association of Health Care Journalists, American Hospital Association. 2014
3. Emilie J C, Alexander P S, Andrea G T & Lee A W. Applying the lessons of maternal mortality reduction to global emergency health. *Bulletin of the World Health Organization* 2015;93:417-423.
4. The WHO application of ICD-10 to deaths during pregnancy, childbirth and puerperium: ICD MM. 2012
5. Nishu P, Verma A, Verma S. Maternal Mortality: Ten years Retrospective Study. JK science. Journal of Medical education and Research. 2010;12(3):134-136.
6. Verma A, Minhas S, Sood A. A study of Maternal Mortality. J. Obstetric Gynaecol India. 2008; 58: 226 – 229.
7. VB Bangal, Purushotham A Giri, Garg R. Maternal Mortality at a Tertiary Care Teaching Hospital of Rural India: A Retrospective Study. Int J Biol Med Res. 2011; 2(4): 1043 – 1046
8. Purandare N. Singh A, Upahdya S, et al. Maternal mortality at referral centre: a five year study. J. Obstetric Gynaecology India. 2007; 57(3): 248–50.
9. Sundari KP, Jayanthi RD, Ramasamy B. Trends in maternal mortality in a tertiary care hospital. Int J Reprod Contracept Obstet Gynecol 2016; 5: 3659-62.

10. Paily VP, Ambujam K, Rajasekharan Nair V, Thomas B. Confidential Review of Maternal Deaths in Kerala: a country case study. BJOG 2014; 121(Suppl. 4): 61–66.

11. Pathak D, Chakraborty B, Goswami S, Adhikari S. Changing trends of maternal mortality: A comparative study. J Obstet Gynae India. 2011; 61(2):161-5.

12. Khandale SN, Kedar K. Analysis of maternal mortality: a retrospective study at tertiary care centre. Int J Reprod Contracept Obstet Gynecol 2017; 6:1610-3.

13. Kaur D, Kaur V, Yuel VI. Alarmingly high maternal mortality in 21st century. JK Science 2007; 9(3): 123 – 126.

14. Bangal VB , Giri PA , Garg R. Maternal Mortality at a Tertiary Care Teaching Hospital of Rural India: A Retrospective Study. Int J Biol Med Res. 2011; 2(4): 1043 – 1046

15. Jadhav CA, Prabhakar G, Shinde MA, Tirankar VR, Maternal Mortality: Five year Experience in Tertiary Care Centre. Indian Journal of Basic & Applied Medical Research; 2013; 2(7): 702 – 709.

16. Murthy BK, Murthy MB. Maternal mortality in tertiary care hospital: A 10 yr review International Journal of Preventive Medicine. 2013; 4(1):105-9.

17. Das R, Biswas S and Mukherjee A. Maternal Mortality at a Teaching Hospital of Rural India: A Retrospective Study. International Journal of Biomedical And Advance Research (2014) 05 (02) ISSN: 2229-3809 (Online) Journal DOI:10.7439/ijbar CODEN:IJBABN

18. Montgomery AL, Ram U, Kumar R, Jha P, for The Million Death Study Collaborators (2014) Maternal Mortality in India: Causes and Healthcare Service Use Based on a Nationally Representative Survey. PLoS ONE 9(1): e83331. https://doi.org/10.1371/journal.pone.0083331

19. Puri A, Yadav I, Jain N. Maternal mortality in an urban tertiary care hospital of north India. Journal of Obstetrics and Gynaecology of India. 2011;61(3):280-285. doi:10.1007/s13224-011-0042-7.

20. Saini V., Gupta M. International Journal of Basic and Applied Medical Sciences. 4(1):59-64. ISSN: 2277-2103 [Online] Available at http://www.cibtech. org/jms. htm 2014 Vol. 4 (1) January-April, pp. 59-64/ Saini and Gupta

21. Association of Health Care Journalists, American Hospital Association. 2014

Dose Response Relationship of Child Centered Task Oriented Training in Children with Cerebral Palsy-A Randomized Controlled Study. Study Protocol

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ABSTRACT

Background: Growing child has innumerable capabilities which can impact his recovery if utilized appropriately. Physiotherapeutical approaches involve child in the treatment and give importance in framing of goals directed by the therapist. Child centered task oriented training completely gives importance to the child in planning and performing activities useful for his recovery.

Objective: Primary Objective of the study is to establish the dose response relationship of child centered task oriented training in children with Cerebral palsy. Secondary Objectives of the study: To establish dose response relationship of child centered task oriented training on Gross Motor function, Balance and quality of life in children with Cerebral Palsy.

Method: 80 children with Cerebral Palsy will be recruited and will be divided into two groups. Experimental group receives Child Centered Task Oriented Training; Control group receives Conventional physiotherapy. Both groups receive treatment for 45 minutes a day, 2 days a week for 15 weeks**.** Gross Motor Function, Balance and Quality of life will be measured Pre Treatment, at the end of 8 weeks and Post treatment.

Results: The study is expected to begin enrolment in June 2018. We anticipate that the experimental group receiving Child centered task oriented training study will have superior outcomes when compared to the control group. From clinical experience this is especially true for children with cerebral palsy as their will be more functional recovery when we give importance for them to choose what they want.

Conclusion: We believe this will be an important study to assess a novel method to improve the Functional recovery in children with cerebral palsy. It is simple to apply and monitor the progression.

Keywords: *Cerebral Palsy, Physiotherapy, Gross Motor Function, Balance, Quality of life, Rehabilitation, Child centered task oriented training.*

Introduction

Cerebral Palsy(CP) defines a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disturbances of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication and behaviour, by epilepsy and by secondary musculoskeletal problems[1]

Prevalence of cerebral palsy in developed countries is 2 per 1000 live births and neonatal survivors[2]. Cerebral palsy is classified on the basis of topography

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into monoplegia, diplegia, hemiplegia and quadriplegia[3]. Common impairments in CP include spasticity, contractures, weakness of muscles, speech and learning problems, cognitive and perceptual skills, impaired trunk control, visuomotor, balance and gait issues.[4]

Balance is defined as the ability to keep the center of mass over its base of support.[5] Children with cerebral palsy (CP) may have impaired muscle tone and abnormal postural control. Both affect functional balance capacity. As balance skills are an integral part of gross motor abilities, poor balance causes difficulties with functional tasks involved in activities of daily living.[6]

Quality of life is usually described as an overall assessment of wellbeing across various domains. It is essential in children with cerebral palsy to assess their life in several aspects, including physical wellbeing, social wellbeing, emotional wellbeing, school, access to services and acceptance by others.[7]

There are various approaches proved to be beneficial in the management of children with cerebral palsy including Neurodevelopmental Therapy (NDT), Roods approach, Proprioceptive Neuromuscular Facilitation (PNF), Constrained induced Movement Therapy and Task oriented approaches etc.

Task oriented training improves muscle strength and motor skill by repeated training of activity tasks of daily life. Child centered task oriented training is a method that supports interesting tasks for children with CP and leads to effective functional movements. Intentional repetitions of activity play's a major role in interacting child with environment. Childhood is the period where a child has to actively involve with the peer group either in school or while playing which enables him identify his caliber.[8]

In the field of physical activity dose refers to the amount of physical activity performed by the person. The total dose or amount is determined by three components. 1) Frequency is commonly expressed in sessions or bouts per day or per week. 2) Duration is the length of time for each session of any specific activity. 3) Intensity is the rate of energy expenditure needed to perform the activity to accomplish the desired function (aerobic activity) or the magnitude of the force exerted during strengthening physical activity.[9]

Physiotherapy plays a vital role in improving child's functional activities. Introduction of ICF into health domain had a great impact on functional disability. Many approaches in recent times focused on active participation of the child in his recovery. Growing child has innumerable capabilities which can impact his recovery if utilized appropriately. Physiotherapeutical approaches involve child in the treatment and give importance in framing of goals directed by the therapist. Child centered task oriented training completely gives importance to the child in planning and performing activities useful for his recovery. Literature suggests that 15 weeks' child centered task oriented training is effective in improving balance in children with Cerebral palsy.[8] There is dearth in the literature which clearly states whether 15 weeks is mandatory or improvement can be achieved by 8 weeks with said protocol in terms of Gross motor function, balance and quality of life.

Study Rationale: If a dose response relationship is established for improving gross motor function, balance and quality of life in children with cerebral palsy, based on the frequency of sessions and duration of each session and overall treatment time, it will have a great influence on disabled children, their families and society in accepting the treatment approach in the recovery of the child. Child enjoys the sessions as there are no restrictions and much commands. Family can involve in the treatment and help their children, Physiotherapist will get time in concentrating on more number of children at the same time.

Materials and Method

Study Participants and Setting: 80 Children with Cerebral Palsy of either gender between 6 to 10 years will be recruited from Justice KS Hegde Charitable Hospital, Mangalore.

Duration: The study will be carried over for a period of 3 years or till the entire sample size is completed.

Objectives

Primary Objective of the study is to establish the dose response relationship of child centered task oriented training in children with Cerebral palsy.

Secondary Objectives of the study: 1)To establish dose response relationship of child centered task oriented training on Gross Motor function in children with Cerebral Palsy.2)To establish dose response

relationship of child centered task oriented training on balance function in children with Cerebral Palsy.3)To establish dose response relationship of child centered task oriented training on Quality of life in children with Cerebral Palsy.

Inclusion and Exclusion criteria: Inclusion Criteria will be Children diagnosed with cerebral palsy,Either Gender with age 6 to 10 years, GMCS LEVEL I, II, III, Pediatric MMSC score of 24 or above. Exclusion criteria will beany structural deformities of spine hip and pelvis,Recent spinal surgeries(3months), Botulinum toxin in last 6 months, Children who are already under physiotherapy treatment or under anti-spastic, anti-epileptic medication.

Procedure: Approval taken from Institutional Ethical Committee of Nitte Institute of Physiotherapy. (NIPT/IEC/Min/014/2017-2018/dated 21-04-2018)

Children diagnosed with CP of either gender between 6 to 10 years will be recruited from physiotherapy department Justice KS hegde Charitable hospital and pediatric community outreach centers associated with Nitte University. Screening will be done for inclusion and exclusion criteria, study procedure will be explained to the parents and children, consent and ascent formswill be taken from parents and children respectively for participating in the study. Demographic data including age, gender, height and weight of children will be taken along with type of CP.

The included subjects will be divided in to two groups interventional group and control group by randomly dividing through computer generated table. Allocation will be done through sequentially numbered opaque sealed envelope.

Before the beginning of the study evaluation of balance through pediatric balance scale(PBS), Gross motor function through GMFM-88 and Quality of Life by CP QOL will be taken. The intervention group will receive child centered task oriented training for 45min per session, 2 times a week for 15weeks. Control group receives Standard Conventional therapy 30 min per session, two sessions per week for 15 weeks. Reassessment will be taken after completing 8th week and 15th week by an assessor with similar experience who is blinded for the intervention in both Experimental and control groups.

Research Design: Assessor blinded Randomized Controlled trial

Treatment: Child-centered task-oriented training program receives Vestibular set, Doing the splits on a hammock with swaying back and forth, side to side. On Swing Lying on one side with swaying back and forth, side to side. Playing quoits. On Roll Moving from side to side, rolling. Lying and rolling on a Physio ball, bouncing while sitting on a physioball. Keep balance while lying down, sitting, and standing on sway board. Activity while standing like Weight bearing, walking while holding a bar. Walking on a balance beam, spinning in one place. Activity on a mat (5 cm thick) like Rolling, weight bearing from side to side while sitting. Movement (pushing a ball), standing up from sitting, walking. Activity of proprioceptive sensibility like Joint movement (extensional movement), pulling toward themselves (tug-of-war, chin-up). Muscular strength of upper/lower extremities (dumbbell exercise).[8]

Participants in the control group receive conventional physical therapy focused on improving walking and balance through facilitation and normalization of movement patterns which involves General stretching, range of motion exercises, weight bearing, Balance and gait training.[9]

Outcome Measures: Gross motor Function Measure (GMFM-88),Paediatric Balance Scale (PBS), Cerebral Palsy Quality of Life (CP-QOL.

Results

The study is expected to begin in the month of June 2018. Ethical approval has been obtained for the study. CTRI registration is under process (already applied). From past literature and clinical experience Child centered Task oriented training may prove beneficial than control group.

Discussion

If the Dose response relationship is proved to be beneficial it can reduce the number of sessions a child has to visit the hospital, it can decrease the load on parent and therapist as the child is active participant. It can motivate the child to do more challenging tasks.

Conclusion

Child centered task oriented training is a simple program where no specific training is required. Child is active participant and will be motivated to perform the activities by himself. As the study is yet to start we are hoping for a good research project as we are going to conduct this study on large population and for 3 years.

Conflict of Interest: None

Source of Funding: The material required for the study will be provided by Nitte (Deemed to be University), Deralakatte, Mangalore.

REFERENCES

1. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M, Damiano D, et al. A report: the definition and classification of cerebral palsy April 2006. Developmental Medicine & Child Neurology. 2007;49:8-14.
2. Pakula A, Van Naarden Braun K, Yeargin-Allsopp M. Cerebral Palsy: Classification and Epidemiology. Physical Medicine and Rehabilitation Clinics of North America. 2009;20(3):425-452.
3. Tecklin J. Pediatric Physical Therapy. 4th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2008.
4. Shepherd R. Physiotherapy in paediatrics. 3rd ed. London: Pa: Elsevier/Butterworth-Heinemann; 1995.
5. Humphriss R, Hall A, May M, Macleod J. Balance ability of 7 and 10-year-old children in the population: Results from a large UK birth cohort study. International Journal of Pediatric Otorhinolaryngology. 2011;75(1):106-113.
6. Gan S, Tung L, Tang Y, Wang C. Psychometric Properties of Functional Balance Assessment in Children with Cerebral Palsy. NeuroRehabilitation and Neural Repair. 2008;22(6):745-753.
7. Waters E, Davis E, Mackinnon A, Boyd R, Graham H, Kai Lo S et al. Psychometric properties of the quality of life questionnaire for children with CP. Developmental Medicine & Child Neurology. 2006;49(1):49-55.
8. Kim Y, Lee B. Clinical Usefulness of Child-centered Task-oriented Training on Balance Ability in Cerebral Palsy. Journal of Physical Therapy Science. 2013;25(8):947-951.
9. Hagströmer M, Franzén E. The importance of physical activity and health for physical therapy. Physical Therapy Reviews. 2017;:1-8.
10. Salem Y, Godwin EM. Effects of task-oriented training on mobility function in children with cerebral palsy. NeuroRehabilitation. 2009;24(4):307-13.
11. Ko J, Kim M. Reliability and Responsiveness of the Gross Motor Function Measure-88 in Children with Cerebral Palsy. Physical Therapy. 2012;93(3):393-400.
12. Her J, Woo J, Ko J. Reliability of the Pediatric Balance Scale in the Assessment of the Children with Cerebral Palsy. Journal of Physical Therapy Science. 2012;24(4):301-305.

Association between Obesity and Elevated Blood Pressure among School Going Adolescents–A Cross Sectional Study

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ABSTRACT

Background: Adolescent overweight and obesity is an issue of epidemic proportions worldwide and it is related to elevated blood pressure among them. Hypertension in the context of overweight and obesity indicates a higher potential for cardiovascular disease (CVD) than is associated with either risk factor alone.

Objectives: To find out the relation between overweight / obesity and elevated blood pressure among school going adolescents.

Method: A school based cross-sectional study was conducted in 1800 adolescents of 10-16 years. Anthropometric parameters like BMI and blood pressure (BP) were measured using standard guidelines.

Results: Prevalence of elevated BP increased with increase of nutritional status. Elevated blood pressure was observed significantly higher among overweight/obese adolescents (P=0.000). As BMI and waist circumference increased, SBP and DBP increased and correlation was significant at 0.01 level.

Conclusion: All overweight/obese adolescents should be screened for hypertension and early intervention measures should be taken for weight reduction and BP control.

Keywords: *Hypertension, Teens, Body weight*

Introduction

Adolescent overweight and obesity is an issue of epidemic proportions worldwide.[1] An increasing number of studies suggest that adolescent overweight has been linked to comorbidities such as dyslipidemia, nonalcoholic steatohepatitis, diabetes mellitus type 2, obstructive sleep apnea, and hypertension.[2] Globally raised blood pressure is a major public health problem of concern because of its association with increased risk of cardiovascular diseases. It is the leading cause of death and disability worldwide and accounted for 9.4 million deaths and 7% of disability adjusted life years (DALYs) in 2010.[3] In India, it is the leading Non Communicable Disease (NCD) risk and estimated to be attributable for nearly 10% of all deaths.[4]

Overweight adolescents with hypertension have a higher likelihood of both elevated weight and BP persisting into adulthood.[5,6] In addition, some complications of obesity are independently related to elevated BP, such as obstructive sleep apnoea.[7] Studies have shown that the level and patterns of blood pressure among children and adolescents may vary from population to population.[8] The prevalence of childhood hypertension in various Indian studies range from 0.96% to 11.4% respectively.[9] Hypertension in the context of overweight and obesity indicates a higher potential for cardiovascular disease (CVD) than is associated with either risk factor alone. Results from the Bogalusa Heart Study demonstrated that multiple risk factors in childhood have multiplicative rather than additive effects on the severity of coronary artery lesions.[10]

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Owing to the relation between elevated blood pressure and overweight/obesity among adolescents and availability of limited data from Odisha, an attempt has been made to relate overweight/obesity and elevated blood pressure among school going adolescents.

Method

This school-based cross-sectional study was conducted from July to December 2013, in 12 schools a city of Eastern India. Sample size was calculated as 1800 with an estimated prevalence of overweight and obesity among school-going adolescents of 20%[11] with an allowable error of 10%, and a non-response rate of 10%. It was decided to cover about 10% (12 schools) out of the total 112 schools with random selection of 6 government and 6 private schools. From each school 150 students were selected (30 students from each class VI to X) by systematic random sampling from the attendance register. In case of absentees, the next roll number was included. Ethical clearance was obtained from Institutional ethics committee and permission from Principal/ Headmasters of the schools were taken prior to the study. Data collection was done by taking assent from adolescent students.

Anthropometric measurements *viz.* height, weight were measured. Height was measured by stadiometer to the nearest centimetre without shoes. Weight was measured with light clothing and without shoes to the nearest 100 grams. Blood pressure (BP) was measured with a standard clinical sphygmomano-meter with appropriate-sized cuffs, using a stethoscope placed over the brachial artery pulse. Body mass index (BMI) was calculated by weight in kg divided by height in meter square. All anthropometric measurements and data collection by questionnaire were done by two trained Medical Social Workers and BP was measured by four medical interns. BP was measured 3 times in right arm, sitting position at 0, 5 and 30 minutes and the average of readings was taken.

Adolescents were categorized according to their BMI using BMI percentile curves for Indian boys and girls from 5- 17 years as per recommendation of Khadilkar, *et al*[12] They were classified as: underweight (BMI <3rd percentile), normal (BMI 3rd percentile to adult equivalent of BMI <23), overweight (Adult equivalent of BMI 23 to adult equivalent of BMI 27.99) or obese (adult equivalent of BMI ≥ 28).

Normal BP was defined as SBP and DBP less than 90th percentile for sex, age, and height. Hypertension was defined as average SBP or DBP greater than or equal to the 95th percentile for sex, age, and height on at least three separate occasions. Average SBP or DBP levels that are greater than or equal to the 90th percentile, but less than the 95th percentile, had been designated as "high normal" and were considered to be an indication of heightened risk for developing hypertension.[13] In this study, Blood pressure was measured 3 times at 0, 5 and 30 minutes and the average of readings was taken.

Data were analyzed using SPSS 20.0 licensed to the institute. Independent samples *t* test was applied to compare the means, and the proportions were compared using Chi square test. *P* value of <0.05 was considered statistically significant.

Results

The age of adolescents varied from 10-16 years with a mean age (SD) of 13.03 (1.43) years with almost equal number of boys and girls, 51.7% and 48.3% respectively. Majority, 94.9% were Hindu and 68.94% belonged to general category, 72.6% of study subjects belonged to nuclear families. It was observed that 27.8% of adolescents were overweight/ obese (overweight – 16.4% and obesity – 11.4%).

Table 1: Elevated blood pressure among school going adolescents

Blood pressure status	No. (%)
Elevated SBP	29 (1.6)
Elevated DBP	82 (4.6)
Elevated both SBP & DBP	178 (9.9)
Not elevated	1311 (83.9)

Elevated blood pressure was observed among 16.1% school going adolescents. Among them, elevated SBP was found among 1.6%, elevated DBP among 4.5% and both SBP and DBP in 9.9% adolescents (Table I).

Table 2: Overweight/Obesity among students and elevated blood pressure

Nutritional status	Total Children	Prevalence of Elevated BP	Remarks
Underweight	86	4 (4.7%)	$X^2 = 135.075$ P = 0.000
Normal	1213	135 (11.1)	
Overweight	295	65 (22.0)	
Obese	206	85 (41.3)	

Table II shows that prevalence of elevated BP increased with increase of nutritional status and there is significant difference of elevated BP among different grades of nutritional status.

Table 3: Correlations between BMI and blood pressure

Variable	r	p value
BMI and Systolic blood pressure	.417	.000
BMI and Diastolic blood pressure	.332	.000

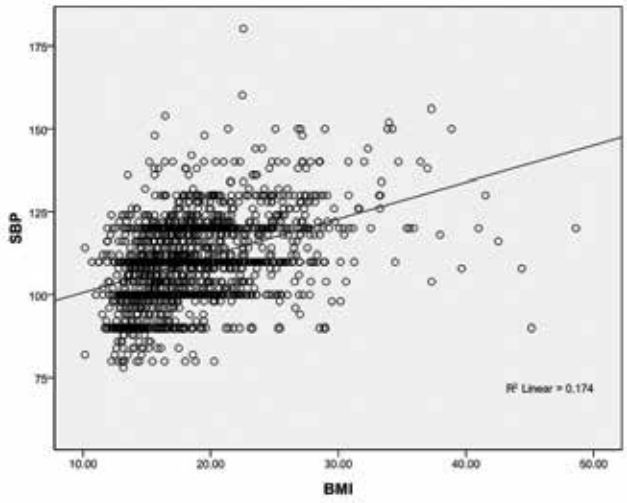


Fig. 1: Correlation between BMI and SBP

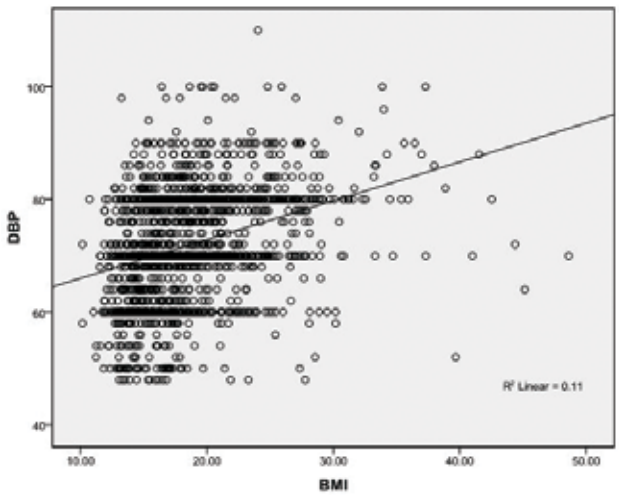


Fig. 2: Correlation between BMI and DBP

Elevated blood pressure was observed significantly higher among overweight/obese adolescents (P=0.000)). As BMI and waist circumference increased, SBP and DBP increased and correlation was significant at 0.01 level (Table III, Fig 1 and 2).

Discussion

In our study, elevated blood pressure was observed among 16.1% of school going adolescents. Among them, elevated SBP was found among 1.6%, elevated DBP among 4.5% and both SBP and DBP in 9.9% adolescents. The present study also revealed that prevalence of elevated BP increased with increase of nutritional status and there is significant difference of elevated BP among different grades of nutritional status. Elevated blood pressure was significantly higher among overweight/ obese adolescents (P=0.000). As BMI increased, SBP and DBP increased and correlation was significant at 0.01 level. In the study by Sundar JS et al in Chennai among 13-17year age group school children, prevalence of adolescent hypertension was 21.5% and one of the major determinants was found to be increased Body mass index.[14] In the study by Xi Lu et al in China BMI is positively correlated with SBP and DBP. Being overweight or obese greatly increased the risk of hypertension in Chinese children and adolescents.[15]

Conclusion

The prevalence of elevated blood pressure was significantly higher among overweight/obese adolescents and BMI was significantly correlated with blood pressure. All overweight/obese adolescents should be screened for hypertension and early intervention measures should be taken for weight reduction and BP control.

Conflict of Interest: NIL

Source of Funding: Siksha 'O' Anusandhan deemed to be University, Bhubaneswar

Ethical Clearance: Ethical clearance from the Institutional ethical committee, IMS & SUM Hospital was obtained.

REFERENCES

1. World Health Organization. *Interim Report of the Commissionon Ending Childhood Obesity*. Geneva: WHO; 2015 [cited April 1, 2015]; Available from: http://www.who.int/end-childhood-obesity/commission-ending-childhood-obesity-interim-report.pdf?ua=1. Accessed April 1, 2015.
2. Friedemann C, Heneghan C, Mahtani K, Thompson M, Perera R, Ward AM. Cardiovascular disease risk in healthy children and its association with body mass index: systematic review and meta-analysis. *BMJ*. 2012;345:e4759.
3. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease study 2010. Lancet. 2013;380:2224-60.
4. Patel V, Chatterji S, Chisholm D, Ebrahim S, Gopalakrishna G, Mathers C, et al. Chronic diseases and injuries in India. Lancet. 2011;377:413-28.
5. Singh AS, Mulder C, Twisk JW, van Mechelen W, Chinapaw MJ. Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev*. 2008;9(5):474–488.
6. Chen X, Wang Y. Tracking of blood pressure from childhood to adult- hood: a systematic review and meta-regression analysis. *Circulation*. 2008;117(25):3171–3180.
7. Horne RS, Yang JS, Walter LM, et al. Elevated blood pressure during sleep and wake in children with sleep-disordered breathing. *Pediatrics*. 2011;128(1):e85–e92.
8. Sung RYT, Lam YM, Leung SSF. Blood pressure in Hong Kong Chinese children: correlation with anthropometric data. JHK Coll Cardiol. 1994;2:99- 106.
9. de Onis M, Blossner M. Prevalence and trends of overweight among preschool children in developing countries. Am J Clin Nutr. 2000;72:1032-9.
10. Berenson GS, Srinivasan SR, Bao W, Newman WP 3rd, Tracy RE, Wattigney WA. Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. The Bogalusa Heart Study. *N Engl J Med*. 1998;338(23):1650–1656.
11. Ramachandran, A., Snehalata, C., et al Prevalence of overweight in urban Indian adolescents school children. Diabetes Res. Clin. Practice, 2002; 57:185-190.
12. Khadilkar VV , Khadilkar A V , Borade AB, Chiplonkar SA. Body mass index cut-offs for screening for childhood overweight and obesity in Indian children. Indian Pediatr. 2012;49:29-34.
13. The fourth report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents. U.S. Department of health and human services, National Institutes of Health, National Heart, Lung, and Blood Institute. www.nhlbi.nih.gov/health/prof/heart/hbp/hbp_ped.pdf.
14. Sundar JS, Adaikalam JMS, Parameswari S, Valarmarthi S, Kalpana S et al. (2013) Prevalence and Determinants of Hypertension among Urban School Children in the Age Group of 13- 17 Years in, Chennai, Tamilnadu. Epidemiol 3:130. doi:10.4172/2161-1165.1000130**.**
15. Xi Lu**,** Peng Shi**,** Chun-Yan Luo**,** Yue-Fang Zhou**,** Hui-Ting Yu**,** Chang-Yi Guo and Fan Wu. Prevalence of hypertension in overweight and obese children from a large school-based population in Shanghai, China. BMC Public Health 2013; **13**:24

The Effectiveness of Constraint-Induced Movement Therapy and Placing Technique of Bobath on Upper Limb Function in Hemiparetic Individual

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ABSTRACT

Objectives: The purpose of this study was to find the the effectiveness of Constraint-Induced Movement Therapy and Placing technique of BOBATH on upper limb function in hemiparetic individual**.**

Method: 44 subjects diagnosed with hemiparesis were included in this study with age group between 40-60 years. Participants with group A (22) were treated with CIMT and placing technique of bobath and group B (22) were treated with CIMT only. Before and after the treatment protocol the subjects were assessed for sensorimotor function by FMS, functional assessment by MAL scale and upper limb-hand co-ordination by BBT. These outcome measures were analysed.

Result: Pre-and post treatment protocol was analysed by using Wilcoxon matched pairs test and paired t test. Data analysis showed significance for FMS ($p=0.0115$) and extremely significance for BBT ($p < 0.0001$) and there is increase in number of subjects with value of 2.5 and 3 in group A than group B for MAL scale.

Conclusion: CIMT combine with Placing technique of Bobath has shown good improvement on upper limb function in hemiparetic individuals.

Keywords: *constraint-induced movement therapy, placing technique of bobath, fugl-meyer scale, motor activity log scale, box and block test, upper limb function.*

Introduction

Stroke or **Brain attack** is the sudden loss of neurological function caused by an interruption of the blood flow to the brain.[1] **Hemiparesis or weakness** is about 80 to 90% of all patients after stroke. It is a major contributor to disability.[2] The force which is necessary for initiating and controlling the movement, the hemiparetic individuals are not able to generate it. The degree of weakness is depending upon the location and the size of the brain injury.[3,4] There are timing abnormalities that contribute to impairment of coordinated motor sequence which prolonged the movement times.[5,6] Also, there is increase co-activation of agonist and antagonists that limits force production during voluntary movement.[7,8]

Constraint-Induced Movement Therapy is designed to promote increased use of the more affected upper extremity. The less affected hand was immobilised in a sling or mitten and emphasizes on intensive and repetitive task-oriented training of the more affected hand involved.[9] This was developed by Taub et al for the purpose of overcoming the learned non-use phenomenon of the affected upper extremity and achieving functional recovery.[10] Neurophysiological basis of CIMT is that, its include overcoming learned non-use and plastic brain re-organization.[11]

Placing technique of Bobath was used to teach the subject to hold his arm against gravity in the three

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positions illustrated. He was asked to hold his arm at various points throughout the range of downward motion.[12] This was developed by Berta Bobath. The patient has lost the normal adaptation of muscles against gravity during movements of his limbs.[13]

Recovery of upper limb function is important in quality of life in hemiparetic individuals as stroke can affect the patient's mobility, limits daily living activities, their participation in social activities and also their occupational activities. Paretic side resembles poor muscle strength under influence of synergistic pattern; it greatly affects the performance of functional activities**.** Because of these limitations patient became dependent. These all factors contribute overall low quality of life.[14] Hence, early interventions of the combination effectiveness of CIMT along with placing technique of Bobath on upper limb function in hemiparetic individuals have been explained in detail.

Method

Population: The subjects which willing to participate in the study was taken. Out of 44 subjects, 32 males/12 females participated in this study, written consent form was taken. The criteria for inclusion were: age between 40-60 years, brunnstrom stage 2 and above. Subjects were excluded if they had any other musculoskeletal problems such as shoulder hand syndrome, secondary adhesive capsulitis, Subjects with visual and auditory impairments psychological disorder.

Group A (22) received CIMT and placing technique of bobath and group B (22) received CIMT only. The treatment was given for 2 weeks; 5 sessions per week, ones a day. Post treatment assessment was taken after completion of 2 weeks. The protocol and the consent form were previously approved by protocol and ethical committee. Group A received placing technique was holding arm against gravity at various points throughout range of motion**.** And CIMT was task-oriented training to affected upper limb and restricting use of unaffected limb with help of mitten or glove; pick up the object, move or slide the object, turn on or off the light switch, turn pages of book, pull and push the door etc. Group B received CIMT. Subjects were treated with baseline treatment in addition for the groups; Active assisted exercises and active exercises**,** gripping exercises, strengthening exercises etc**.** each activity 10 repetitions.

Outcome measures:

Fugl-Meyer scale (FMS): The pioneering work of Twitchell and Brunnstrom[15,16] on motor recovery and behaviour following stroke led to the development of the FMA.[17] A three-point ordinal scale is used to measure impairments of volitional movement with grades ranging from 0 (item cannot be performed) to 2 (item can be fully performed). Specific descriptions for performance accompany individual test items. Subtest exists for UE function, LE function, balance, sensation, ROM, and pain. The cumulative test score for all components is 226 with availability of specific subtest score (e.g., UE maximum score is 66, LE score 34; balance score 14).

Motor Activity Log scale (MAL): Daily hand use was measured using the MAL, 28 a semi-structured interview relating to 30 common daily tasks and consisting of two assessment sub-scale for rating the affected upper extremity. The amount sub-scale addresses the amount of use; the how well sub-scale addresses the quality of movement. A six-point rating scale is used in each case (0= no use of affected extremity, 5= normal use).[18]

Box and Blocks test (BBT): Box and block test (BBT) was used to measure promptness in the upper limbs and hand coordination. In general, this test has been used to assess unilateral gross manual dexterity of the upper limbs. BBT verified the ability to reach for and grasp wooden regular hexahedrons (2.54 cm × 2.54 cm × 2.54 cm), and to transport them to the other side of a wooden box (53.7 cm × 8.5 cm × 27.4 cm) with a separation in the middle, releasing regular hexahedrons. The test measured the number of hexahedrons transferred to the other side for 60 seconds.[18,19]

Statistical Analysis

Statistical analysis was done manually as well as using the statistic software INSTAT so as to verify the results obtained. Data was analyzed using Wilcoxon matched pairs test and paired t test for within and between the groups.

Results

1. FUGL-MEYER SCALE:

MOTOR FUNCTION:

Table No. 1: Comparison of pre-pre-and post-post score of Fugl-Meyer scale

Group	Pre-Treatment	Post-Treatment
	Mean ± SD	**Mean ± SD**
A	34.31 ± 7.69	54.13 ± 5.86
B	33.90 ± 6.73	49.45 ± 5.82
'p'	0.4434	0.0115
'r'	0.2595	0.1800

Analysis of pre-and post-interventional data was extremely significant within the group with p value of <0.0001 for group A and group B. Statistics showed that post interventional data in between the group was significant with p value of 0.0115.

MOTOR ACTIVITY LOG SCALE:

GROUP A: (AMOUNT SCALE)

Table No. 2: Comparison of pre-and post-score of MAL (AS) Group A

		POST											
		0	1	1.5	2	2.5	3	3.5	4	4.5	5	T	(%)
	0		1	1	1							3	13.63%
	1			1	4	3	1					9	40.90%
	1.5					1	5					6	27.27%
	2						2	1	1			4	18.18%
PRE	2.5												
	3												
	3.5												
	4												
	4.5												
	5												
	T		1	2	5	4	8	1	1			22	
	(%)		4.54	9.09	22.72	18.18	36.36	4.54	4.54				

GROUP A: (HOW WELL SCALE)

Table No. 3: Comparison of pre-and post-score of MAL (HW) Group A

		POST											
		0	1	1.5	2	2.5	3	3.5	4	4.5	5	T	**(%)**
	0		2	1	1							4	18.18**%**
	1			1	3	3	1					8	36.36**%**
	1.5					1	5					6	27.27**%**
	2						2	1	1			4	18.18**%**
PRE	2.5												
	3												
	3.5												
	4												
	4.5												
	5												
	T		2	2	4	4	8	1	1			22	
	(%)		9.09	9.09	18.18	18.18	36.36	4.54	4.54				

GROUP B: (AMOUNT SCALE)

Table No. 4: Comparison of pre-and post-score of MAL (AS) Group B

		POST											
		0	1	1.5	2	2.5	3	3.5	4	4.5	5	T	(%)
PRE	0		2	1								3	13.63%
	1			3	6	1						10	45.45%
	1.5				1		3					4	18.18%
	2						1	1				2	9.09%
	2.5						2					2	9.09%
	3												
	3.5								1			1	4.54%
	4												
	4.5												
	5												
	T		2	4	7	1	6	1	1			22	
	(%)		9.09	18.18	31.81	4.54	27.27	4.54	4.54				

GROUP B: (HOW WELL SCALE)

Table No. 5: Comparison of pre-and post-score of MAL (HW) Group B

		POST											
		0	1	1.5	2	2.5	3	3.5	4	4.5	5	T	(%)
PRE	0		2	1								3	13.63%
	1			4	4	1						9	40.90%
	1.5				1		3					4	18.18%
	2				1		1	1				3	13.63%
	2.5						2					2	9.09%
	3												
	3.5								1			1	4.54%
	4												
	4.5												
	5												
	T		2	5	6	1	6	1	1			22	
	(%)		9.09	22.72	27.27	4.54	27.27	4.54	4.54				

BOX AND BLOCK TEST:

Table No. 6: Comparison of pre-pre-and post-post box and block test between groups

Group	**Pre-Treatment**	**Post-treatment**
	Mean ± SD	**Mean ± SD**
A	23.22 ± 8.39	37.36 ± 12.22
B	19.72 ± 6.34	25.18 ± 6.50
'p'	0.0662	< 0.0001
't'	1.983	5.003

Intra group statistical analysis was carried out by paired t test and showed extremely significant difference with p value <0.0001 for group A and for group B. Statistics showed that post interventional data in between the groups was extremely significant with p value of < 0.0001.

Discussion

The present clinical trial was conducted to find out the effectiveness of CIMT and placing technique of Bobath on upper limb function in hemiparetic individuals.

Total 44 subjects who were clinically diagnosed with hemiparesis fulfilling inclusion and exclusion criteria were taken in this study.

Statistical analysis was performed by using Instat-Graph pad. Among them, 24 had right sided hemiparesis (Group A = 10, Group B = 14) and 20 had left sided hemiparesis (Group A = 12, Group B = 8). Out of 44 subjects, 34 subjects had ischemic (Group A = 14, Group B = 20) and 10 subjects had haemorrhagic type of stroke (Group A = 8, Group B = 2).

Wilcoxon matched-pairs test used to analyse the effect of CIMT and placing technique of bobath on upper limb function on FMS within the group which showed that there was significant improvement in upper limb sensorimotor function with ($p < 0.0001$) and in between the groups there was significant improvement with p value of 0.0115 post treatment.

Intra group analysis of MAL (amount and how well) scale showed improvement and Inter group analysis of MAL (amount and how well) scale score, post interventional showed that there is increase in number of subjects with value of 2.5 and 3 in group A than group B.

Some previous study has evaluated the efficacy of modified CIMT in hemiparetic upper limb stroke patients. Rajkumar Yadav et al.[20] performed modified CIMT using FMA and MAL as outcome measures which showed significant improvement with FMA (p value <0.0001) and MAL amount scale (p value 0.0007), how well scale (p value 0.0015) at end of one month after treatment.

Paired t test used to analyse the effect of CIMT and placing technique of bobath on BBT for upper limb and hand coordination within and between the group. This showed there was extremely significant improvement with ($p < 0.0001$). Previous study by Jin A Yoon et al.[21] performed BBT as a one outcome measure which showed improvement with mean and standard deviation (21.88 ± 14.18) and (p value 0.012).

Some studies have evaluated the effects of CIMT combined with other treatments. Hyun Seok et al.[22] performed CIMT combined with visual biofeedback training for subacute stroke patients. Combination group did not show significant improvement than VBT only group. Another study by Yoon et al[21] performed CIMT combined with the mirror therapy for hemiplegic patients after stroke. Combination group showed more improvement than CIMT only group in the fine motor functions of the hemiplegic upper limb. In our study, combination of CIMT and placing technique of Bobath showed significant improvement in combination group as here sample size was larger than previous study.

The above findings were due to, CIMT shows Function-induced recovery (use dependant cortical reorganization) refers to the ability of nervous system to modify itself in response to changes in activity and environment. CIMT supports the concept of redundancy. The generation of new or redundant neuron pathways permits cortical map reorganisation and maintenance of function. This plastic brain re-organization which is effect of CIMT in improvement of hand function.

Placing technique of bobath has effect on the normal adaptation of muscles against gravity during movement of limbs which improves proximal arm control. This is due to; functional activity is not possible unless the patient can hold his arm at shoulder in any position while moving the elbow and hand independently. Placing technique supports the principle of Bobath which is facilitation versus inhibition. The normal postural reactions and normal patterns of movements should be facilitated along with reflex inhibitory movement patterns. Stimulation of proximal key points as a facilitation technique used in Placing.

So, we get independent and controlled movement which improves the overall quality of gross and fine upper limb function in daily living activities with combination of CIMT and placing technique of bobath.

Thus, it is proven that, early physical therapy interventions like placing technique of bobath along with CIMT hasten the prognosis and these are cost effective.

Conclusion

Based on the statistical result and interpretations it was concluded that, the present study provides evidence to support the use of placing technique of bobath with constraint-induced movement therapy which is more effective than constraint-induced movement therapy alone on improving upper limb function in hemiparetic individuals.

Conflict of Interest: There were no conflicts of interest in this study.

Source of Funding: This study was funded by Krishna Institute of Medical Sciences Deemed to Be University, Karad.

REFERENCES

1. Susan B. o'Sullivan, Thomas J. Schmitz, et al. Physical Rehabilitation 5th addition, chapter 18, stroke, page no. 705.
2. Bogousslavsky, J, et al: The Lausanne stroke registry: Analysis of 1,000 consecutive stroke patients. Stroke 19: 1083, 1988.
3. Colebatch, J, and Gandevia, S: The distribution of muscle weakness in upper motor neuron lesions affecting the arm. Brain 112:749, 1989.
4. Adams, R, Gandevia, S, and Skuse, N: The distribution of muscle weakness in upper motor neuron lesions affecting the arm. Brain 113:1459, 1990.
5. Dickstein, R, et al: Reaction and movement times in patients with hemiparesis for unilateral and bilateral elbow flexion. Phys Ther 73:37, 1993.
6. Buonocore, M, et al: Psychomotor skills in hemiplegic patients: Reaction time differences related to hemispheric lesion side. Neurophysiol Clin 20:203, 1990.
7. Gowland, C, et al: Agonist and antagonist activity during voluntary upper-limb movement in patients with stroke. Phys Ther 72:624, 1992.
8. Knutsson, E, and Martensson, C: Dynamic motor capacity in spastic paresis and its relationship to prime mover dysfunction, spastic reflexes and antagonistic co-ordination. Scand J Rehabil Med 12:93, 1980.
9. Mark, V, and Taub, E: Constraint-induced movement therapy for chronic strike hemiparesis and other disabilities. Restorative Neorol Neurosci 22:317, 2002.
10. Taub E, Miller NE, Novack TA, Cook EW 3rd, Fleming WC, Nepomuceno CS, et al. Technique to improve chronic motor deficit after stroke. Arch Phys Med Rehabil. 1993;74: 347-54.
11. Taub, E.& Uswatte G. (2000). Constraint induced manual therapy and massed practice. Stroke. 31:983-991.
12. BERTA BOBATH, MBE, FCSP, PhD (Hon Boston) Adult Hemiplegia: Evaluation and Treatment, third edition. Page no. 166
13. BERTA BOBATH, MBE, FCSP, PhD (Hon Boston) Adult Hemiplegia: Evaluation and Treatment, third edition. Page no. 28,29.
14. Samer M. Hatem et al. Rehabilitation of motor function after stroke: A multiple systemic review focused on techniques to stimulate upper extremity recovery. Frontiers in Human Neurosciences, September 2016, volume 10, article 442.
15. Brunnstrom, S: Motor testing procedures in hemiplegia based on recovery stages. J Am Phys Ther Assoc 46:357, 1966.
16. Brunnstrom, S: Movement Therapy in Hemiplegia. Harper & Row, New York, 1970.
17. Fugl-Meyer, A, et al: The post stroke hemiplegic patient, 1. A method for evaluation of physical performance. Scand J Rehabil Med 7:13, 1976.
18. Gitendra Uswatte et al, Reliability and validity of the upper-extremity Motor Activity Log-14 for Measuring Real-World Arm Use. stroke, 2005;36:2493-2496.
19. Thomas Platz et al, Reliability and validity of arm function assessment with standardized guidelines for the Fugl-Meyer Test, Action Research Arm Test and Box and Block Test. Clinical rehabilitation 2005
20. Rajkumar Yadav, Rajendra Sharma, s y Kothari, giganath Borah Efficacy of Modified Constraint-Induced Movement Therapy in the treatment of hemiplegic upper limb in stroke patients: a randomized controlled trial. Journal of Clinical and Diagnostic Research, 2016 Nov, Vol-10(11): YC01-YC05.
21. Jin A Yoon, et al. effects of constraint induced movement therapy and mirror therapy for patients with subacute stroke. Annals of Rehabilitation Medicine 2014;38 (4):458-466.
22. Hyun soek, Seung yeol lee, jinhoon Kim, jungho yeo, hyungdong kang. Can short- term Constraint-Induced Movement Therapy combined with Visual Biofeedback Training improve hemiplegic upper limb function of subacute stroke patients? Annals of Rehabilitation Medicine (arm) 2016;40(6):998-1009

Effect of Manual Positioning as an Adjunct to Intercostal Drainage tn Hydropneumothorax

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ABSTRACT

Objectives: The purpose of this study was to check the effect of manual positioning in supine lying, side lying, and semi fowler's (45^0)

Method: 30 subjects diagnosed with hydropneumothorax with ICD. were included in this study. These subjects were allocated by convenient sampling method. RR, spo2, CC of all the three levels. (axillary level,2nd intercostal space, xiphistrenum level.) Pretreatment and post treatment assessment was noted down according to the pulse oximeter and with measurement tape. These outcome measures were analyzed.

Result: Pre and post treatment protocol was analyzed by using paired t test. Data analysis showed extremely significance in group C for RR (p=<0.0001) spo2 (p=0.0006) CC axillary level (p=<0.0001) 2nd intercostal space (p=<0.0001) xiphistrenum level (<0.0001).

Conclusion: this study concludes that semi-fowlers position was more improved as compared to the two positions.

Keywords: *chest circumference, inter costal drainage, hydropneumothorax.*

Introduction

Hydropneumothorax is the abnormal presence of air and fluid in the pleural space. The knowledge of hydropneumothorax dates back to the days of ancient Greece when the Hippocratic succession used to be performed for the diagnosis. There have been tremendous advancements in the field of laboratory and radiological diagnosis and therapeutic management for pleural pathologies[1]. However, not many national or international literature are documented regarding hydropneumothorax. patient seen with straight line dullness, shifting dullness, splash, fullness of chest is seen. Causes iatrogenic: introduction of air during pleural fluid aspiration in effusion, presence of gas-forming organism, thoracic trauma.[2] For this purpose an intercostal tube draining is used to collect the fluid, blood, air, to allow the underlying lung to expand. itis a flexible plastic tube that is inserted through the chest wall and into the pleural space from the intrathoracic space. It is also known as a Bülau drain[3]. Pathophysiology if air, fluid, or blood enters the tiny space between the parietal and the visceral pleurae, the negative tendency to recoil will take over and the lung will collapse[4].the patient may experience minimal symptoms or significant shortness of breath.in addition the parietal pleurae are highly innervated with sensory nerves, so any change in the pleural space may be very painful as well. Pleuritic pain is character-sized by a sharp, stabbing pain during inspiration as the pleurae move[1]

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Manual Positioning

Manual positioning is prescribed to optimize cardiopulmonary function and oxygen transport is different from routine body positioning[18]. Positioning stimulate normal physiological effect of gravity and

change on oxygen transport are priority that is being upright and moving[19]. The distribution and ventilation in the lungs are primarily influenced by gravity and by manual positioning. Manipulating body positioning however alters both intraregional and interregional determinants ventilation perfusion and their matching. Changing a patient's position may not seem a dramatic technique, but some action often prevents recourse to more time consuming. Positioning is an integral part of all respiratory care. Sometimes knowledge and technology can't save patients complications and the stay in hospital is prolong.so, something simple as giving the patient manual positioning like supine lying, side lying, semi-fowler. Positioning generates significant alterations in arterial oxygenation in patients with unilateral lung diseases[16]. Change in positioning and the consequent change of the gravity effect, among other factors, cause change in respiratory function at different intensities[27]. body position changes to aid in the prevention of skin breakdown, to enhance secretion clearance, and to improve ventilation perfusion[9 10]. Proper positioning is also vital for providing comfort for patients who are bedridden or have decreased mobility related to a medical condition or treatment. Supine is the least helpful position for lung function[7, 8]. For ventilated patients the lateral position increases functional residual capacity and enhances gas exchange compared with supine. Patients who are confined to bed should spend a proportion of time on their side lying well forwards so that their diaphragm is free from abdominal pressure. Compared to supine this position not only increases lung volume, but also improves gas exchange and reduces the work of breathing. Airflow resistance is lower in side lying compared to supine[13]. Optimizing O2 transport is goal of positioning and mobilization[13]. the purpose of this study is to throw light on the effects of various manual body positioning in patients with inter costal drainage in hydropneumothorax. It affects the pulmonary volumes of the lung manual positioning reduces the collapsing of lungs. And improves the gas exchange.

Method

Population: Patients diagnosed with hydropneumothorax with ICD. volunteered participate in the study were taken as patients. Each of the patient was screened as per full filling the inclusion and exclusion criteria. and they were briefed about the study and intervention. Informed consent was taken from the patients. Initial through the assessment of each patients was taken as per the data collection sheet. Out of 30 subjects in group A 10 patients 8M 2F. Group B 10 patients 8M 2F. Group C 10 patients 6M 4F participated in this study, All the subjects were informed about the protocol and gave written consent before their participation. The protocol and the consent form were previously approved by protocol and ethical committee.

Interventions: Subjects who were referred to Krishna Hospital, Karad, and diagnosed as hydropneumothorax as an adjunct with ICD. The nature of study and intervention were explained to the subjects and those who were willing to participate were included. Before proceeding to intervention a written consent was taken from subject. A brief demographic data was recorded. By using random sampling method, the participants were divided into three groups by convenient sampling method.

In group A: Patients in this group were given supine position. But before the intervention base-line values were taken. RR, SpO2, CC measurement was taken. That is axillary level, 2nd inter costal space, and xiphisternum level was noted down. after that supine position was given. treatment was given continuously for 2 weeks,1 session per day. Each position was maintained 2 hours in the morning and 2 hours in afternoon. Post treatment assessment was taken after completion of 2 weeks.in supine lying pre-intervention. RR was 30 breaths per minute, SpO2 was 89%, Axillary level=32.5cm,2ndintercostal space=32cm, xiphisternum level=30cm. post intervention RR was 21 breaths per minute, SpO2 was 90%, Axillary level=32.7,2nd intercostal space=33, xiphisternum level=31.

In group B: Patients in this group were given side lying position. That is the opposite side. But before the intervention base-line values were taken. RR, SpO2, CC measurement was taken. That is axillary level, 2nd inter costal space, and xiphisternum level. Was noted down after that side lying position was given. treatment was continuously given for 2weeks 1 session per day. Each position was maintained 2 hours in the morning and 2 hours in afternoon. Post treatment assessment was taken after completion of 2 weeks.in side lying pre-intervention. respiratory rate was 23 breaths per minute, SpO2 was 84%, Axillary level=34cm,2nd intercostal space=35cm, xiphisternum level=35.5cm, post intervention RR was 22 breaths per minute, SpO2 was 92%, Axillary level=33.8,2nd intercostal space=35.7cm, xiphisternum level=35.2,

In group C: Patients in this group were given semi-fowler's position. But before the intervention base-line values were taken. RR, SpO2, CC measurement was taken. That is axillary level, 2nd inter costal space, and xiphisternum level. Was noted down after that semi-fowler's position was given. treatment was given continuously for 2 weeks 1 session per day. Each position was maintained 2 hours in the morning and 2 hours in afternoon. Post treatment assessment was taken after completion of 2 weeks.in semi-fowler's position pre-intervention. respiratory rate was 28 breaths per minute, SpO2 was 92%, Axillary level=33.5cm,2nd intercostal space=32cm, xiphisternum level=30cm. post intervention RR was 18 breaths per minute, SpO2 was 96%, Axillary level=34cm,2nd intercostal space=32.3cm, xiphisternum level=30.2cm

After 2-week posttest values was taken than by statistical analysis result was calculated.

Measurement Procedure: Respiratory rate is act of breathing, the normal RR is 16-20 breath per min. When patient was given manual positioned in supine lying, side lying, semi-fowler in intensive care unit the RR was noted down pre and post treatment according to the pulse oximetry and was checked by the therapist.

Peripheral oxygen saturation: It is an estimate of the amount of oxygen in the blood. More specifically it is the percentage of oxygenated haemoglobin (haemoglobin containing oxygen) compared to the amount of haemoglobin in the blood (oxygenated and non-oxygenated haemoglobin). when patient was positioned in supine lying, side lying, semi-fowler in intensive care unit the SpO2 was noted down pre and post treatment by pulse oximetry.

Chest circumference: Circumference of chest at the fullest part of the breast region. The measurement of chest was taken when patient was positioned in supine lying, side lying, semi-fowler position pre and post measurement was noted down. Axillary level,2ndintercostal space, xiphisternum level.

Result

Pre and post treatment protocol was analyzed by using paired t test.in group A RR not significant (p=0.2813) spo2 not significant (p=0.0944) CC axillary level significant (p=0.0087) 2nd intercostal space significant (p=0.0414) xiphisternum level significant (p=0.0106) in group B RR not significant (p=>0.9999) spo2 significant (p=0.0016) CC axillary level not significant (p=0.1637) 2nd intercostal space not significant (p=0.7895) xiphisternum level significant (p=0.0212) in group C RR extremely significant (p=<0.0001) spo2 extremely significant (p=0.0008) CC axillary level extremely significant (p=<0.0001) 2nd intercostal space extremely significant (p=<0.0001) xiphisternum level extremely significant (p=<0.0001)

Statistical analysis: The data was entered into Microsoft office excels 2007 and analyzed using instat software. Descriptive statistics were used to analyze for demographic data: Pre and post treatment protocol was analyzed by using paired t test.

As per the inclusion criteria 30 subjects were included in the study. During 2 weeks of protocol program 10 subjects in group A where given supine position .10 subjects group B where given side lying position. 10 subjects in group C where given semi-fowler position. Pre and post analysis were done for 30 subjects. In Table.1 Table.2 Table.3

Table 1: Pre and Post Interpretation of Group A

GROUP A	PRE TREATMENT	POST TREATMENT			INTERPRETATION
	Mean ± SD	Mean ± SD	't' value	'p' value	
RR	24.5 ± 3.171	22.9 ± 1.912	1.199	0.2613	Not significant
SPO2	87.7 ± 3.831	90.1 ± 2.685	1.869	0.0944	Not significant
CC (AXILLAY LEVEL)	34.15 ± 2.925	33.44 ± 2.717	3.339	0.0087	Very significant
CC (2ND INTERCOSTAL SPACE)	34.99 ± 3.044	34.22 ± 2.834	2.377	0.0414	Significant
CC (XIPPISTERNAL LEVEL)	34.85 ± 3.408	34.14 ± 3.157	3.215	0.0106	Significant

We studied three parameters among that axillary level P value was 0.0087 and 2nd intercostal space P value was 0.0414. xiphisternum P value was 0.0106. shows statistically significant except all other variables had no statistical significance

Table 2: Pre and Post Interpretation of Group B

GROUPB	PRE TREATMENT	POST TREATMENT			INTERPRETATION
	Mean ± SD	Mean ± SD	't' value	'p' value	
RR	23.9 ± 2.961	23.9 ± 3.107	0.000	>0.9999	NOT SIGNIFICANT
SPO2	87.3 ± 3.713	92.1 ± 2.079	4.431	0.0016	VERY SIGNIFICANT
CC (AXILLARY LEVEL)	36.35 ± 2.729	35.95 ± 2.689	1.517	0.1637	NOT SIGNIFICANT
CC(2ND INTERCOSTAL SPACE)	36.11 ± 2.786	36.07 ± 2.704	0.2750	0.7895	NOT SIGNIFICANT
CC (XIPPISTERNAL LEVEL)	36.58 ± 3.365	36.14 ± 3.440	2.787	0.0212	SIGNIFICANT

We studied three parameters among that xiphisternum P value was 0. 0212.shows statistically significant except all other variables had no statistical significance.

Table 3: Pre and Post Interpretation of Group B

GROUP	PRE TREATMENT	POST TREATMENT			INTERPRETATION
	Mean ± SD	Mean ± SD	't' value	'p'value	
RR	26.4 ± 2.547	19.4 ± 2.366	7.000	<0.0001	EXTREMLY SIGNIFICANT
SPO2	89.5 ± 3.440	95.7 ± 2.669	5.207	0.OOO6	EXTREMLY SIGNIFICANT
CC (AXILLARY LEVEL)	34.16 ± 2.348	33.3 ± 2.263	8.777	<0.0001	EXTREMLY SIGNIFICANT
CC(2ND INTERCOSTAL SPACE)	35.06 ± 2.875	31.55 ± 2.518	11.296	<0.0001	EXTREMLY SIGNIFICANT
CC (XIPPISTERNAL LEVEL)	34.86 ± 3.625	32.34 ± 3.220	6.978	<0.0001	EXTREMELY SIGNIFICANT

We studied three parameters among that respiratory P value was <0.0001. SPO2 P value was 0.0006 and. axillary level P value was <0.0001. 2nd intercostal space P value was <0.0001 and xiphisternum p value was <0.0001 which shows statistically significant.

Discussion

Hydropneumothorax has been common entity in this country. However, only isolated case reports have been documented on hydropneumothorax and there has been a dearth of large case studies[26].ICD was inserted in all the patients and drainage was required for longer than 30 days. This is usually the case seen in practice where the tube remains for longer time draining some amount of fluid due to underlying TB and most of these patients had bronchopleural fistula by prolonged air leak in ICD.but there are not such cases documented on effects of manual position in patients with hydropneumothorax with ICD. the principal goal of positioning is to optimize proper oxygen transport, to maintain RR, and CC. Our previous study examined the effect of positioning on oxygenation in patients with unilateral pleural effusions[23].in this study when patients are given positioning with ICD that is three positions are given. Ventilation and perfusion matching

and gas exchange can be theoretically augmented in the supine position by an increase in cardiac output. The SpO2 remains president even if the patient is in supine position and is supported by various studies. In all the three-position comparing the lung function in the semi-fowlers and supine positions suggests that the semi-fowlers position could be a therapeutic adjunct for improving gas exchange. Compared with the conventional supine positioning. Side lying positioning is frequently instituted for both medical and surgical patients.in patients after surgery arterial oxygen tensions were greater in the lateral position.in this position RR and SpO2 is not significant the axillary level and 2nd intercostal space is not significant, xiphisternum is significant and comparing side lying position the distribution of the blood flow and ventilation is similar to that of semi-fowlers position, there is two important concepts in this situation. Because the perfusion is gravity dependent the vertical hydrostatic gradient is smaller in the lateral that in semi-fowlers position[19].in regard to ventilation the dependent diaphragm is pushed higher into chest by abdominal contents compared with the nondependent lung diaphragm thus side lying can be used to enhance the efficiency of gas exchange and thereby to minimize or avoid the use of supplemental oxygen, in semi-fowlers position the FRC and tidal volume increase due to lowering of diaphragm and alveolar expansion due to lungs own weight. The semi-fowlers position maximizes lung volumes and capacities the FRC in side lying falls between that is supine position[24]. Semi-fowlers position is found to be better in improving TV and oxygenation in this the RR SpO2 and CC are significant and that's why semi fowlers position is proved to be more effective.

Conclusion

Thus, the above study it concludes that semi-fowlers position was more improved as compared to the two positions that is side lying, and supine lying position. in semi- fowlers position the FRC and tidal volume is increased and oxygen transport is better seen.so semi-fowlers position is significantly improved clinically and statistically in patients with hydropneumothorax as an adjunct with ICD.

So, this study supports the alternate hypothesis

Conflicts of Interest: There were no conflicts of interest in this study.

Source of Funding: This study was funded by Krishna Institute of Medical sciences Deemed to Be University, Karad.

REFERENCES

1. Emerson CP (Charles P. Pneumothorax: A Historical, Clinical and Experimental Study. [Baltimore, 1903]; 1903. p. 466. Available from: http://www.archive.org/details/pneumothoraxhist00emer. [Last cited on 2013 Oct 17].
2. *3Clarke, Christopher; Dux, Anthony (2017). Chest X-rays for Medical Students. John Wiley & Sons. p. 82. ISBN 9781119426721. Retrieved 6 November 2017.*
3. *Noppen, M. (2002). "Manual Aspiration versus Chest Tube Drainage in First Episodes of Primary Spontaneous Pneumothorax: A Multicenter, Prospective, Randomized Pilot Study". American Journal of Respiratory and Critical Care Medicine. 165 (9): 1240–1244.* doi:10.1164/rccm.200111-078OC. ISSN 1073-449X. PMID 11991872.
4. *Hippocrates (1847). Genuine Works of Hippocrates. Sydenham Society.*
5. *Capps Js, TylerML, RuschVW, PiersonDJ: Potential of chest drainage units to evacuate broncho-pleural air leaks. Chest 1985;88S:578. (classic for discussion of physics)*
6. Carroll PL: The principles of vacuum and its use in the hospital environment.1995. ohmeda, Inc.; Columbia, MD. (classic for discussion of physics)
7. Gordon p,Norton JM,Merrel R:Refining chest tube management: analysis of the state of practice. *Dimensions of critical care Nursing* 1995;14(1):6-13,(early evidence-based practice)
8. Hess D, Agarwal NN, Myers CL: Positioning, lung function, and kinetic bed therapy. Respir Care 1992, 37:181–197.
9. Clauss RH, Scalabrini BY, Ray JF, Reed GE: Effects of changing body position upon improved ventilation perfusion relationships. Circulation 1968, 37:214–217.
10. Ibanez J, Raurich JM, Abizanda R, ClaramontR,Ibaneze P, Bergada J. The effects of lateral positions on gas exchange in patients

with unilateral lung disease during mechanical ventilation. Intensive care med. 1981;7(5):231-4.

11. Elizabeth Dean. Effect of Body Position on Pulmonary Function**.** 1985;65(5).
12. Pryor J, bWeber BA. Physiotherapy for respiratory and cardiac problem. Second edition; 275.
13. 1 Kaneko K, Milie-Emili }, Dolovich MB, Dawson A, Bates V. Regional distribution non ventilation and perfusion as a function of body position. J Appl Physioll966; 21:767-76
14. BlairE, Hickam JB. The effect of change in body position on lung volume and intrapulmonary gas mixing in normal subjects. Coo Invest 1955; 34:383-98
15. Craig DB, Wahba WM, Don HF: Couture JG, Becldake MR. "Closing. Volume" and its relationship to gas exchange in seated and supine positions. JAppl Physiol1971; 31:717-21
16. ImlePC, klemic N 1989 changes with immobility and methods of mobilization In:Mackenzie CF(ed) chest physiotherapy in the intensive care unit.2nd edn.williams and wilkins,Baltimore,PP188-214
17. Antunes LC, Rugolo LM, Crocci AJ. Effects of preterm infant position on weaning from mechanical ventilation. 2003;79(3):239-44.
18. Donna Flowmeter D, Dean E. Principles and practices of cardiopulmonary physical therapy; 738-741.
19. Leblanc P, Ruff F, Milic-Emili J: Effects of age and body position on airway closure in man. J Appl Physiol 28:448-451, 1970

Goal Directed Physiotherapy Treatment Program for Improving Lower Extremity Function in a Child with Spastic Paraplegic Cerebral Palsy. A Case Report

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ABSTRACT

Spastic Paraplegic Cerebral Palsy (CP) involves both the lower limbs which effects balance and gait in children. These individuals are treated by physiotherapy with various means like Stretching, Strengthening, application of Neuro developmental Therapy (NDT), Task oriented approach and Proprioceptive Neuromuscular Facilitation (PNF) but there is no evidence on goal oriented physiotherapy program using various approaches for the treatment of spastic paraplegic CP children. Here we report a case of a 9-year-old boy diagnosed with spastic paraplegic CP, who underwent 5 months of Goal directed Physiotherapy Program. Documented improvements in muscle tone, balance and various parameters of gait reveal promising outcome. Hence we propose goal directed physiotherapy treatment might improve balance and gait in children with spastic paraplegic CP.

Keywords: *Spastic Paraplegic CP, Physiotherapy, Rehabilitation, NDT, PNF, Physical activity, Paediatric Rehabilitation.*

Introduction

Cerebral palsy describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of Sensation, Perception, Cognition, Communication and behavior: by epilepsy, and by secondary musculoskeletal problems.[1] Prevalence in general population is found to be 2-2.8/1000.[2]

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Children with spastic paraplegic cerebral palsy suffers with spasticity of lower limb muscles.[3] Spasticity associated with cerebral palsy can lead to musculoskeletal complications, such as contractures, pain and subluxation[4]. which affects the pelvic movements and thereby causing alterations in the lower trunk control which leads to functional limitations. Most of these limitations will affect the individual's physical, socially and emotional health leading to decline in their health related quality of life[5].

Children with spastic CP involving lower limbs have a very good upper limb function but the disability involving the lower limbs hinders the child to involve with the peer group and participate in various outdoor activities.[6]

There is a paucity in the literature related to spastic paraplegic cerebral palsy. Studies regarding goal directed treatment for improving lower limb function is also scarce. Bobath concept aims to improve Gross Motor Function and Postural Control by facilitating muscle activity through key points of control assisted

by the therapist.[7] The purpose of this case report is to explain the importance of goal directed physiotherapy program involving NDT, Task oriented approach, PNF Techniques in the treatment of balance and gait issues in children with spastic paraplegic CP.

Case Report: The child was a 9 years old boy diagnosed with Spastic Paraplegic Cerebral Palsy. He was presented with the following problems in Physiotherapy department of Justice KS Hegde Charitable Hospital, Deralakatte Mangaluru, Karnataka, India

Problem List: Spasticity Grade 1+ in Bilateral hamstrings, Hip adductors, hip flexors Grade 1 was noted in bilateral plantar flexors according to Modified Ashworth Scale. Final 10 degrees of active Extensor lag was noted in left knee joint and 5 degrees was noted in right knee joint Lacks ability to shift weight in standing posture, weakness of bilateral gluteus maximus, hip abductors, knee extensors, and dorsiflexors of ankle. Cannot maintain balance in activities involving transitions in positions. Difficulty in walking independently not even 5 steps, scissoring was noted in gait.

On the day 1, assessment was taken where spasticity was measured by modified ashworth scale (MAS)[8], balance was measured by Paediatric Balance Scale (PBS)[9], parameters of gait like Stride length (by chart paper), Cadence (number of steps using stop watch) and Speed (by 10 meter walk test) were measured. Child was at Stage III of GMFCS.[10]

Child was treated from June 2017 to October 2017 at Justice K S Hegde Charitable hospital for 1-and-a-half-hour session, 6 days a week for 5 months. Task oriented training and NDT were given together followed by strength training by PNF the next day.

Treatment goals are the basis for treatment planning, gives direction to the treatment and helps in planning discharge.

Long term goal (5 months): Mr. X will walk from his bedroom to washroom (approx.30 meters) at his home independently for five consecutive days without scissoring of lower extremities

Short term goal 1(6 weeks): Mr. X will stand independently by holding a ball with both hands and throw it in basket which is kept at 5 meters' distance without losing balance at least 5 times in 2 mins

Short term goal 2 (12 weeks): Mr. X will walk for 10 steps independently without scissoring while entering home from parking area

Treatment goal 1: Mr X will be able to maintain balance in kneeling position to lift a ball from ground and to throw it in a basket kept at 3 meters' distance.

Treatment goal 2: Mr. X will be able to do transition from kneeling to half kneeling with minimal assistance progressed to independent transition to get up to standing position.

Treatment goal 3: Mr. X will shift the weight on his left leg and place the right leg on a stool of 15 cms height with minimal support of therapist without losing balance

Treatment goal 4; Mr. X will walk 20 steps in parallel bar with mirror without support for 10 steps.[11]

Our first priority was to normalize the tone and it was achieved by prolonged lengthening with various functional positions it was followed with application of various strategies using principles of NDT in task oriented environment targeting transitions involving lower limb. Rhythmic initiation and dynamic reversals were used to strengthen the antagonists to achieve controlled mobility of lower limb in various positions. Task oriented training in standing and walking were used for improving balance. Treatment goals were given priority and timely achievement of treatment goals helped us to achieve short term goals and long term goals in time. Tone was measured by (Modified Ashworth Scale), stride length was measured by chart paper and ink, cadence was measured by using stop watch, gait velocity was measured by using 10 meters walk test, balance was measured by using Paediatric Balance Scale (PBS) on day 1 and after 5 months. Differences in outcome measures before and after treatment Shown in **table 1,** various treatment strategy is shown in **figure 1-4**.

Table 1: Outcome Measures before and after Treatment

Balance/gait parameters	Pre intervention	Post intervention
Stride length (Inches)	55	60
Cadence (Steps/min)	72	100
Gait velocity (m/min)	54	63
Paediatric balance scale	35	48

Fig 1: active lengthening of Hip adductors



Fig 2: Active lengthening of hip adductors and hamstrings



Fig 3: Lower extremity Balance training



Fig 4: Task oriented Training



Discussion

NDT is defined as a client centered, hands-on, problem solving approach. It is used in the management and treatment of children who have disorders of function, movement or postural control because of damage in their central nervous system. This approach uses clinical reasoning rather than a series of standardized techniques.[7] We have followed principles of NDT in International classification of functional disability and health (ICF) format. Long term goal is the therapist professional judgement of how long a client requires to achieve the functional task our long term goal was based on the priority of child and parents. To achieve the controlled mobility Spasticity, strength and range of motion of joints were our primary concern. To achieve them we used Task oriented strength training, focused on strengthening the lower extremities and practicing functional tasks similar to those the child performs during daily activities. Task-oriented training is defined as the repetitive training of significant, functional activities or element of such activities, to acquire well-organized and effective motor skill.[12] Proprioceptive Neuromuscular Facilitation (PNF) techniques stimulates the proprioceptors of the muscle to enhance the performance, flexibility and balance. PNF has been proven to be effective in improving the lower limb function in cerebral palsy children with spastic diplegia.[13] Rhythmic initiation and dynamic reversals were used to strengthen the weak muscles to achieve controlled

mobility of lower limb. Weight shifting training and controlled stepping helped in improving stride length. Improved strength of bilateral gluteas maximus, hip abductors and knee extensors along with dorsiflexors of ankle helped in improvement of cadence and gait velocity thereby balance. The child's active participation helped in the faster recovery. Accurate planning, continuity of treatment and periodic measurements of outcome helped in successfully achieving the treatment goals. Short term goals and Long term goals. Hence application of evidence based approaches by setting a proper goal and achieving it stepwise is proved to be beneficial rather than targeting the impairments alone.

Conclusion

Goal directed treatment using NDT, Task oriented approach and PNF proved to be effective in the management of children with spastic paraplegic cerebral palsy.

Conflict of Interest: None

Source of Funding: Nil

Consent Form: A written informed consent was taken from the parents of the child.

REFERENCES

1. Rosenbaum P, Paneth N, Levitan A, Goldstein M, Bax M, Damiano D, et al. A report: the definition and classification of cerebral palsy. Dev Med Child Neurol. 2007; 109:8-14.
2. Gladstone M. A review of the incidence and prevalence, types and aetiology of childhood cerebral palsy in resource-poor settings. Ann Trop Paediatr. 2010;30(3):181-196.
3. Minear W. L Special Article: A Classification of Cerebral Palsy. Pediatrics. 1956;18;841.
4. Krigger KW. Cerebral palsy: an overview. Am Fam Physician. 2006;73(1):91-100.
5. Gilson K M, Davis E, Reddihough D, Graham K. Quality of Life in Children with Cerebral Palsy: Implications for Practice. J Child Neurol. 2014; 8:1134-1140.
6. Bottcher L. Children with Spastic Cerebral Palsy, Their Cognitive Functioning, and Social Participation: A Review. Child Neuropsychol. 2010;16(3):209-228.
7. Zanon M, Porfírio G, Riera R, Martimbianco A. Neurodevelopmental treatment approaches for children with cerebral palsy. Cochrane Database Syst Rev. 2015; 11:1-4
8. Mutlu A, Livanelioglu A, Gunel M. Reliability of Ashworth and Modified Ashworth Scales in Children with Spastic Cerebral Palsy. BMC Musculoskelet Disord. 2008; 9:44
9. Franjoine M, Gunther J, Taylor M. Pediatric Balance Scale: A Modified Version of the Berg Balance Scale for the School-Age Child with Mild to Moderate Motor Impairment. Pediatric Physical Therapy. 2003;15(2):114-128.
10. Bodkin A, Robinson C, Perales F. Reliability and Validity of the Gross Motor Function Classification System for Cerebral Palsy. Pediatric Physical Therapy. 2003;15(4):247-252.
11. Stamer M H Functional Documentation: A Process for the Physical Therapist. 2nd ed. Texas: Therapy Skill Builders; p. 27-37.
12. Salem Y[1], Godwin EM. Effects of Task Oriented training on mobility function in children with cerebral palsy NeuroRehabilitation. 2009;24(4):307-13
13. Kumar C, Ostwal P. Comparison between Task - Oriented Training and Proprioceptive Neuromuscular Facilitation Exercises on Lower Extremity Function in Cerebral Palsy-A Randomized Clinical Trial J Nov Physiother. 2016;06(03):1-9

Effect of Motor Control Training on Isolated Lumbar Stabilizer and Core Muscle Training in Chronic Low Back Pain Patients

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ABSTRACT

Background: The segmental stability of vertebrae of lumbar spine is maintained by contraction of the transverse abdominis, multifidus. Impaired functioning of the deep stabilizers may lead to poor segmental stabilization which inclines to injury. In order to provide spinal stability it has been projected as a key component in controlling of chronic low back pain exercise programs aimed at augmenting strength, retraining these muscles.

Objectives: Present study was undertaken to compare the effect of motor control training on isolated lumbar stabilizer and core muscle training in chronic low back pain patients.

Method: A experimental study was conducted in and around hospitals of karad, following a simple random sampling technique on a sample size of 66. The participants were divided into 2 groups. Group A was given HMP, TENS, Motor Control Training and Group B was given HMP, TENS, Core Muscle Training.All outcome measure were assessed before starting and at the end of treatment. The data were analyzed using Instat Software.

Result: On comparing post treatment scores, there was no statistically significant difference in p values for NPRS and MODQ but was statistically significant difference in p values for Electromyography of transverse abdominis, multifidus.

Conclusion: The study concluded that Motor Control Training was found more effective than Core Muscle Training for patients with chronic low back pain.

Keywords: *Chronic low back pain, Motor Control Training, Core Muscle Training, Electromyography, Transverse Abdominis, Multifidus.*

Introduction

Low back pain is usually defined as pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal fold, with or without leg pain[1]. Low back pain is one of the major health problem, mostly accompanied with expensive care, disability and absenteeism[2]. Nearly 10-20% patients suffering from low back pain develop chronic low back pain (LBP more than 3 months)[3]. About 70% world's population will have low back pain at least once in their life.

The segmental stability of lumbar vertebrae is maintained by contraction of transverse abdominis, multifidus[4]. Studies on individuals with LBP shown lack

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control of deep trunk muscles[5]. All abdominal muscles control the stability of spine, but some researchers focused on function of deep muscles[6].

Generation of force against lumbar lordosis is because of pressure created by visceral cavity anterior to spine, results in increase the structural spine stability for a various posture, movements[7]. When lumbar spine positioned neutral, abdominal bracing maneuver produces contraction of antagonist muscle which increases spine stability[8].

Osteoarthritis (OA) a common disease of aged population and one of the leading causes of disability. Incidence of knee OA is rising by increasing average age of general population. Age, weight, trauma to joint due to repetiting movements in particular squatting and kneeling are common risk factors of knee OA. Several factors including cytokines, leptin, and mechanical forces are pathogenic factors of knee OA. In patients with knee pain attribution of pain to knee OA should be considered with caution. Since a proportion of knee OA are asymptomatic and in a number of patients identification of knee OA is not possible due to low sensitivity of radiographic examination. In this review data presented in regard to prevalence, pathogenesis, risk factors.

Keywords: Knee, Osteoarthritis, Pathogenesis, Prevalence

Increased superficial back muscle activity may result in limitation of tensile forces, motion of painful structures in back[9]. Multifidus repossession from inhibition related with LBP does not resolve pain, disability[10]. The cross-sectional area of multifidus is decreased in people with acute unilateral LBP from Ultrasound measurement[11]. Impaired functioning of the deep stabilizers may lead to poor segmental stabilization[12].

A major trend in rehabilitation is core strengthening. To maintain functional stability, the muscular control required around lumbar spine. It is a form of rehabilitation used as preventive regimen, performance -enhancing program for lumbar spine injuries. In training for prevention of injury as well as for treatment for various musculoskeletal conditions principle of core stability has been recognized widely[12].

The exercises were developed by Richardson and colleagues which play a major role in stabilizing the deeper muscles. Motor control exercises help to re -instruct the optimal control of the spine[13]. Based on the principle that individual with LBP have a lack of control of the trunk muscles the motor control exercise has been developed. The motor learning approach is used to retrain the optimum control and coordination of spine[5].

Increased activity of superficial trunk muscles in patients with recurrent LBP delays activation of deep muscles[14]. In individuals with chronic low back pain and a delay of the anticipatory postural adjustments of some trunk muscles in line,studies reported an over -activation of superficial para -vertebral muscles[15].

There were very less studies accessible in relation with the short term effect of motor control exercises and core muscle training on subjects with chronic low back pain. This study resulted in better planning and treatment of chronic low back pain. So there was need to study effect of motor control training on isolated lumbar stabilizer and core muscle training in chronic low back pain patients.

Materials and Method

A experimental study was conducted in and around hospitals of karad, following a simple random sampling technique on a sample size of 66. The participants were divided into 2 groups. The study protocol was started after being approved by institutional ethical committee of Krishna Institute of Medical Sciences Deemed To Be University, Karad. Subjects were selected according to inclusion criteria. Written informed consent was taken and the whole study was explained to them. Each subject was assessed for muscle activity, intensity of pain and activity limitation by using Electromyography, Numeric Pain Rating Scale and Modified Oswestry disability Questionnaire. The equipments used were (1)Electromyography machine, (2)Transcutaneous electrical nerve stimulation, (3)Hot moist pack. Inclusion criteria was as follows: (1)Subjects with chronic low back pain (low back pain more than 3 months). (2) Subjects with their pain intensity less than or equal to 5 on NPRS. (3)Age group: 30-60 years. Exclusion criteria

was as follows: (1)Subjects with red flag which suggests serious spinal pathology. (2)Subjects with neurological deficits. (3)Pregnancy. (4)Any past history of fracture in proximal femur or pelvis. (5)Previous medical history of vertebral fracture,congenital spine disorders. (6)Any recent surgery for LBP. (7)Subjects who are unable to go to prone position.

Group A: Motor control training[5], HMP and TENS.

First week: 8 reps: (1)Activation of transversus abdominis. (2)Activation of multifidus

Second week: 15 reps, 5-10 sec hold: (1)Strengthening of transversus abdominis. (2)Strengthening of Multifidus.

Group B: Core muscle training[8,12,22,23], HMP and TENS.

First week: 8 reps: (1)Abdominal hollowing. (2) Abdominal hollowing with leg lifts. (3)Pelvic tilt. (4) Pelvic bridging.

Second week: 15 reps, 5-10 sec hold: (1) Fall out. (2) Modified crunch. (3)Cat stretch. (4)Back extension.

All outcome measure were assessed before starting and at the end of treatment.

Result

NPRS- Intra Group comparison using Paired t- test.

Table 1: Comparison of pre and post NPRS score

Groups	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	P Value
A	4.09 ± 1.04	0.90 ± 0.76	<0.0001
B	4.00 ± 0.93	0.90 ± 0.84	<0.0001

In Group A, the mean NPRS score on pre and post intervention was 4.09 ± 1.04 and 0.90 ± 0.76. P value *<0.0001.*

In Group B, the mean NPRS score on pre and post intervention was 4.00 ± 0.93 and 0.90 ± 0.84. P value *<0.0001.*

NPRS- Inter group comparison using unpaired t- test

Table 2: Comparison of pre- pre and post- post NPRS score

Groups	Pre-intervention Mean ± SD	Post-intervention Mean ± SD
A	4.09 ± 1.04	0.90 ± 0.76
B	4.00 ± 0.93	0.90 ± 0.84
P Value	0.71	0.99

The table shows comparison of mean and standard deviation of NPRS scores in Group A and B. Pre and post intervention shows that there is no significant difference in the NPRS scores.

MODQ- Intra Group comparison using Paired t-test.

Table 3: Comparison of pre and post MODQ score

Groups	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	P Value
A	30.48 ± 10.92	2.78 ± 2.95	<0.0001
B	24.72 ± 11.64	3.39 ± 3.58	<0.0001

In Group A, the mean MODQ score on pre and post intervention was 30.48 ± 10.92 and 2.78 ± 2.95. P value *<0.0001.*

In Group B, the mean MODQ score on pre and post intervention was 24.72 ± 11.64 and 3.39 ± 3.58. P value *<0.0001.*

MODQ- Inter group comparison using unpaired t- test

Table 4: Comparison of pre- pre and post- post MODQ score

Groups	Pre- intervention Mean ± SD	Post- intervention Mean ± SD
A	30.48 ± 10.92	2.78 ± 2.95
B	24.72 ± 11.64	3.39 ± 3.58
P Value	0.04	0.45

The table shows comparison of mean and standard deviation of MODQ scores in Group A and B. Pre and post intervention shows that there is no significant difference in the MODQ scores.

Electromyography- Intra Group comparison using Paired t- test

Table 5: Comparison of pre and post Electromyography score

Electromyography	Groups	Pre- intervention Mean ± SD	Post- intervention Mean ± SD	P Value
Right Transverse Abdominis	A	231.55 ± 107.29	512.06 ± 136.29	<0.0001
	B	244.27 ± 115.17	430.88 ±165.67	<0.0001
Left Transverse Abdominis	A	238.91 ± 123.18	545.30 ± 133.28	<0.0001
	B	255.94 ± 117.69	425.06 ±165.61	<0.0001
Right Multifidus	A	248.21 ± 94.06	539.18 ± 131.16	<0.0001
	B	274.09 ± 121.15	413.27 ±153.10	<0.0001
Left Multifidus	A	306.52 ± 172.95	548.42 ± 161.99	<0.0001
	B	307.06 ± 138.31	445.21 ±149.01	<0.0001

With Electromyography (Right Transverse Abdominis) score, P value *<0.0001* shows that there was significant difference in pre- post intervention scores, in both Group A and B.

With Electromyography (Left Transverse Abdominis) score, P value *<0.0001* shows that there was significant difference in pre- post intervention scores, in both Group A and B.

With Electromyography (Right Multifidus) score, P value *<0.0001* shows that there was significant difference in pre- post intervention scores, in both Group A and B.

With Electromyography (Left Multifidus) score, P value *<0.0001* shows that there was significant difference in pre- post intervention scores, in both Group A and B.

Electromyography- Inter group comparison using unpaired t- test

Table 6: Comparison of pre- pre and post- post Electromyography score

Electromyography	Groups	Pre- intervention Mean ± SD	Post- intervention Mean ± SD
Right Transverse Abdominis	A	231.55 ± 107.29	512.06 ± 136.29
	B	244.27 ± 115.17	430.88 ±165.67
	P Value	0.64	0.03
Left Transverse Abdominis	A	238.91 ± 123.18	545.30 ± 133.28
	B	255.94 ± 117.69	425.06 ±165.61
	P Value	0.56	0.00
Right Multifidus	A	248.21 ± 94.06	539.18 ± 131.16
	B	274.09 ± 121.15	413.27 ±153.10
	P Value	0.33	0.00
Left Multifidus	A	306.52 ± 172.95	548.42 ± 161.99
	B	307.06 ± 138.31	445.21 ±149.01
	P Value	0.98	0.00

With (Right Transverse Abdominis) score, p value less than 0.05 shows that there was significant difference in the post intervention scores of Group A and B.

With (Left Transverse Abdominis) score, p value less than 0.05 shows that there was significant difference in the post intervention scores of Group A and B.

With (Right Multifidus) score, p value less than 0.05 shows that there was significant difference in the post intervention scores of Group A and B.

With (Left Multifidus) score, p value less than 0.05 shows that there was significant difference in the post intervention scores of Group A and B.

Discussion

The aim of this study was to determine effect of motor control training on isolated lumbar stabilizer and core muscle training in chronic low back pain patients. This study was experimental study with Group A subjects were guided to perform motor control exercises and Group B performed core stabilization exercises.

We found that there is reduction in pain, disability and also good improvement in muscle activity. The pain reduction in Group A was not statistically significant when compared to Group B with p value 0.99. The reduction in the disability in Group A was not statistically significant when it was compared with Group B score with p value 0.45. But when activity of muscle is compared in both the groups then there was significant improvement in Group A than Group B with $p<0.05$.

The enhancement in pain, disability may be because of renovation in strength, endurance level in both the groups or because of combination of learning and training[5]. The pain is due to increased activity of superficial trunk muscles and motor control training improves the activity of deep trunk muscles which ultimately reduces this over- activation. Thus we can assume that there is decrease in cortico- spinal drive to motor neurons of superficial MF and helps in to normalize anticipatory postural adjustments[15]. There is change in the trunk muscle behavior during functional task reduces load and enhances quality of movement. Plastic changes at the brain is because of exercising the individual muscle (isolation)[5].

The present study has determined that the rehabilitation of specific muscles with Motor Control exercises on pain and disability has proven to have a superior outcome rather than the Core Stabilization exercise program to diminish back pain and disability in chronic low back pain subjects. Most of all the observations are made in brief period.

Conclusion

Present study concludes that motor control training was found more effective than core muscle training exercise program for patients with chronic low back pain.

Conflicts of Interest: This study can be carried out with motor control exercise in functional activities, periodic assessment of outcome measures, Needle Electromyography and large sample size can also be taken into consideration.

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical science, deemed University, Karad.

Source of Funding: Source of funding is Krishna institute of medical sciences deemed University, Karad.

REFERENCES

1. Hodges. Spinal Control: The rehabilitation of back pain, 3rdedition; 2013.
2. Leonardo O. P. Costa, Christopher G. Maher, Jane Latimer, Paul W. Hodges, Motor Control Exercise for Chronic Low Back Pain: A Randomized Placebo-Controlled Trial. 2009; Vol 89, No 12 Physical Therapy f 1275.
3. Asghar akbari, Samane Khorashadizadeh, Gholam Abdi. The Effect of Motor Control Exercises on Lumbar Local Stabilizing Muscle Thickness: Randomized Controlled Trial of Patients With Chronic Low Back Pain. 2008; Journal of Back and Musculoskeletal rehabilitation 21, 105-112.
4. Larissa Cavichioli Mendes Ferreira, Amanda Costa Araujo. Association between abdominal muscles recruitment with clinical outcomes and prognostic risk in patients with chronic non-specific low back pain: a preliminary study. 2015; DOI: 10.1590/18092950/14560723012016
5. Vikranth G. R, Lawrence Mathias, Mohd Meraj Ghori. Effectiveness of core stabilization exercises and motor control exercises in patients with low back ache. June 2015; Int J Physiother. Vol 2(3), 544-551, ISSN: 2348–8336.
6. Julie A. Hides, Carly L. Boughen, Warren R. Stanton, A Magnetic Resonance Imaging Investigation of the Transversus Abdominis Muscle During Drawing- in of the Abdominal Wall in Elite Australian Football League Players With and Without Low Back Pain. 2010; J Orthop Sports Phys Ther. 40: 4-10.
7. Paul W Hodges, Carolyn Richardson. Insufficient Muscular Stabilization of The Lumbar Spine Associated With The Low Back Pain, 1996; SPINE Vol 21, No 22, pp 2640-2650.

8. Shivapuji Basavaraj. To Compare The Effectiveness Of Abdominal Bracing Activation Strategy Versus Abdominal Hollowing Activation Strategy In Subjects With Chronic Low Back Pain- A Randomized Controlled Trial. 2011; sdmmedicalcollege.org>uploads>files.

9. David MacDonald, G. Lorimer Moseley, Paul W. Hodges. Why do some patients keep hurting their back? Evidence of ongoing back muscle dysfunction during remission from recurrent back pain. 2009; PAIN 142 183- 188.

10. Julie A. Hides, Carolyn Richardson, Gwendolen A Jull. Multifidus Muscle Recovery is not Automatic After Resolution of Acute, First-Episode Low Back Pain. 1996; SPINE Vol 21, No23, pp 2763- 2769.

11. Paulo H. Ferreira, Manuela L. Ferreira, and Paul W. Hodges, Changes in Recruitment of the Abdominal Muscles in People With Low Back Pain. 2004; SPINE Vol 29, No 22, pp 2560- 2566, Lippincott Williams & Wilkins, Inc.

12. Venu Akthota MD, Scott F, Nadler DO, Core Strengthening. Arch Phys Med Rehabil. 2004; 85(3 Suppl 1): S86- 92.

13. Arun balasubramaniam and mahadevi bharathi, Effect of motor control exercises on psychological variables in chronic low back pain in computer professionals. 2016; Int J Pharm Bio Sci 2016 Oct ; 7(4): (B) 490- 494.

14. H. Tsao, M. P. Galea, P W Hodges, Reorganization of The Motor Cortex is Associated With Postural Control Deficit In Recurrent Low Back Pain. 2008; Brain 131 2161- 2171, doi10.1093/brain/awnl54.

15. Hugo Massé- Alarie, Louis- David Beaulieu, Richard Preuss, Influence of para- vertebral muscles training on brain plasticity and postural control in chronic low back pain. 2016; Scandinavian Journal of Pain 12, 74- 83.

16. Takuya Miura, Masanori Yamanaka. The Effect Of Activation Of The Deep Abdominal Muscle On The Activity Of The Superficial Abdominal Muscle. A Comparison Of Healthy Control With The Patients With Low Back Pain. ORS 2014; Annual Meeting, Poster No.1609.

17. Assis, RO, Souza, RR., Araujo, RC., Study On Placing Electromyography Electrodes On Lumbar Multifidus Muscle. 2011; J. Morphol. Sci.,Vol 28, No 1, p 46- 51.

18. Adalgiso Coscrato Cardozo, Mauro Goncalves, Assessment of low back pain by surface EMG. 2012; Application of EMG in clinical and sport medicine, Dr. Catriona Steele. ISBN: 978- 953- 307- 798- 7.

19. Amelia Williamson, Barbara Hoggart, Pain: A Review Of Three Commonly Used Pain Rating Scales. 2005; Blackwell Publishing Ltd. Journal Of Clinical Nursing, 14, 798- 804.

20. Jeremy C.T. Fairbank, Paul B. Pynsent, The Oswestry Disability Index. 2000; SPINE Vo l25, No 22, pp 2940- 2953.

21. Veena Joshi, Pradyumna Pai, Aditi Kulkarni, Validity and Reliability of English and Marathi Oswestry Disability Index (ODI) in Indian population. 2013; Article in Spine 38(11), DOI: 10.1097/BRS.0b013e31828a34c.

22. David Grisaffi Women's Issue, Posture and Core Conditioning. http://www.sweetpoison.com/health-articles/issue36.php.

23. Carolyn Richardson, Gwendolen Jull, Paul Hodges. Therapeutic Execise For Spinal Segmental Stabilization in Low Back Pain, Scientific Basis And Clinical Approach. 1993; 3rd edition.

Enterprise Gamification: A Motivational Drive at Workplace

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ABSTRACT

Gamification, a strategy derived from game design for a non-game environment for specific cause, is the application of elements of game playing to encourage engagement with a product or service. This strategy widely taps the employees' curiosity quotient and it helps in solving huge crises in simple manner. Gamification is thus transforming business models by creating new ways to broaden relationships, making longer-term engagement, and driving customer and employee loyalty. Globally, the concept of gamification is widely adopted in various fields such as marketing, education, medical, human resources and real estate business. Almost every enterprise had tried this concept either for employee management or client management. However in India it is still in its nascent stage and there is a lot of scope to understand the application of gamification in the Indian context. This study would help in understanding the role of gamification as a motivator in the work place with special reference to millennial employees in Chennai which is one of the "IT Hubs" in India. The present study attempted to investigate the perception of the employees on Enterprise Gamification and its impact on employee motivation. The findings of the study reveal that gamification is a vital tool in keeping the millennial employees motivated.

Keywords: *Perception, Enterprise Gamification, Millennials, Motivation*

Introduction

Gamification is the application of typical elements of game playing (e.g. point scoring, competition with others, and rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service. Gamification is a strategy derived from game design for a non-game environment for specific cause. It invokes new solution to many problems in business. Its techniques are intended to influence people's natural desires for socializing, learning, mastery, competition, achievement, status and self-expressions as game or play. Gamification is thus transforming business models by creating new ways to broaden relationships, making longer-term engagement, and driving customer and employee loyalty. Gamification can potentially resolve the basic issues encircling employees and employers. The first key issues resolved through gamification are communication among employees. For instance, the communication goals can be specified for each employee and they can be rated in meeting these goals (during customer interactions or communications within teams) per week and those communicating well or scoring high can be rewarded. Secondly**,** Gamification can find a prominent role in measuring productivity and performance. A performance reviewing tool (framed under Gamification) can keep track of the specific employees' performance over a long period of time. It also helps in training and boosting work culture.

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Review of Literature

Enterprise Gamification is not just a mechanism that makes workplace more enjoyable. It drives tangible, hard business benefits and is a powerful tool in engaging employees to achieve successful digital transformation[1]. Organizations are now more compelled to ride gamification to bring about a radical change in employee, vendor, and customer experience. Similar to several evidences they had also stated that in the decade to come, several emerging technologies, including gesture

control, head-mounted displays and augmented reality will mature[2].In addition organizations have introduced legal and ethical considerations, and have also provided pointers to other resources to continue the journey in designing gamification that works[3]. It is cautioned that the user engagement in enterprise gamified system is a complex which contains many aspects[4]. Gamification at work has been described as the engagement through innovative interactions, besides the production of competitive knowledge[5].A well designed gamification has had a powerful impact on improving the intrinsic motivation of the employees within the organizations. Gartner Inc had discussed about the "sweet spot" where many companies fail to understand it while designing a gamified application. The sweet spot refers to a situation where in the business objective and player objective if overlaps and the player will automatically get motivated in reaching the goal[6].Deloitte Leadership academy had a gamified application, an online program for training its own employees as well as its clients. It also emphasized that those executives who are interested in implementing this popular new tool should think of gamification as a business improvement initiative and start asking business-related questions such as details about business goals, target audience and the method of tracking the success[7]. Gamification advocates increased engagement as one of the primary benefits of the approach. Students play online games for hours and gamification aim to tap into that same deep and persistent motivation[8]. Gamification is considered as design principle that helps in changing the employees and customer's behavior, which increases the employee engagement[9]. The gamification can be designed based on its six user types such as Philanthropists, Socializers, Achievers, Freespirits, Players and Disruptors. These types of users get motivated for different reasons and this framework of six user is called as Hexad framework[10].While framing gamification strategies for GenY employees it is essential that there must be personalization and should be relevant to their work in addition to creating a meaningful expirence[11]. A successful gamification tool will lead to the stronger relationship between employer and employee to a new level. It is based on feedback, recognition, status and self-fulfillment which go beyond frames of wages and labor contract in a workplace[12].A caution note for strategy makers is that a wrong gamification might create a set of false incentives and can ruin motivation. Therefore implementation of the strategy requires prior research, which is a cost consuming process[13].It is essential to follow a five step process. The Management should gain a positive employee perception, it is essential to assess employees psychological needs, clarity in communicating about gamification to employees before implementation is very important, implementing gamification in relation to the psychological needs assessment, assessing and adjusting gamification if appropriate[14].Gamification implementation thus helps in understanding the behavior of the employees and the dynamics of stress management for the same[15].

Background of the study

Globally, gamification concept is widely spread in various fields such as marketing, education, medical, human resources and real estate business. Almost every enterprise had tried this concept either for employee management or client management. However in India it is still in its nascent stage and there is a lot of scope to understand the application of gamification in the Indian context. *Secondly,* millennial employees have penetrated in the working environments who are generally technology and game lovers. Consequently, HR brains have adopted gamification as a magical wand to solve problems even though it is an expensive strategy. The transformation in workplace through new trends and strategy is inevitable with a contradicting and a challenging phase inbuilt in the system especially in countries like India. In India, the workforce mostly comprises of millennials and within 2020 it will comprise of three different generation cohorts, Hence, an understanding of the gamification and its preference is very essential especially in Chennai which is one of the "IT Hubs" in India . The present study attempts to investigate the perception of the employees on Enterprise Gamification and its impact on employee motivation.

Objectives of the Study

- To identify the perception of millennial employees on Enterprise gamification.
- To investigate on the influence of certain demographic factors in the perception of the employees on Enterprise gamification.
- To explore the impact of Enterprise gamification on the employee motivation.

Materials and Method

Methodology of a research is a structural framework for any research paper which is a combination of

material collected and methods used in a particular research paper. Descriptive research was designed for the study and opportunity sampling was used to select the respondents. The data was collected through a structured questionnaire from 156 millennial employees from various organizations such as Amazon, Accenture, Cognizant, Delloitte, Ernst Young, Oracle, ICICI, RBS, Zoho, HCL, Vodafone, Infosys, Wipro, TCS, and Goldman Sachs. The data collected was coded in SPSS 20.0 version, and then tested for Cronbach's Alpha Reliability (0.8503) which ensured data reliability. KMO test for sampling adequacy (81%) showed that the sample size was adequate. Statistical tools such as descriptive Statistics, Chi-square and Regression were used to analyse the data collected.

Results & Discussion

Demographic Profile of the Respondents: Table 1 reveals that out of 156 respondents, 49% of the respondents were male and 51% female; 58% of the respondents were team members and a minimum of 11% were managers, 82 %were graduates, and 4.5% are professionals; 76.3% of the respondents were with less than 5 years of work experienceand5.8% with more than 10 years of experience.

Table1: Demographic profile

Category	Option	Respondents	Percentage (%)
Gender	Male	77	49
	Female	79	51
Designation	Team Member	90	58
	Team Leader	18	11
	Manager	18	11
	Executive	30	20
Highest Educational Qualification	Diploma	9	5.8
	Bachelor's Degree	128	82
	Master's Degree	12	7.7
	Professionals	7	4.5
Experience (in years)	0-5	119	76.3
	6 -10	28	17.9
	Above 10	9	5.8

Source: Primary Data

Perception of the Employees on Gamification: The data on the perception of the employees on gamification were collected and analysed using descriptive statistics and is presented Table 2.The study revealed that most of the respondents perceive that social media should play an active role in enhancing the usage of Enterprise gamification (mean 4.11).The employees opined that the gamification strategy should have built in challenges and competition in its process (4.04).

Table 2: Employees perception on Gamification

Particulars	Mean	Ranking
I enjoy seeing my name in the scoreboard	3.87	6
Gamification process should have different levels to explore the talents	3.95	5
Rewards in gamification are considered significant for performance	3.86	7
I Prefer for collecting virtual/ online badges	4.00	3
Points should be awarded for different activities in gamification	3.94	4
Preference for built in challenges & competition in the gamification process	4.04	2
Community links with social media should play an active role	4.11	1

Source: Value Computed from primary data

The employees prefer badges (4.00), Points (3.94), and names in the scoreboard (3.87) as rewards fortheir work in the gamification process. They also perceived that gamification process should have different levels to explore their talents (3.95). It can be inferred that the respondents agreed that communities linked with social media should play an active role in the gamification process.

Demographic Factors and Perception on Enterprise Gamification as a Motivational Drive: The association between certain demographic variables and the perception of the respondents on Enterprise Gamification were tested using chi-square analysis.

H_0: There is no association between demographic factors and perception on gamification as a motivational drive

H_1: There is association between demographic factors and perception on gamification as a motivational drive

Table 3: Pearson Chi Square

Demographic variables	Chi square value Gamification–Motivational Drive
Gender	0.002*
Experience	0.000*
Occupation	0.003*
Education	0.304

*significance at 5 % level

The analysis (Table 3) showed a significant association between Gender, Experience and Occupation on the perception that gamification is a motivational drive. There is no association between Education and the perception on enterprise gamification as motivational drive. The employees with different work experience had same kind of perception towards enterprise gamification. Occupation of the employees had association with the perception on enterprise gamification especially when enterprise gamification challenges people's skills. Ultimately there is no association between education and the perception on enterprise gamification. Those employees from different educational qualification have had different opinion on the enterprise gamification. On the whole the association between perceptions on gamification with demographic factors was stronger with gender, experience, and occupation whereas it was weaker with educational factor.

Impact of Gamification in motivating the Millennial employees

Dependent variable: Motivation, Independent variable: Gamification

Multiple R value: 0.758, **R square value:** 0.572, **F value:** 208.555, **P value:** 000.00

Table 4, provides the *R* and R^2 values. The *R* value represents the simple correlation and is 0.758 (the "**R**" Column), which indicates a high degree of correlation. The R^2 value (the "**R Square**" column) indicates how much of the total variation in the dependent variable, Intrinsic Motivation can be explained by the independent variable Gamification which is very large in this case.

Table 4: Model Summary(b)

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics			
					R^2 Change	df1	df2	Sig. F
1	.758(a)	.575	.572	2.65781	.575	1	154	.000

(a) Predictors: (constant), Gamification

(b) Dependent Variable:Motivation

The multiple correlation coefficient is 0.758 and it measures the degree of relationship between the actual values and the predicted values. This coefficient value of 0.758 indicates that the relationship between (Predictors Constant) Gamificationand Motivation is strong and positive.

Table 5: ANOVA(b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1473.225	1	1473.225	208.555	.000(a)
	Residual	1087.852	154	7.064		
	Total	2561.077	155			

a. Predictors: (Constant), Gamification

b. Dependent Variable: Intrinsic Motivation

From the Table 5, it can be seen that the p value .000 , which is less than 0.05, indicating that, the regression model significantly predicts the outcome variable (i.e., it is a good fit for the data).

Table 6: Coefficients(a)

Model B		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
1	(Constant)	3.445	1.035		3.328	.001	1.400	5.490		
	Gamification	.459	.032	.758	14.441	.000	.396	.522	1.000	1.000

a. Dependent Variable: Motivation

The coefficient of determination R-square measures the goodness of fit of the estimated Sample Regression Plane (SRP) in terms of the proportion of the variation in the dependent variables explained by the fitted sample regression equation. Thus, the value of R square is 0.572 which simply means that about 57.2% of the variation in Gamification as Motivator is explained by the estimated SRP that uses the gamification as a motivation independent variable and R square value is significant at the 5% level.

The multiple regression equation is

MOTIVATION = 3.445+ 0.459(Gamification)

The beta coefficient tells how strongly the independent variable is associated with the dependent variable. It is equal to the correlation coefficient between the 2 variables. Thus this regression model shows that there exists a strong impact of gamification in motivating the employees.

Conclusion

Gamification is a strategy that taps employee's potential and acts as the best motivator. Even a passive employee can be transformed into energetic and enthusiastic employee by implementing the gamification strategy. Organizations must come forward to implement gamification for the recognition of employees especially as hard workers and smart workers. Gamification can be related towards personal development and help in self-realization and it can be made a compulsory strategy to bring an interest in the initial stage of implementation. Thus it is important to note that incorporating gamification in the work place shall have strong positive impact in the performance of the employees in the long run.The key objective of this study was to identify whether gamification is motivational factor amongst employees. It was found that gamification is an amazing tool that acts as a motivator and helps in tapping the employees' curiosity quotient. Future researches can correlate a study between gamifications as a stressor or a motivator and also on its application in other areas of management.

Conflict of Interest: There is no conflict of Interest in this paper

Source of Funding: Self

Ethical Clearance: This is the independent work of the authors. We have not published this article with any other publisher.

REFERENCE

1. Buggie M, Pluck E, James E. Enterprise Gamification: Playing to Win. New York, NY, USA. 2014.
2. Deshpande N. Are You Leveraging Enough Gamification In Your Digital CRM?.
3. Kumar J. Gamification at work: Designing engaging business software. InInternational Conference of Design, User Experience, and Usability 2013 Jul 21 (pp. 528-537). Springer, Berlin, Heidelberg.
4. Ayoung SU. Measuring User Engagement in an Enterprise Gamified System. InCHI 2015 Workshop_ Gamification Research Network 2015 Apr 18.
5. Marache-Francisco C, Brangier E. Gamification and human-machine interaction: a synthesis. Le travail humain. 2015;78(2):165-89.
6. Burke B. Gamification 2020: what is the future of gamification? Gartner. Inc., Nov. 2012;5.
7. Meister JC. How Deloitte made learning a game. Harvard Business Review. 2013 Jan;2:506-17.

8. Cruz L, Penley J. Too cool for school?: The effects of gamification in an advanced interdisciplinary course. Journal of Teaching and Learning with Technology. 2014 Nov 21:1-1.

9. Robson K, Plangger K, Kietzmann JH, McCarthy I, Pitt L. Game on: Engaging customers and employees through gamification. Business Horizons. 2016 Jan 1;59(1):29-36.

10. Tondello GF, NackeLE.Towards Customizing Gameful Systems by Gameful Design Elements. Int. Work. Pers. Persuas. Technol. 2018.

11. Bhattacharyya P, Jena LK, Pradhan S. Does "meaningful gamification" address gen Y needs? Exploring its influence on creating meaningful engagement for gen Y workers.Human Resource Management International Digest. 2018 Jan 8;26(1):11-3.

12. Kamasheva AV, Valeev ER, Yagudin RK, Maksimova KR. Usage of gamification theory for increase motivation of employees. Mediterranean Journal of Social Sciences. 2015 Feb 28;6(1 S3):77.

13. Saha MD, Pandita D. Digitalizing Human Resources ThroughGamification For Employee Engagement. ELK Asia Pacific Journals. 2017.

14. McIntyre D. Can Gamification Increase Employee Engagement in a New Zealand Context?.

15. Hoffmann A, Christmann CA, Bleser G. Gamification in Stress Management Apps: A Critical App Review. JMIR serious games. 2017 Apr;5(2).

Design and Implementation of Performance Improved Medical Signal Filters with and without Multiplier

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ABSTRACT

The digital filter can be done professionally with the compact area and reduced power with simplified multiplication arithmetic. More than Decades of years Computer aided analysis of ECG signal is getting with incredible quantity of work being carried out in the earth. This paper is a small work on our part in that track. ECG Electrocardiogram signal is most comely known familiar and used medical signal, the ECG signal is very responsive in nature, and still if small noise combined with actual signal the different properties of the signal changes, Data ruined with noise must either filtered or eliminated, filtering is important issue for design thought of real time health care process. This work presents a better FIR filter which can be designed in VLSI technique, with or without multiplier and has less power and area improvement.

Keywords: *FIR filter design; ARM processor; Multiplier; ECG;*

Introduction

In signal processing, the filter functions to remove the noise from the signal like random noise and also to extract the necessary parts of the signal like components within a precise range of frequency (Quan et al., 2009)[1]The design of the filters for specific application includes the coefficient calculation according to various criteria including sampling frequency, pass band and stop band frequency, filter order etc.

In future, the mobile phones and portable computing systems are anticipated to offer increased services, faster data rates and higher processing speeds at reduced power dissipation levels. This delivers us with an inspiration to explore new methods in low-complexity design of high-performance digital signal processing blocks which operate at lower power levels. Semiconductor technology today provides unprecedented level of device integration where several orders of millions of transistors can be packaged in a single chip using the state-of-the-art. The number is expected to grow steadily for many years.

Human bodies are continuously provides messages about fitness. This messages may be observed through body-structure-related devices that evaluate heart speed, blood stress, oxygen infiltration levels, blood glucose, nerve transmission, brain movement and so forth. Usually in the past, such observations are taken at clearly stated points in time and indicated in patient's chart. Doctors in fact observe a smaller amount than one percent of these values as they make their round and treatment are prepared based upon this chart readings

Bio-medical signal processing includes the study of these observations to offer helpful message upon which doctors can make conclusions. Engineers are finding new techniques to prepare these signals by means of a range of mathematical formulae and sets of computer commands. Functioning with conventional bio-measurement tools, the signals can be figured out by software-commands and provides the doctors , idea about what happening or viewable at present. By using more fancy (or smart) means to carefully study what bodies are saying, we can possibly decide the state of a patient's health through equipments which will not require cutting into the body.

Background

An extensive literature review was carried out on existing digital filters model and the method that are used for enhancing the performance of the digital filters.

Kucic et al.,(2001)[2]suggested a floating-gate technology based on adaptive filter which can be programmed. The author has carried out a basic review on floating-gate techniques and how this technique is programmed into adaptive filter circuits. The author has proposed a program filter method that can extend the capacity of the function and circuits. Furthermore, the author has demonstrated to expand our programmable channels as versatile channels both through weight bother strategies and constantly adjusting relationship rule techniques.

Yamada & Nishihara, (2001)adders and subtracters. The critical path is minimized by insertion of pipeline registers and is equal to the propagation delay of an adder. The number of pipeline registers is limited by using an equivalent transformation on a signal flow graph. The price paid for the 100% speedup is 5% increase in the area. The maximum sampling frequency is 78.6MHz.

Shahramian et al., (2012)[8] proposed Decision feedback equalizer (DFE) architectures with changing quantities of discrete-time taps and continuous time IIR filters are thought about for use in run of the mill wireline filters. For every situation, the DFE coefficients are enhanced to minimize a cost capacity that similarly weights both jitter and vertical eye opening. Notwithstanding when a few reflections are available persistent time IIR taps can be successful if their channel coefficients are appropriately enhanced. Utilizing a DFE engineering with just two IIR channels gives satisfactory outcomes to both a 26-dB misfortune persuade link and a 16 FR-4 back-plane channel at 10 Gb/s while keeping the DFE intricacy low. Moreover, the usage and exploratory aftereffects of a DFE with different (three) IIR channels is accounted for. Generated in a 0.13 μm CMOS handle, the DFE uses17.3 mW from a 1.2 V supply. A BER of 10−12 was accomplished at an information rate of 3.7 Gb/s.

Kamat et al.,(2010)[5] suggested dynamic resistor–capacitor (RC) channels utilizedoperation amps and its alteration by Moschytz are notable to dynamic RC filter designs. This utilization first-arrange all-pass organizes in a negative feedback loop. New present mode all inclusive operational trans conductance amplifier-capacitor (OTA-C) biquad channels in view of the TG dynamic RC channel was considered for this study. Furthermore, the author suggested that these depend on the proposed OTA-C based first-arrange all-passnetwork. Three diverse input plans were explored in the proposed digital filter structure to lessen the Q pole sensitivity. The proposed biquad channels are appeared to execute every single diverse sort of channels like low-pass, high-pass, band-pass, symmetric indent, all-pass, low-pass score and high-pass indent. The amalgamation of the general biquad is completed withnovelty by summoning the relationship with direct-frame advanced filter structures. The unique instance of all-pass digital filter acknowledgment got from the proposed global filter needs extra equipment for understanding the feed forward coefficients. Subsequently elective OTA-C based all-pass filter usage in view of Mitra–Hirano and Gray–Markel second-arrange computerized channel structures are inferred in which the coefficients that are utilized to understand the denominator are partaken in the acknowledgment of numerator. All the proposed circuits are contrasted and alternate structures accessible in the writing. The stimulation aftereffects of the proposed circuits was demonstrated.

Tsividis, (2010)[6]reviewed the event driven analog-to-digital conversion and related to digital signal processing techniques. The author suggests that techniquesare still in the research stage and can possibly lessen the utilization of energy and data transmission assets in a few critical applications.

Azim et al., (2011)[4] suggested most generally utilized digital channels are FIR channels that are typically implemented with the transversal structures. For FIR channel, the signal output is a direct mix of channel coefficients that generates a quadratic capacity (mean-square-error) along with the specific optimal operation point. FIR filter then again be acknowledged for getting changes in examination of transversal channel structure for speed of union, computational multifaceted nature and finite word length properties. IIR separating strategies display solid option for customary FIR sifting. The central favorable position of IIR channels is lesser parameterization to accomplish at standard execution of FIR channels. Moreover, the pole zero structures facilitate their displaying in physical frameworks.

C.Dai (2010)[10] proposed new parallel FIR filter structures, which are valuable to symmetric coefficients as far as the equipment cost, under the condition that the quantity of taps is a multiple of 2 or 3. The proposed parallel FIR structures exploits the innate way of symmetric coefficients lessening a large portion of the quantity of multipliers in sub channel segment to the detriment of extra adders in preprocessing and post handling squares. Trading multipliers with adders is favorable in light of the fact that adders weigh not as much as multipliers as far as silicon region; what's more,

the overhead from the extra adders in preprocessing and postprocessing squares remain settled and do not increment alongside the length of the FIR channel, though the quantity of lessened multipliers increments alongside the length of the FIR channel.

Implementation of FIR Filter

Multiplier based implementatio: A filter is employed to adjust the parameters of applied signal in order to meet our requirement.. A digital filter acts over digital data. (a series of 1&0s, obtained by the sampling and quantizing an analog data) also develops a digital data... These specifications, in linear convolution by the key in sequence provide the required yield. In the Figure.1, the multiplier part is represented with the Line and column bypassing multiplier.

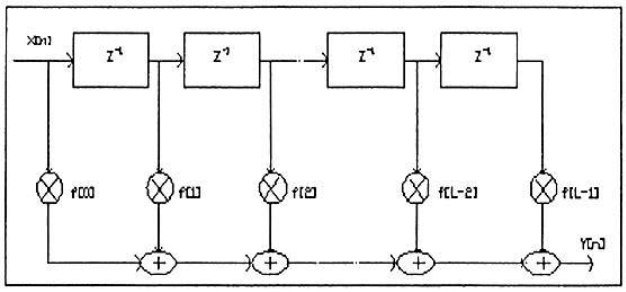


Figure 1: The FIR filter with order L

Comparison of FIR filters with Different multipliers: The Booth multiplier in which the multiplication of one of two pre determined value with a product takes place to get the result .Wallace tree multiplier is one which uses AND , half and full adders.FIR Filter can be constructed with bypassing multiplier instead of other multipliers the figure 2 shows the power consumption performance of different multipliers.

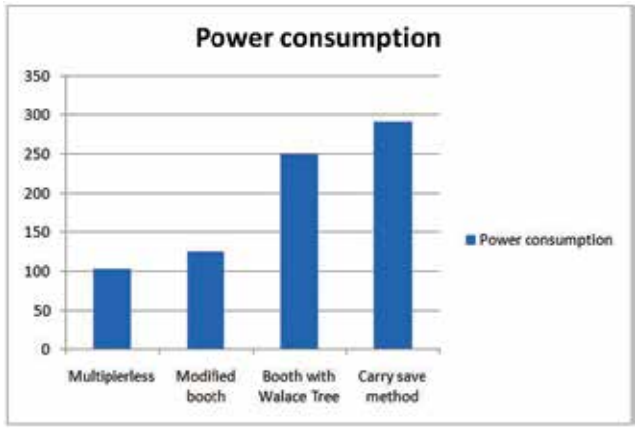


Figure 2: Power consumption Comparison of Multipliers

Multiplier Less Implementation:

ARM processor implementation of Proposed Medical signal filter: ARM Cortex M4 processor have an extremely superior set of multiply-combine commands that can execute more than one integer multiply-combine operation in one clock period (e.g. SMLAD), which leads them to perform better in digital signal processing.

The simple idea for building a digital filter is to employ Micro Modeler DSP, which gives a browser-based, self-sufficient filter design situation. Pull a filter to the function and visually organize the filter's frequency reaction. Once response is organized, copy and paste the robotically developed code into a .c and an h file and add to the project. All of the filters developed by Micro Modeler DSP utilize the equal interface, so it's simple to change to another filter with no change in present function code. It can be chosen to develop a code that uses C, CMSIS DSP libraries or mixed C and ARM Assembly depending on user preference.

This example explains the usage of the Code Replacement Library (CRL) for ARM processor with DSP blocks. The wave form is as shown in figure.3.

Task 1: Setup and Simulate

1. Open the ex_fir_ne10_tut_ml example function, which implements a lowpass FIR filter object.
2. Create two sine wave signals with 1KHz and 3KHz frequency, respectively.

```
sin1 = dsp.SineWave('Amplitude',1,'Frequency',1000,...
'SampleRate',8000, 'SamplesPerFrame', 76,...
'OutputDataType', 'single');
sin2 = dsp.SineWave('Amplitude',4,'Frequency',3000,...
```

‘SampleRate’,8000, ‘SamplesPerFrame’, 76,...

‘OutputDataType’, ‘single’);

3. Create a spectrum analyzer to view the spectrum of the input and filtered output.

scope = dsp.SpectrumAnalyzer(‘SampleRate’,8e3,’ShowLegend’,true,...

‘PlotAsTwoSidedSpectrum’, false, ...

‘RBWSource’, ‘Property’,...

‘RBW’,8000/260, ‘Window’,’Kaiser’, ...

‘OverlapPercent’, 80,...

‘YLimits’, [-76 56], ‘SpectralAverages’,10);

4. Simulate the example

NN = 2000;

for k = 1:NN

x1k = sin1(); % generate 1K Hz sine wave

x3k = sin2(); % generate 3K Hz sine wave

n1 = randn(size(x1k), ‘single’)*sqrt(.05); % generate noise signal

u1 = x1k+x3k+n1;

y1 = ex_fir_ne10_tut_ml(u1);

scope([u1,y1]);

end

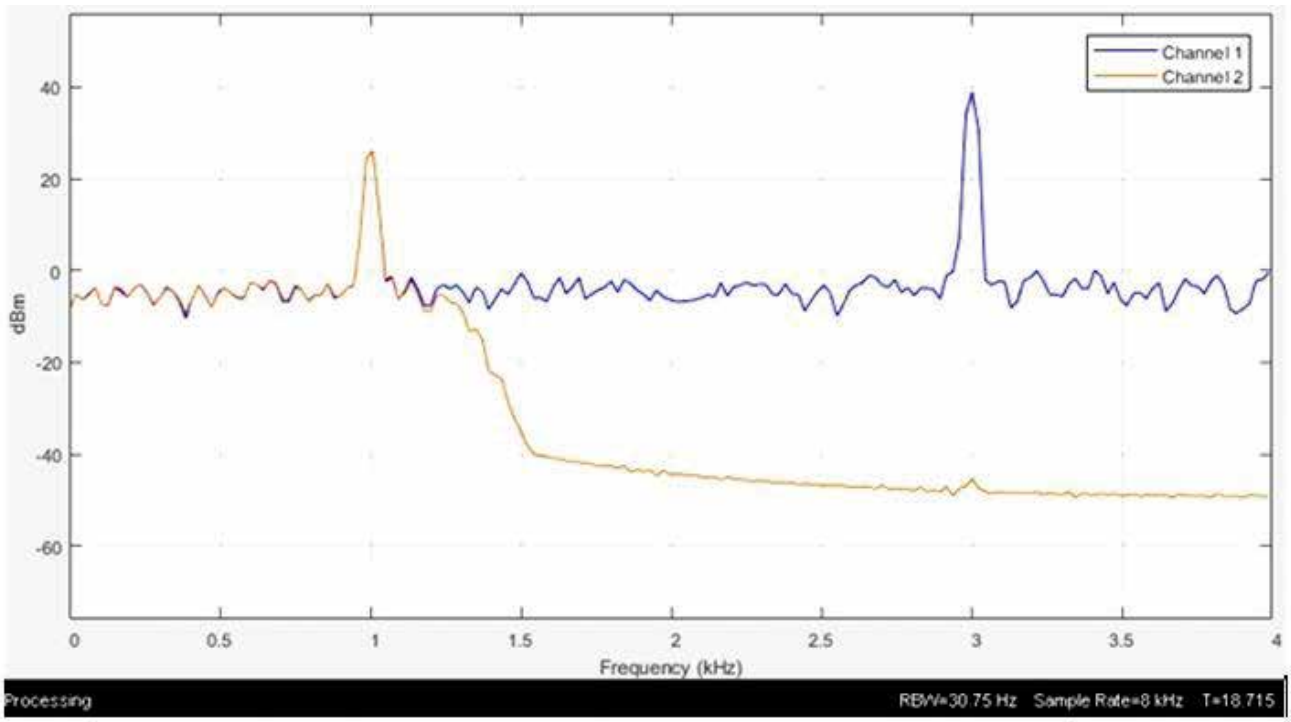


Figure 3. Output signal from Spectrum analyzer.

Task 2: Configure for Code Replacement

1. Create a code generation configuration object for use with codegen when generating a C/C++ static library.

   cfgEx = coder.config('lib');

   cfgEx.CodeReplacementLibrary = 'ARM Cortex-A';

   cfgEx.HardwareImplementation.ProdHWDeviceType = 'ARM Compatible->ARM Cortex';

   cfgEx.GenCodeOnly = true;

2. Open the **Custom Code** panel of the configuration dialog and verify the settings.

   cfgEx.dialog

Task 3: Generate code

1. Change your current folder in MATLAB to a temporary writable folder. Copy the MATLAB file to the temporary folder.

   tempdirObj = armcortexadstexample.dstTempdir('ex_fir_ne10_tut_ml_workflow');

   dstarmsrc = which('ex_fir_ne10_tut_ml');

   dstarmtmpdir = tempdirObj.tempDir;

   type(fullfile(dstarmsrc))

   copyfile(dstarmsrc, dstarmtmpdir, 'f');

   function y1 = ex_fir_ne10_tut_ml(u1)

   % Copyright 2014-2016 The MathWorks, Inc.

   %#codegen

   persistent fir;

   if isempty(fir)

   fir = dsp.FIRFilter('Numerator', fir1(63, 0.33));

   end

   y1 = fir(u1);

   end

2. Generate C code for the MATLAB function ex_fir_ne10_tut_ml.m.

   codegenex_fir_ne10_tut_ml-argssingle(u1)-configcfgEx-report

3. When code generation finishes successfully, click **View report** to display the code generation report.

4. Click on the ex_fir_ne10_tut_ml.c file. Notice the NE10 functions, **ne10_fir_init_float** and **ne10_fir_float_neon** in the ex_fir_ne10_tut_ml function.

Task 4: Verify the generated C code on target

The generated code can be compiled and executed on ARM Cortex-A target by using a user- selected tool chain.

Run the following code to delete the temporary directory.

status = tempdirObj.cleanUp;

Results and Discussion

Comparison with Multiplier based implementations: The improved multiplier less ARM processor implementation having less delay of only 10.2 ns and consumes only 102 mw power as Shown in Table 1and 2.

Tablel 1: Delay Comparison of similar methods

Methods	Delay ns.
Multiplier less method	10.2
Modified Booth	10.22
Modified Booth with Wallace Tree	8.9
Distributed Arithmetic	18.9
Distributed Arithmetic with Partition	16.804

Table 2: Power consumption Comparison of similar methods

Methods Table	Power consumption in mw.
Multiplier less Method	102
Modified Booth	125
Modified Booth with Wallace Tree	250
Carry save method	290

Medical signal Display and Transmission With ARM processor: If this proposed method is used in medical applications like filtering of ECG and other medical signals, due to the presence of ARM controller some other measurement, control ,display and transmission of the signal to some other remote location also can be done without additional processor.

The inputting and the handling of EMG signal is completed using LPC-2103 microcontroller unit. The LPC- 2103 is 32-bit ARM-7TDMIS processing unit, using on-time emulation that associates the microcontroller unit with 32 KB implanted quick flash memory. Owing to unit's miniature dimension and little power utilization, the LPC -2103 is perfect in areas wherever dimension is main constraint.

For monitoring heart activity the ECG signal is used. Our system is divided into three subsystems 1.ECG Acquisition 2.Processing in ARM7 3.GSM.This is real time system. In this project we will design for monitoring of ECG data using ARM7 LPC2148 and GSM module .Here first data is acquired using ARM7 which is further sent wirelessly using GSM. The device will be economical. It will be helpful for the patient and doctor for easy Monitoring. It will be less complex as compared to other technology. Less Power is required for its operation and control of the device. This device is used in Hospital, Military, Homecare Unit, and Sports Training.

The block diagram of this system is as shown in the figure 4.The hardware system consist of ECG acquisition, ARM7 processor and GSM module. In this system, ECG signal are acquired using 3 lead ECG electrodes .This signal are given to ARM7 processor for amplification and filtration.

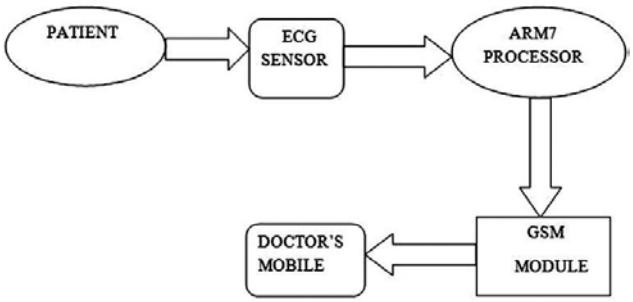


Figure 4: System block diagram

GSM (Global System for Mobile communication or Groupe Speciale Mobile) communications, initiated by the European Commission, is the second generation mobile cellular system aimed at developing .GSM is the world's most popular 2G technology. It was developed to solve the fragmentation problems of the first cellular system in Europe.GSM promised a wide range of network services through the use of ISDN. It also specifies digital modulation and network level architectures and services.

Conclusion

In this work we also projected and implemented a portable filter for real-time and personal purposes. We reduced the hardware complexity by using the digital filter-driven hardware architecture. According to the experimental results, the proposed filter with ARM processor has lower computational complexity than other existing filtering algorithms. The minimized number in hardware of this idea offers the benefit such as less consumption of space and power for overall system including signal transmission and display. As the ARM processor can also be used for signal transmission and display the revised filter has less delay and power.

Ethical Clearance: NA

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Quan, Q., &Cai, K. Y. (2012). Time-domain analysis of the Savitzky-Golay filters. *Digital Signal Processing: A Review Journal*, *22*(2), 238–245. https://doi.org/10.1016/j.dsp.2011.11.004
2. Kucic, M., Hasler, P., Dugger, J., & Anderson, D. (2001). Programmable and adaptive analog filters using arrays of floating-gate circuits. *Proceedings - 2001 Conference on Advanced Research in VLSI, ARVLSI 2001*, *0*, 148–162. https://doi.org/10.1109/ARVLSI.2001.915557
3. Azami, H., Mohammadi, K., &Behzad, B. (2012). An Improved Signal Segmentation Using Moving Average and Savitzky-GolayFilter.*Journal of Signal and Information Processing*, *3*(1), 39–44. https://doi.org/10.4236/jsip.2012.31006
4. Azim, C. F., Ahmed, S. F., &Memon, A. R. (2011). On the optimal design of IIR filter with its state-space realization, *4*(9), 1021–1024.
5. Kamat, D. V., Ananda Mohan, P. V., &GopalakrishnaPrabhu, K. (2010). Current-mode operational transconductance amplifier-capacitor biquad filter structures based on Tarmy–Ghausi Active-RC filter and second-order digital all-pass filters. *IET Circuits, Devices & Systems*, *4*(4), 346. https://doi.org/10.1049/iet-cds.2009.0213

6. Tsividis, Y. (2010). Event-Driven Data Acquisition and Digital Signal Processing #x2014;A Tutorial. *IEEE Transactions on Circuits and Systems II: Express Briefs*, *57*(8), 577–581. https://doi.org/10.1109/TCSII.2010.2056012

7. Yamada, M., & Nishihara, A. (2001).High-speed FIR digital filter with CSD coefficients implemented on FPGA.*Proceedings of the Asia and South Pacific Design Automation Conference, ASP-DAC*, *2001–Janua*(April), 7–8. https://doi.org/10.1109/ASPDAC.2001.913262

8. Shahramian, S., Yasotharan, H., &Carusone, A. C. (2012).Decision feedback equalizer architectures with multiple continuous-time infinite impulse response filters.*IEEE Transactions on Circuits and Systems II: Express Briefs*, *59*(6), 326–330. https://doi.org/10.1109/TCSII.2012.2195055

9. Jaikla, W., Siripongdee, S., &Suwanjan, P. (2012). MISO current-mode biquad filter with independent control of pole frequency and quality factor. *Radioengineering*, *21*(3), 886–891.

10 .C. Dai, W. Chen, & Y. Zhu. (2010). Seeker Optimization Algorithm for Digital IIR Filter Design.*IEEE Transactions on Industrial Electronics*, *57*(5), 1710–1718. https://doi.org/10.1109/TIE.2009.2031194

11. Dastjerdi, M. M., A. A. Kusha., and Pedram M., 2009, "BZ-FAD: A LowPower Low-Area Multiplier Based on Shift-and-Add Architecture," IEEE Transactions on VLSI Systems, 17 (2), pp. 302-302.

12 .Dwivedi, A. K., Ghosh, S., &Londhe, N. D. (2016). Low-Power FIR Filter Design Using Hybrid Artificial Bee Colony Algorithm with Experimental Validation Over FPGA. *Circuits, Systems, and Signal Processing*, (April), 1–31. https://doi.org/10.1007/s00034-016-0297-4

Effect of Inpatient Physiotherapy Intervention Versus Delayed Outpatient Physiotherapy Intervention in Post Stroke Hemiplegic Individuals

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ABSTRACT

Objectives: The purpose of this study was to evaluate the effect inpatient physiotherapy intervention, outpatient physiotherapy intervention and compare inpatient physiotherapy intervention versus delayed outpatient physiotherapy intervention in post stroke hemiplegic individual.

Method: 44 subjects diagnosed with post stroke hemiplegia were included in this study. Subjects were divided into two different groups. Group A was inpatient and group B was delayed outpatient group. These subjects were allocated by convenient sampling method. During Pre and post treatment assessment functional independence and mobility were assessed by outcome measures Functional Independence Measure and Barthel Index. These outcome measures were analysed.

Result: Pre and post functional independence and mobility was analysed by using paired and unpaired t test. Data analysis showed significance for FIM and Barthel Index (p value less than 0.001) for both the groups but comparative to group B (delayed outpatient), group A (inpatient) is more effective.

Conclusion: Inpatient physiotherapy intervention and delayed outpatient physiotherapy intervention is effective in improving the functional independence and mobility in the post stroke hemiplegic individuals but comparative to delayed outpatient physiotherapy intervention, inpatient physiotherapy intervention is more effective.

Keywords: *Inpatient, Delayed outpatient, Physiotherapy Intervention, Post Stroke Hemiplegia.*

Introduction

Stroke can be defined as "Rapidly developed clinical sign of focal (or global) disturbances of cerebral function lasting more than 24 hours or leading to death, with no apparent cause other than vascular origin"[1] Stroke may cause a disturbance in the blood supply to the brain and may lead to rapid loss of brain functions. Disturbance in blood supply may be due to ischemia i.e lack of blood flow caused by blockage (thrombosis, arterial, embolism) or haemorrhage (leakage of blood) [3]. About 80% of individuals are affected by ischemic stroke; which is the most common type of stroke.[1]

Stroke is one of the leading causes of death & disability in India. Stroke is the third commonest cause of death according to the statistics.[4] The estimated average prevalence rate of stroke range 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 [4]

According to the American Physical Therapy Association (APTA), "physical therapists are health care professionals who maintain, restore, and improve movement, activity, and health, enabling an individual to have optimal functioning and quality of life, while

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ensuring patient safety and applying evidence to provide efficient and effective care. Physiotherapists assess, diagnose, and treated individuals of all age groups who have impairments, activity limitations, and participation restrictions, promoting health.[5]

Stroke can result in a many symptoms and signs but the most common symptom is motor impairment. Which typically affects the control of movement of the face, arm, and leg of one side of body characterized by paralysis (hemiplegia) or weakness (hemiparesis) typically on the one side of body opposite to the side of lesion. Immediately after stroke, there is an initially flaccid paralysis in over 90% of individuals, which is often replaced by spasticity lasting for 24 hours to 12-18 months.[5] In acute phase, about 50 to 80% of stroke patients has various impairments in the body.[6]

Pathophysiology: The pathophysiology of stroke, If presence of prolonged state of hypotension, stenosis of measure cerebral arteries or internal carotid artery following thromboembolism or due to episode of sudden cardiac arrest, the brain cells undergo a state of nutritional deprivement which leads to Ischaemic Hypoxic Cerebral injury and result in formation of acute infarction which initially is soft and swollen but eventually herniates compressing the vital structure in the brain. Acute infarction if not reversed within 3 minutes undergoes a permanent damage and heals in the form of a firm cyst known as gliosis. The dense central core of this region consist of dead neurons referred as penumbra region has a chances to reversal of symptoms if perfusion is established within 3 hours. In neuronal injury resultant of increased cytosolic calcium concentration due to failure of ionic pumps. Ionic leaks changes the sodium and potassium ion gradient which create a state of acidosis with release of free radicals disrupting the Blood Brain Barrier. Following Hypoxia, the brain fails to maintain normal concentration of ATPs. This energy depletion delays the resynthesis of macromolecular proteins essential for endothelial cell structure and function. Proteolysis and lipolysis result in production of arachidonic acid and platelet activating factors which further activates the release of cell adhesion molecules, free radicals resulting in more brain damage.[7]

Warning Signs: Warning signs of stroke are sudden numbness or weakness of the face, arm or leg, especially on one side of the body, sudden confusion, disturbed sleep or understanding, sudden difficulty in seeing in one or both eyes, sudden severe headache with unknown cause sudden difficulty in walking, dizziness, loss of balance or coordination.[2]

Physiotherapy Intervention: The physiotherapy intervention that is exercise is to improve mobility, increase functional independence, relive pain, and minimise limitations due to permanent disabilities. Stroke is a chronic condition, we have to spend the more time of rehabilitation, from the early stage that is inpatient in the acute care hospitals physiotherapy intervention are the primary mechanism by which functional recovery, mobility and functional independence of patient are achieved in stroke.[9]

Conventional Exercises: Conventional exercises are exercises that are traditionally practiced since ancient times and are accepted worldwide. Conventional training for stroke survivors include Passive movement, sustained stretching, active assisted RIMP to both the limbs, bed mobility exercises, Gait training. These exercises can also be performed with the help of various modifications and may help to achieve a faster recovery at least to improve the patient's functional performance.[8]

Timing of Interventions: Patient those who are admitted in a hospital with a stroke are referred to physiotherapy when medical condition is stable. All stroke patient received physiotherapy while they are admitted in wards, so in inpatient the recovery was good. On discharge from the ward, the stroke patients are advised to return as physiotherapy OPD but, a large number of patient deteriorate after discharge from the hospital, so in delayed outpatient the recovery was poor as compared to inpatient. At a global level, many patients with a stroke not attending outpatient physiotherapy intervention, this according to the review study by Thomas and parry. In another study was conducted in United States (Barclay2007), 30% of post stroke hemiplegic individual reported that they were attending outpatient physiotherapy .[9] The more number of patient in the study lived in rural areas. Every day they had to travel long distant from their home for physiotherapy intervention so the flow of outpatient was reduced.[10]

The stroke patient who are admitted in hospital they are taken physiotherapy treatment regularly, but after discharge some of them delay or discontinue the treatment. After some period they realise that there is no functional improvement then they come back to

the physiotherapy department .So there is necessity to create awareness among these people who delay the physiotherapy treatment. It is necessary to note that still there are many regions in our country without any physiotherapy department providing comprehensive stroke rehabilitation.

Method

The subjects which willing to participate in the study was taken. The criteria for inclusion were: clinically diagnosed with post stroke hemiplegia and the age group 30-65 years. Subjects were excluded if any musculoskeletal conditions e.g. fracture, subject with visual and auditory impairment and subject associated with psychological disorder.

44 post stroke hemiplegia survivors were selected from Krishna Hospital Karad. Subjects were divided into two different groups. 22 subjects in each group, group A was inpatient there were 16 male and 6 female and group B was delayed outpatient group there were 17 male and 5 female.These subjects were allocated by convenient sampling method, written consent form was taken. All the subjects were informed about the protocol and gave written consent before their participation. The protocol and the consent form were previously approved by protocol and ethical committee. Group A and Group B was given Conventional training exercises regularly for 4 weeks 6 days a week. After 4 weeks the post treatment assessment for functional mobility was taken with the help of assessment tools (Functional Independence Measure and Barthel Index).

Result

Pre and post functional mobility was analysed by using paired and unpaired t test. Data analysis showed significance for FIM and Barthel Index (p value less than 0.001) for both the groups but comparative to group B (delayed outpatient), group A (inpatient) is more effective.

Statistical analysis: The data was entered into Microsoft office excels 2007 and analyzed using INSTAT software. Descriptive statistics were used to analyze for demographic data: Pre and post treatment protocol was analyzed by using paired and unpaired t test and p value <0.0001 was considered to be statistically significant.

Within Group Comparison

Within group comparison was done by applying 'Paired t-test' to pre and post training values of Functional independence measure.

Table 1: Comparison of Pre and Post-treatment average with Functional Independence Measure

Group	Pre training Mean	Post training Mean	t value	p value
Group A	54.364	69.909	11.984	< 0.0001
Group B	55.955	59.545	10.021	<0.0001

Table 2: Comparison of Pre and post-treatment average with Barthel Index

Group	Pre training Mean	Post training Mean	t value	p value
Group A	30.227	60	18.678	< 0.0001
Group B	31.364	36.818	17.390	< 0.0001

Between Group Comparison: Between groups comparison was done by applying 'unpaired t test'

Table 3: Comparison of Pre and post-treatment average with Functional Independence Measure

Group	Group A	Group B	t value	p value
Pre training Mean	54.364	56.500	0.7822	0.4385
Post training Mean	69.909	59.545	3.517	0.0011

Table 4: Comparison of Pre and post-treatment average with Barthel Index

Group	Group A	Group B	t value	p value
Pre training Mean	30.227	37.045	2.817	0.0074
Post training Mean	60	36.818	6.795	< 0.0001

Discussion

The study "Effect of inpatient physiotherapy intervention versus delayed outpatient physiotherapy intervention in post stroke hemiplegic individual" was conducted to compare the two groups to find out its effects on functional independence and mobility. The inpatient are the acute stroke patient they are taken continuously 4 weeks physiotherapy intervention and the delayed outpatient are the chronic stroke patient they discontinue or delayed the treatment after some period they taken continuously 4 weeks physiotherapy intervention. This study mostly focused on the functional independence and mobility of the individuals and the best possible treatment for it so, the outcome measures for this study were Functional Independence Measure and Barthel index. The subjects were analysed for Functional Independence and mobility.

The loss of motor function because of stroke is caused by cell death in the infarcted area as well as dysfunction the areas surrounding the infarct. The function of brain regions, including the contralateral areas that are connected to the areas of tissue damage, is compromised because hypo metabolism, neurovascular uncoupling, and disrupted neurotransmission, jointly called diaschisis. Some recovery of function occours spontaneously after stroke. It is believed that this functional recovery involves, to some extent overlapping, phases: (1) reversal of diachisis, activation of cell genesis, and repair; (2) changing the properties of existing neuronal pathway; and (3) neuroanatomical plasticity leading to the formation of new neuronal connection. Neuroanatomical plasticity leading to the formation of new neuronal connections. The basic process underlying phases 2 and 3 also involved in normal learning and it has been recognised that functional improvement after brain injury is a relearning process. [15]

In stroke, physiotherapy intervention that is conventional exercise is to minimize the effects of the brain cell damage and optimize re-learning. It is well recognized that for cortical re-organisation to occur post stroke, there is a requirement for high levels of repetition of tasks and exercises that are both challenging and engaging.[16]

Conventional Exercises with patient's following stroke may be a stimulus for making new more effective functional connections within remaining brain tissue. Repetitive exercises appear to be major factors in promoting synaptogenesis and are important in rehabilitation of motor weakness following stroke.

Stroke severity is considered the most powerful prognostic factor because disability is a consequence of the severity of neurological impairment. Similarly, the strong positive relationship between initial and later disability is well known. Shah et al7 reported that initial disability was a powerful predictor of discharge Barthel Index:

(BI) score, and Oczkowski and Barreca14 found that the absolute admission functional independence measure score was the best predictor of outcome disability and place of discharge. The strong positive relationship between increasing age and disability is well established.[17]

Conclusion

Through this study, it is concluded that, inpatient physiotherapy intervention and delayed outpatient physiotherapy intervention is effective in improving the functional independence and mobility in the post stroke hemiplegic individual but comparative to delayed outpatient physiotherapy intervention, inpatient physiotherapy intervention is more effective.

Conflicts of Interest: This study can be carried out with large sample size.

Source of Funding: This study was funded by Krishna Institute of Medical sciences Deemed to Be University, Karad.

REFERENCES

1. Moskowitz H, Goodman CR, Smith E, Balthazar E, Mellins HZ. Hemiplegic shoulder. N Y State J Med 1969; 69: 548–50.
2. Susan B. o'sullivan, Thomas J. Shmitz, et al. Physical Rehabilitation 6th addition 645-646.
3. Jeyaraj Durai Pandian, Paulin Sudhan. Stroke epidemiology and Stroke care services in India. Journal of Stroke.2013;15(3):128-134.
4. Isa U. Lawal1,4*, Susan L. Hillier2†, Talhatu K. Hamzat3† and Anthea Rhoda et al Effectiveness of a structured circuit class therapy model in stroke rehabilitation: a protocol for a randomised controlled trial BMC Neurology (2015) 15:88.

5. Janne Marieke Veerbeek1, Erwin van Wegen1 et al What Is the Evidence for Physical Therapy Poststroke? ASystematic Review and Meta-Analysis February 2014

6. Ntamo NP, MPH1; Buso D, MSc2; Longo-Mbenza B, PhD, DSc3 Factors affecting poor attendance for outpatient physiotherapy by patients discharged from Mthatha General Hospital with a stroke SA Journal of Physiotherapy 2013 Vol 69 No3.

7. Venkatraman S, Paul AM, API Textbook of Medicine. 7th ed. New Delhi. Jaypee Brothers; 2003.s

8. *Gary N. Davidoff, MD, Ofer Keren, MD, Haim Ring, MD, Pablo Solzi, MD et al.*Acute Stroke Patients: Long-Term Effects of Rehabilitation and Maintenance of Gains Arch Phys Med Rehabil 1991;72:869-7

9. *Rose Galvin, Brendan Murphy, Tara Cusack, and Emma Stokes,et al* The Impact of Increased Duration of Exercise Therapy on Functional Recovery Following Stroke – What Is the Evidence? July-August 2008

10. Barclay L 2007 More than 30% of US stroke survivors receive outpatient rehabilitation. Morbidity and Mortality Weekly Report 56: 504-507.

11. Disa K. Sommerfeld et al. Spasticity After Stroke: Its Occurrence and Association With Motor Impairments and Activity Limitations.AHA. *Stroke.* 2004;35:134-139

12. Davidoff GN, Keren 0, Ring H, Solzi P. Acute stroke patients: long-term effects of rehabilitation and maintenance of gains. Arch Phys Med Rehabil 1991;72:869-73.

13. Moghe, Devyani M ;Kanse, suraj indian journal of physiotherapy & occupational therapy Effect of early intervention for Trunk control in stroke patients. jul-sep2017,vol. 11 issue 3, p177-182.6p.

14. Johnstone M. Restoration of motor function in the stroke patient, third edition. New York: Churchill Livingstone, 1987

15. Wieloch T, Nikolich K. Mechanisms of neural spasticity following brain injury. Curr Opin Neurobiol. 2006.

16. Shah S, Vanclay F, Cooper B. Predicting discharge status at commencement of stroke rehabilitation. *Stroke*. 1989;20:766–769.

17. Roland PS Van Peppen Gert Kwakkel et al studied that The impact of physiotherapy on functional outcome after stroke: What's the evidence? Clinical Rehabilitation 2004; 18(8): 833-862.

18. Pamela W. Duncan, PhD, FAPTA et al studied that Adherence to Post acute Rehabilitation Guidelines Is Associated With Functional Recovery in Stroke (*Stroke*. 2002;33:167-178.)

Effect of Therapeutic Intervention and Hand Muscle Training on Pain and Quality of Hand Function in Subjects with Chronic Tennis Elbow

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ABSTRACT

Background: Tennis elbow is a form of repetitive injury. It results in pain at the lateral humeral epicondyle on gripping and frequent rotatory motion of the forearm. It leads to reduce hand grip strength and causes functional disability

Objectives: To find and compare the effect of mulligan mobilisation with movement (MWM), phonophoresis, eccentric strengthening exercises and hand muscle training on pain and quality of hand function in subjects with chronic tennis elbow.

Method: 30 subjects diagnosed as chronic tennis elbow were included in the study on the basis of inclusion and exclusion criteria. In the study pre and post treatment outcome assessment was taken on (Visual Analogue Scale) VAS, Hand Held Dynamometer and on (Patient Rated Tennis Elbow Evaluation) PRTEE. Mulligan mobilisation with movement, phonophoresis, eccentric strengthening exercises were baseline treatment for both the group. Group A received baseline treatment and hand muscle training and Group B received only baseline treatment for 3 weeks treatment protocol.

Results: 30 subjects (19 female and 11 male), participated in the study. Intra group comparison results showed statistically significant reduction in post interventional VAS, HHD, and PRTEE score for both the groups ($p < 0.0001$). Inter group comparison results showed Group A was statistically significant in showing improvement in VAS, HHD, and PRTEE score than Group B ($p < 0.0001$).

Conclusion: Group A treated with baseline treatment and hand muscle training showed significant improvement than Group B.

Keywords: *Chronic Tennis Elbow, Mulligan mobilisation, Phonophoresis, Hand muscle training, Hand Held Dynamometer (HHD), Patient Rated Tennis Elbow Evaluation (PRTEE)*

Introduction

Tennis elbow is also known as lateral epicondylitis[1]. Pain in region of epicondyle which can be elicited by giving resistance to either extensor or flexor muscles of wrist. Functional impairment and reduced productivity due to the pain is common symptom[2]. Male and females are equally affected with the peak incidence is between 30-60yr of age [3]. Extensor Carpi Radialis Brevis (ECRB) is most commonly affected structure[4]. The cardinal symptoms of tennis elbow are pain and inflammation. The cause of pain maybe changes in the nervous system as a result of neuronal tissue changes as well as nociceptive and non-nociceptive process[5]. Due to which subjects shows difficulty to perform the gripping activities and exhibit reduced grip strength[6]. In various daily activities hand grip strength is vital[7]. Improve the quality of hand function is essential as it enhance the functional ability and prevent the recurrence.

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Among various available physiotherapy treatment options[8] Phonophoresis is a therapeutic method gives combined effect of ultrasound and nonsteroidal anti-inflammatory drug which helps to resolve pain and inflammation[9]. Mulligans mobilisation with movement is relatively quick with active participation of subject in treatment. which results in immediate pain reduction and improvement in function [10]. As there is paucity of literature on combined effect of phonophoresis and MWM and no study has concerted on improving the quality of hand function in subjects with chronic tennis elbow the present study is intended to find out the combined effect of Phonophoresis, MWM and effect of Hand muscle training on the pain and quality of hand function in subjects with chronic tennis elbow to improve the quality of hand function and to avoid functional disabilities.

Materials and Method

Participants: On the clinical screening using special test 30 subjects who diagnosed as chronic tennis elbow based on inclusion and exclusion criteria were selected. Both male and female between age group 35-55 yr, willing to participate were included in the study. Written consent was taken. Inclusion criteria were as follows: 1) more than 3 months symptom duration 2) Pain with gripping at lateral humeral epicondyle 3) Tenderness on palpation over lateral epicondyle of humerus 4) Subjects having pain on resisted extension of third finger 5) Positive mills test 6) Previous physiotherapy treatment for tennis elbow. Exclusion criteria were as follow: 1) Subjects having tenderness within the muscle 2) Cervical radiculopathy 3) Previous fracture or tendon rupture in elbow. Intensity of pain on VAS, hand grip strength on Hand held dynamometer and functional disability on PRTEE SCALE was recorded pre-interventional and post interventional.

Interventions: 30 subjects were divided into two group (n=15 in each group) by simple lottery method. Baseline treatment for both the group was phonophoresis, mulligan mobilisation, eccentric exercises. Group A were given hand muscle training and baseline treatment and Group B were given only baseline treatment for 3 weeks 5days/week. Pre and post treatment assessment were done with VAS, Hand Held Dynamometer and PRTEE questionnaire. Post treatment assessment was taken on Day 7, Day 14 and Day 21.

Baseline treatment:

Phonophoresis: in sitting position. Mode continuous, Frequency 1 MHz, intensity 0.8 W/cm^2 over the area of the lateral epicondyle for 5 minutes.

Mulligan mobilisation with movement: In supine position forearm pronated, lateral glide to the proximal forearm was sustained for 5-10 sec for 3 repetitions progress to 6 repetitions.

Eccentric strengthening exercise: In seated position with elbow in extension, forearm in pronation, and wrist in full extension. subject was asked to slowly lower the wrist into flexion for a count of 30 and again return back to the wrist full extension for 3 sets of 10 repetitions.

Hand Muscle Training:

1. **Exercise With Exercise Ball:** In sitting position with elbow at 90^0 of flexion , wrist in neutral and fingers are spread around the exercise ball . subject was asked to squeeze the exercise ball and then released.
2. **Rubber Band Exercise:** Rubber band was wrapped around the finger and subject was asked to performed extension of finger for 3 sets of 10 repetitions.
3. **Supination with Dumbbell:** In sitting position with elbow resting on plinth holding dumbbell vertically and asked to rotate the arm outword so that palm turns up. Then again rotate the hand inward so the palm faces downward. Repeat 10 times 3 sets.
4. **Twisting a Towel:** Grasp the towel horizontly in the hand. And twist it into the roll. Repeat 10 times 3 sets.

Data Analysis

Table 1: Comparison of VAS score at rest between group

Groups	Pre-treatment	Post- treatment		
	Day 1	Day 7	Day 14	Day 21
		Mean ± SD	Mean ± SD	Mean ± SD
A	5.12 ± 1.460	3.5 ± 1.242	1.8866 ± 0.814	0.7866 ± 0.4833
B	4.4933 ± 1.599	3.8866 ± 1.429	3.3666 ± 1.171	2.22 ± 1.080
U'	126	137	185.50	194.50
P	0.5897	0.3195	0.0026	0.0007
Significance	Not significant	Not significant	Very significant	Extremely significant

The pre-treatment values were 5.12 ± 1.460 for group A and 4.4933 ± 1.599 for group B respectively and post interventional value for group A was 0.7866 ± 0.4833 and in group B was 2.22 ± 1.080. It showed VAS SCORE AT REST between group A versus group B statistically very significant difference. This was done by using unpaired 't' test. (Mann-Whitney test)

Table 2: Comparison of VAS score on activity between group

Groups	Pre-treatment	Post- treatment		
	Day 1	Day 7	Day 14	Day 21
		Mean ± SD	Mean ± SD	Mean ± SD
A	7.8466 ± 0.6823	5.4733 ± 0.8908	3.5266 ± 0.7842	1.58 ± 0.4632
B	8.1066 ± 1.428	7.02 ± 1.372	5.94 ± 1.251	4.5266 ± 1.146
U'	143.50	185.50	210.00	222.00
P	0.2058	0.0026	<0.0001	<0.0001
Significance	Not significant	Very significant	Extremely significant	Extremely significant

The pre-treatment values were 7.84 ± 0.68 for group A and 8.1066 ± 1.428 for group B respectively and post interventional value for group A was 1.58 ± 0.4632 and group B was 4.5266 ± 1.146. It showed VAS score ON ACTIVITY between group A versus group B statistically very significant difference. This was done by using unpaired 't' test. (Mann-Whitney test)

Table 3: Comparison of Hand Grip Strength within group

Groups	Pre-treatment	Post- treatment			p value
	Day 1	Day 7	Day 14	Day 21	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
A	6.6 + 2.613	13.8 ± 3.212	21 ± 2.591	24.46 ± 2.100	p <0.0001, Fr = 42.920
B	6.46 + 2.100	11.8 ± 1.971	15.4 ± 1.804	19.26 ± 2.01	p <0.0001, Fr = 45.040

The pre-treatment values were 6.6+2.613 in group A and 6.46+2.100 in group B respectively, were as post interventional value for group A was 24.46+2.100 and group B was 19.26±2.01. It showed extremely significant INCREASE in HAND GRIP STRENGTH for both the groups. This was done by using paired 't' test (Friedman test with post-test)

Table 4: Comparison of Hand Grip Strength between groups

Groups	Pre-treatment	Post- treatment		
	Day 1	Day 7	Day 14	Day 21
		Mean ± SD	Mean ± SD	Mean ± SD
A	6.6 ± 2.613	13.8 ± 3.212	21 ± 2.591	24.4666 ± 2.100
B	6.466 ± 2.100	11.8 ± 1.971	15.4 ± 1.805	19.2666 ± 2.017
U'	115.00	148	221.00	217
P	0.9336	0.1451	<0.0001	<0.0001
Significance	Not significant	Not significant	Extremely significant	Extremely significant

The pre-treatment values for group A 6.6 ± 2.613 and 6.466 ± 2.100 in group B respectively, were as post interventional value for group A was 19.2666 ± 2.017 and group B was 24.4666 ± 2.100. It showed statistically very significant difference. This was done by using unpaired 't' test. (Mann-Whitney test)

Table 5: Comparison of PRTEE score within group

Groups	Pre-treatment	Post- treatment			p value
	Day 1	Day 7	Day 14	Day 21	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
A	63.13 ± 6.553	49.8 ± 9.147	38.9666 ± 7.763	23.7333 ± 6.397	p <0.0001 Fr= 45.000
B	65.0333 ± 11.889	52.3 ± 7.894	41.3666 ± 6.269	31.4333 ± 4.57	p <0.0001 Fr=45.000

The pre-treatment values were 63.13 + 6.553 for group A and 65.0333 + 11.889 for group B respectively, were as post interventional value for group A was 23.7333 + 6.397 and group B was 31.4333 + 4.57. PRTEE SCORE showed extremely significant increase in functional ability for both the groups. This was done by using paired 't' test (Friedman test with post-test)

Table 6: Comparison of PRTEE SCORE between groups

Groups	Pre-treatment	Post- treatment		
	Day 1	Day 7	Day 14	Day 21
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
A	63.1333 ± 6.553	49.8 ± 9.147	38.9666 ± 7.763	23.7333 ± 6.397
B	65.0333 ± 11.889	52.3 ± 7.894	41.3666 ± 6.269	31.4333 ± 4.574
U'	136.50	137	145	191.50
P	0.3297	0.3192	0.1842	0.0011
Significance	Not significant	Not significant	Not significant	Very significant

The pre-treatment value for group A 63.1333 ± 6.553 and 63.0333±11.889 for group B respectively, were as post interventional value for group A was 23.7333 ± 6.397 and group B 31.4333 ± 4.574. PRTEE SCORE showed statistically very significant difference. This was done by using unpaired t' test. (Mann-Whitney test)

Discussion

The present study was undertaken with the aim to evaluate the effect of therapeutic intervention and hand muscle training on pain and quality of hand function in subjects with chronic tennis elbow.

Study included 30 subjects. It affects both the sexes commonly and it appears to be more severe and of longer duration in females [11,12]. which correlates in this study.

Tennis elbow is common in age group between 30 and 60 years of age[3]. Subjects of the age group 35-55 were included in the study. The inclusion of sample in this study supports the prevalence rate of above study.

According to study mean value of age for Group A was 40.4 and for Group B was 40.06, which is considered as not significant. Statistical analysis was done using nonparametric unpaired t test for between group analysis and paired t test was used for within group analysis.

Statistical analysis showed that post treatment there was extremely significant difference in VAS score at rest in both the groups(p=0.0007). (Table 1)

Statistical analysis showed that post treatment there was extremely significant difference in VAS score on activity in both the groups (p=0.0001) (Table 2)

Group A was more efficient in improving Hand Grip Strength than Group B post treatment. (Table 4)

Statistical analysis showed that post treatment there was extremely significant difference in Hand grip strength in both the groups (p <0.0001)

Statistical analysis showed that post treatment there was very significant difference in PRTEE score in both the groups (p=0.0011)

Group A was more efficient in improving functional disability than Group B post treatment. (Table 5, 6)

In phonophoresis ultrasound facilitates the passage of some drug into and through the skin and the effects are due to absorption of the drug and also due to the ultrasound[13]

Reduction of inflammation is achieved with the phonophoresis as it causes elevation of the pain threshold and alteration of neuromuscular activity which leading to muscle relaxation, induction of tissue regeneration.

A Paungmali et al (2003)[14] showed there is sufficient recruitment and activation of descending pain inhibitory systems following application of MWM which produces sensory input which results in analgesic effects

Lateral glide to elbow joint helps to reposition the ulna and radius in relation to the humerus[15].

Eccentric strengthening exercises and hand muscle training helps to reduce the pain and improve quality of hand function.

Strength training is type of resistance that induces muscular contractions that results in building the strength and size of skeletal muscles[16].

It improves Strength, grip strength and endurance thus it leads to improvement in hand function.

Recent evidence has indicated that the combination of exercise training with electrotherapeutic modality is more effective than exercise training alone[17]. Which correlates in this study.

The findings in study were consistent with the experimental study. And it showed the significant reduction in intensity of pain and improvement in hand grip strength and functional disability on the outcome measure, VAS, Hand held dynamometer and on PRTEE. Hand muscle training yields better outcome in improving hand grip strength and functional disability.

Result

Based on the results of the present study it is concluded that both the Groups showed significant reduction in VAS and improvement in HHD and PRTEE score. Group A showed extremely significant result than Group B in subjects with chronic tennis elbow.

Conclusion

Results supported that hand muscle training with baseline treatment was more effective than only baseline treatment in reducing pain and improving quality of hand function.

Conflicts of Interest: There were no conflicts of interest in this study

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical science, deemed University, Karad.

Source of Funding: Source of funding is Krishna institute of medical sciences deemed University, Karad

REFERENCES

1. Thomas De Smedt et al, Lateral epicondylitis in tennis: update on aetiology, biomechanics and treatment, Br J Sports Med. 2007 Nov; 41(11): 816–819. Published online 2007 Jul 6
2. Rahman Siri, et al, Prevalence and determinants of lateral and medial epicondylitis: a population study, American journal of epidemiology vol.164, issue 11 published 12 sep 06: 1065-74.
3. Dimitrios S, Areti-Zoe C, Theodoros C (2013) Are there Effective Ultrasound Parameters in the Management of Lateral Elbow Tendinopathy? A Systematic Review of the Literature. Int J Phys Med Rehabil 1:117. doi: 10.4172/2329-9096.1000117
4. R stoeckart PhD et al, Anatomy of extensor carpi radialis brevis muscle related to tennis elbow, vol.4, issue 4, no.1989, pg. no. 210-212
5. Amrisho Chourasia PhD, Kevin A. Buh, PhD (2013), Relationship between biomechanics, tendon pathology and function in individual with lateral epicondylitis. J ortho sports Phys Ther.2013 June; 43(6): 368-378.
6. Hafizur Rahman et al, Effectiveness of mulligan mobilisation with movement compared to supervised exercise program in subjects with lateral epicondylitis. Int J Physiotherapy Res 2016, vol 4(2):1394-1400
7. Danielle soares morel et al effects of whole body vibration intervention on handgrip strength of brazilian healthy soldiers, afr j tradit complement altern med. 2017; 14(4 suppl): 28–32. Published online 2017 July 7
8. Jagartheesan Alagesan et al Physiotherapy management of lateral epicondylalgia: A critical review of treatment method, ijcrr 7/12/11, vol 04 issue 02
9. Electrotherapy explained Principles and practice 4th edition Val Robertson, Alex Ward, John Low and Ann Reed, pg. No. 295)
10. Kinser C. Colby L: A: Therapeutic exercises 5th edition Ch. No. 5 pg.no. 120
11. Coombes BK, Bisset L, Vicenzino B. Management of Lateral Elbow Tendinopathy: One Size Does Not Fit All. J Orthro Sports Phys Ther. 2015; 45:938–949
12. Waugh EJ et al Factors associated with prognosis of lateral epicondylitis after 8 weeks of physical therapy. Arch Phys Med Rehabil. 2004; 85:308–318
13. John Low and Ann reed, Electrotherapy Explained Principles and practice, 9th edition
14. Paungmali A et al, Hypoalgesic and sympathoexcitatory effect of mobilization with movement for lateral epicondylalgia. Phy Ther 2003; 83:374-83
15. Vicenzino B et al. Specific manipulative therapy treatment for chronic lateral epicondylalgia produces uniquely characteristic hypoalgesia. Man Ther. 2001;6(4):205–212.
16. Komal.D. Thorat1 et al, Effectiveness of strength training on hand function in patients with Diabetic neuropathy**,** Indian Journal of Basic and Applied Medical Research; September 2015: Vol.-4, Issue-4, P. 429-437
17. Dingemanse R et al. Evidence for the effectiveness of electrophysical modalities for treatment of medial and lateral epicondylitis: a systematic review. Br J Sports Med. 2014; 48:957–965.

Assessment of Balance in Children with Developmental Coordination Disorder in Indian Context

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ABSTRACT

Background: Children with Developmental Coordination Disorder (DCD) have inability in performing physical activity as like the peer group children of same age and they have deficit in motor control and encounter imbalance when exposed to gait initiation in an unfamiliar environment. It has been shown that imbalance leads to inhibition of gait adaptations which is evident by shorter steps, greater trunk inclination, decreased ankle plantar and dorsiflexion

Methodology: The children who participated in this study were selected from various elementary schools in and around Chennai. There were 100 children in the age group of 8-10 years old. After getting informed consent signed, all children were evaluated using Body Coordination Test for children - BCTC. Initially at the baseline all the 100 children were evaluated with MABC

Discussion: The present study examined the movement difficulties in children with DCD and to examine the balance ability between children with Developmental Coordination Disorder (DCD) and NON-DCD Group. The Body Coordination Test for Children was used in this study since the test examines the assessment of children's coordinative performance.

Result: The results showed that children participating in this study exhibited difficulty in balance along with the motor coordination difficulty indicating the existence of DCD disorder

Conclusion: Children with DCD physically, psychologically and socially avoid participating in physical activities in order to avoid injuries due to their difficulty in balance. Thus, early identification and treatment of balance control difficulties are in increasing need.

Keywords: *DCD, MABC, BCTC, BALANCE, INCOORDINATION*

Introduction

Children with Developmental Coordination Disorder (DCD) have inability in performing physical activity as like the peer group children of same age. This inability is due to poor motor coordination. Children with DCD have difficulties in performing activity of daily living, which makes them isolated from the peer group of same age in school and sometimes at home too. If this isolation continues for a long period of time might leads to long term health and psychological issues[1].

Walking is an essential skill that needs to be acquired by all the children at the age of one. Children with DCD experiences difficulty in achieving this task and they find walking as a difficult and complex task to perform. They experience difficulty in locomotion from place to place without tripping or falling. Majority of researchers have highlighted that these children without evaluation of their gait patterns and reasons of fall during their locomotion will be reported to have the persistent difficulty in adolescence[2].

Teachers and parents commonly call these children as clumsy, awkward in walking. Therapist working with DCD children have identified different gait pattern and they found to have difficulty in walking and loose balance when certain new object has been interfered in their walking space in a familiar environment. They reported to have frequent sway, stumbling and hitting to objects in the pathway. When the Gait pattern of these children has studied in detail, children with DCD walked with shorter steps and at a higher cadence than the typically developing children[3].

It has been known that, DCD is not caused by neurological or any other pathological condition and its prevalence is reported to be 2-3% in southern India. Deficit in proprioception and perception makes these children clumsy, however, it remains unclear how the impairment in motor control contribute to the completion of daily activities[4].

However children with DCD reported to lose balance when they were exposed to new environment and they have a poor visual- proprioception that hampers the gait pattern and increases the incidence of fall. When Obstacle crossing is examined in children with DCD, it has been clear that children lose balance control and fall, because it demands precise balance control using perceptually driven postural adjustments. Previous researches in traumatic brain injury patients and their balance control during obstacles crossing during the initiation of normal walking has concluded that imbalance and postural sway has reported, when the patients encounter hurdles or obstacles in the pathway[5].

Children with DCD have deficit in motor control and encounter imbalance when exposed to gait initiation in an unfamiliar environment. It has been shown that imbalance leads to inhibition of gait adaptations which is evident by shorter steps, greater trunk inclination, decreased ankle plantar and dorsiflexion[6].

Literatures with the established difficulties with balance and visual perception, children with DCD were expected to demonstrate more signs of instability and less accurate foot positioning leading to more unsuccessful Gait initiation. But none of the researchers have documented which activity has imposed a sway and instability in children's with DCD. Hence the study is conducted with the Aim to evaluate balance limitations in Children with Developmental Coordination Disorder (DCD) and typically developing (TD) children[7].

Methodology

The children who participated in this study were selected from various elementary schools in and around Chennai. There were 100 children in the age group of 8-10 years old. After getting informed consent signed, all children were evaluated using Body Coordination Test for children - BCTC. Initially at the baseline all the 100 children were evaluated with MABC. It was found that 20 children out of the total number of 100 children selected in the study shows motor difficulties and identified as DCD disorder. Control group of 20 children with NON-DCD has been randomly selected from the 80 subjects found to have low score on MABC

The 20 students diagnosed with DCD were matched with Non-DCD children according to gender and age to avoid environmental and educational influences causing bias. Enrolled children's have normal IQ documented with WISC and children's with No physical or neurological disorder. Any history suggestive of sensory impairment, epilepsy was excluded from the study[9].

However information regarding the activity of daily living and academic achievements and the impact difficulty in coordination with physical activity and performance has been evaluated and documented. Age and intellectual ability of the children was derived from school reports and records according to the recommendations of APA

Body Coordination Test for Children evaluates the overall body co-ordination and balance control of children from 5 to 14 years old. It is gold standard in assessment of children with DCD. This test measures the overall body coordination by children performing four tasks: retro walking, obstacle jump on one foot, sideways movements with initial position and side jumps. In side jumps children were instructed to jump sideways over a hurdle within a period of 15 seconds.

The instructions provided to each children is similar to avoid influence of motivation in test performance for the four subtests a raw score (RW) is recorded. A Motor Quotient (MQ=100) percentiles is estimated per item as well as for the global test. A score less than 85 indicates coordination difficulty. Balance testing was performed on a pressure platform. All the children were asked to perform one-leg stance and double-leg. They were instructed to stand motionless on the platform. They can adapt the normal posture and arms should hang at the side. Posture should be maintained for 30 seconds[10].

Each task has to be repeated with eyes open and with eyes closed with 2 trails of each test and a five-minute rest was provided between successive trials. The best trial was documented. Children were instructed to stand on the force platform with the dominant leg exactly placed on the reference marking of foot in the force platform. Before making the children to stand on

the force platform, the dominant leg assessment was made by making the children to kick a ball which has been suddenly rolled before him without any instructions on which leg to be used for kicking with the simple instruction like "kick the ball hard". Time in seconds has been recorded and 2 trial has been allowed with the baseline familiarization test for 5 minutes.

A computer program in the pressure platform was used to analyze and document peak-to-peak amplitude and standard deviation of the COP from the mean value of COP in mm, denoted as sway amplitude. In the same way double leg stance time the sway was calculated. The trial has been repeated by making the child to close their eyes during single leg stance and double leg stance and their ability to balance has been assessed.

Data Analysis

Table 1: Peak-to-peak amplitude of the center of pressure (cop) displacement (copmax) and standard deviation of the cop (copsd) in the anterior posterior (a/p) and in mediolateral (m/l) direction

Balance Test	Group A	Group B
Double Leg Stance with Closed Eyes (mm)		
CoP max -M/L	25.00 ± 9.90	10.11 ± 2.00
CoP sd -M/L	4.20 ± 1.00	2.00 ± .00
CoP max-A/P	15.20 ± 3.30	10.44 ± 2.00
CoP sd-A/P	4.00 ± 2.00	2.01 ± .00
One Leg Stance with Closed Eyes (mm)		
CoP max -M/L	40.67 ± 0.80	20.00 ± 2.00
CoP sd -M/L	15.00 ± 2.00	4.11 ± 1.00
CoP max-A/P	40.00 ± 7.00	28.20 ± 4.00
CoP sd-A/P	9.15 ± 1.00	5.52 ± 1.00

Discussion

The present study examined the movement difficulties in children with DCD and to examine the balance ability between children with Developmental Coordination Disorder (DCD) and NON-DCD Group. The Body Coordination Test for Children was used in this study since the test examines the assessment of children's coordinative performance. The results showed that children participating in this study exhibited difficulty in balance along with the motor coordination difficulty indicating the existence of DCD disorder.

Motor skills and balance were still improving till the age of 8, to avoid the bias in balance control and motor performance in younger children, the age group selected in this study is 8 to 10 years of age, and the primary finding of the current research was COP Excursion was decreased in children with DCD. The reduction of ability to maintain balance has been well documented in children's with DCD. **TABLE 1** show that children with DCD have greater postural sway as compared to non-DCD children. This observation was done with closed eyes in children with DCD during balance testing. Proprioceptors play a major role in maintaining balance control rather than on visual afferent impulse.

DCD children have immediate adverse effects on academic and daily living skills because of balance disorder and have significant impacts on academic, psycho-social and vocational outcomes.

Conclusion

Children with DCD physically, psychologically and socially avoid participating in physical activities in order to avoid injuries due to their difficulty in balance. Thus, early identification and treatment of balance control difficulties are in increasing need.

Ethical Clearance: Has been obtained from institutional ethical committee

Conflict of Interest: Nil

Source of Funding: Nil

REFERENCES

1. GanapathySankar U, Saritha S. A study of prevalence of Developmental Coordination Disorder (DCD) at Kattankulathur, Chennai, Indian Journal of Physiotherapy and occupational therapy, 2011, Jan;5(1).
2. Dr. U. Ganapathy Sankar, the Prevalence of Developmental Coordination Disorder at Kattupakkam, Tamilnadu. IOSR Journal of Pharmacy, Volume 8, Issue 2 2018, PP. 49-52 2018
3. Nicolson, R. I., Fawcett, A. J., & Dean, P. Developmental dyslexia: The cerebellar deficit hypothesis. Trends in Neurosciences, (2001). 24, 508–511, Commentaries pp. 512–516.

4. Odenrick, P., & Sandstedt, P. Development of postural sway in the normal child. Human Neurobiology,1984, 241–244.

5. Piek, J. P., & Coleman-Carman, R. (1995). Kinaesthetic sensitivity and motor performance of children with developmental co-ordination disorder. Developmental Medicine and Child Neurology, 37, 976–984.

6. Piek, J. P., & Skinner, R. A. (1999). Timing and force control during a sequential tapping task in children with and without motor coordination problems. Journal of the International Neuropsychology Society,5, 320–329.

7. Raynor, A. J. (1998). Fractioned reflex and reaction time in children with developmental coordination disorder. Motor Control, 2, 114–124.

8. Raynor, A. J. (2001). Strength, power, and coactivation in children with developmental coordination disorder. Developmental Medicine and Child Neurology, 43, 676–684.

9. Riach, C. L., & Hayes, K. C. (1987). Maturation of postural sway in young children. Developmetnal Medicine and Child Neurology, 29, 650–658.

10. Roncevalles,M. N. C., Jensen, J. L., &Woollacott, M. H. (2001). Development of lower extremity kinetics for balance control in infants and young children. Journal of Motor Behavior, 33, 180–192.

A Comparative Study to Determine the Effectiveness of the Taping and Mulligan's Mobilization with Movement Techniques on Pain in Knee Osteoarthritis

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ABSTRACT

Background: There is no cure for knee OA, thus conservative treatment aims to reduce pain and limit functional impairment. Inexpensive Non pharmacological, non-surgical interventions with minimal side effect are desirable. Such as the treatment offered by physiotherapists, there are recommended as the first line of treatment for hip and knee osteoarthritis (OA)

Methodology: 20 Patients took for the research study, they divided into two groups. Group A-10 Patients has given McConnell Patella taping, Group B-10 patients has given mobilization with movement, For both the groups each treatment session may last for 15-20minutes 4 days a week.

Result: As the results indicate, there was statistical significant effects following two techniques i.e. MWM and taping on pain in OA knee patients. Group A (MWM) shows the pre treatment mean of vas 6.1 and post treatment mean value is 2.2. the difference between pre and post treatment is 3.9 with p value <0.0001 i.e. significant

Conclusion: The study also emphasis that mobilization with movement is comparatively more beneficial in reducing pain than taping in OA knee patients

Keywords: *Osteoarthritis, MWM, McConnell patella taping*

Introduction

Life is movement, and movement is life. Live movements takes place at joints. Arthritis hampers joint movement and disturbs normal life. Osteoarthritis, is a joint disorder and most common form of arthritis, it is a deliberating progressive disease affecting 20% of the population, principally the elderly[1]. The commonly affected joints are knees, hips, spine and shoulder. Knee osteoarthritis is a degenerative disease of the knee joint more common in people older than 40 years predominately considered a 'wear and tear' process, where there is a gradual degradation of the hyaline cartilage that covers the articulating surfaces of the bones in the knee joint. It is regarded as the important socioeconomic problem because it is one of the foremost disabling conditions and its treatment entails great expenditures

The high incidence of knee osteoarthritis in India is the result of its prevalence among women who fall victim to it[2]. Menopausal women are especially prone to it. Till the age of 55 it occurs equally in both the sexes; after 55 the incidence is higher in women. It is estimated that approximately four out of 100 people are affected. The incidence of knee osteoarthritis in India is as high as 12 Per cent. Factors such as age, family history, obesity increase susceptibility to OA. In addition to these, local biomechanical factors like congenital anomalies, trauma, and occupational injuries affect the occurrence and localization of OA. Symptomatically, the most common

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affected joint in OA is the knee joint[3].Old age cannot be healed or prevented. The common clinical features of knee osteoarthritis are pain stiffness and decreased range of motion. The commonest obstacle for the elderly to carry out ADL is the problem of joint pain and decreased mobility.

Changes in Osteo-Arthritic Knee

Joint Space Narrowing: Osteoarthritis causes deterioration of the joint structures, deterioration of articular cartilage leads to narrowing of the joint space (i.e., the space between the end of bones in a joint). Progressively smaller joint space suggests worsening of osteoarthritis. Joint space loss is usually not uniform within the joint.

Development of Osteophytes: Osteophytes , also called bone spurs, are protrusions of bone and cartilage. The bony projections are commonly seen in areas of a degenerating joint and can be seen on x-rays. Osteophytes, Which typically develop as a reparative response by remaining cartilage, cause pain and limited range of motion in the affected joint

Ligamentous Instability: Anterior cruciate ligament, posterior cruciate ligament, Medial collateral ligament , Lateral collateral ligament

Subchondral Cyst Formation: Subchondral cysts are fluid-filled sacs which extrude from the joint. The cysts contain thickened joint material, mostly hyaluronic acid, Traumatized subchondral bone undergoes cystic degeneration.

There is no cure for knee OA, thus conservative treatment aims to reduce pain and limit functional impairment. Inexpensive Non pharmacological, non surgical interventions with minimal side effect are desirable. Such as the treatment offered by physiotherapists, there are recommended as the first line of treatment for hip and knee osteoarthritis(OA). Given the prevalence of knee OA, its economic and human burden, and accumulating evidence supporting the effectiveness of various physiotherapy interventions for patients with knee OA of the hip or knee, further research is warranted[4]. Two common forms of physiotherapy intervention are patellar tapping and mulligan mobilization with movement recommended by international bodies

Patellar taping was invented by jenny McConnell, a physiotherapist. This intervention involves pushing the patella medially and securing it in this position with tape on the skin/ The acute effects of taping the knee as short term or intermittent treatment for knee pain is believed to relieve pain by improving alignment of the patellofemoral joint and/or unloading inflamed soft tissues.

Benefits of Patella Taping: When used correctly, patella tapping techniques can; decrease pain during sport or activity aid healing of certain knee injuries, correct patella alignment , allow an earlier return to sport or activity following injury , reduce the likelihood of injury aggravation, prevent knee injuries (such as a dislocated patella) during high risk of sports (such as basketball, football etc.,)

Objective of the Study

To study the effect of McConnell patella taping on pain in knee osteoarthritis.

To study the effect of Mobilization with movements on pain in knee osteoarthritis.

To compare the effect of McConnell patella tapping and mobilization with movements on pain in knee arthritis.

Need of Study: Application of mulligan's mobilization with movement techniques produced immediate pain relief after first treatment procedures thus MWM have been found to be feasible and efficacious in individuals with knee osteoarthritis. Taping has been proved cheap and effective method of treatment on pain in knee osteoarthritis. Taping and MWM techniques compared in this study for their effectiveness for treating patients with knee osteoarthritis[5].

Material and Methodology

Sample Size: The samples of the study will consist of 20 patients with knee joint osteoarthritis

Sampling Technique: Simple random technique is used

Population: The population for this study includes all subjects having osteoarthritis of knee.

Sample Selection

Inclusion Criteria: knee pain, age 50 years , body mass index 38, crepitus, bony tenderness , bony enlargement , no palpable warmth

Exclusion Criteria: Allergy to tape, secondary arthritis of kne or inflammatory condition like rheumatoid arthritis,

Body mass index 38(owing to difficulties of taping the knee effectively). Active infection around knee joint, patients who underwent knee surgery (previous 6 months), psychological problems.

Outcome Measures: Pain and functional disability

Measuring Tools: VAS (VISUAL ANALOG SCALE); Knee pain is recorded with VAS before and after each tape application and mobilization with movement.

Methodology

Treatment Protocol: 20 Patients took for the research study, they divided into two groups. Group A-10 Patients has given McConnell Patella taping, Group B-10 patients has given mobilization with movement, For both the groups each treatment session may last for 15-20minutes 4 days a week.

Before starting the study process all participants are informed with the study in general and the study aims and objectives. Consent forms and pre study information sheet has given to them prior to the study. The subjects have been randomly assigned to one of the two groups either the experimental group or control group. The participants were blind to which group they enrolled to.

At the first session, before giving the treatment demographic information was taken after that the participant was asked to use VAS to assess pain. Group A, was given therapeutic knee taping (patella taping) and Group B, was given mulligan's mobilization with movement (MWM) for the knee.

Taping Procedure: Patient is seated in a comfortable position usually supine at an optimal working height .The skin should be cleaned and dried, removing any grease of sweat. Full attention of patient is demanded. The joint is place in a functional position with minimum stress on the joint. It is ensured that the ligaments are in shortened position. The patient is explained about the function of the tape and how it feels.

McConnell Patella taping –Begin lying on your back, with the knee slightly bent, but completely relaxed and a foam roller or rolled up towel under the knee. Start the tape in line with the middle of the knee cap at the outer aspect of the knee. Using your thumb on top of the tape, gently push the knee cap towards the inner aspect of the knee whilst simultaneously using your fingers to pull the skin at the inner aspect of the knee towards the knee cap. Finish this taping technique at the inner aspect of the knee ensuring you have created some wrinkling of the skin at the inner aspects of the knee . repeat this process 1 – 3 times depending on the amount of support required[6].

Removing The Tape: Care should be taken when removing the tape to avoid injury aggravation or skin damage. The tape should be removed slowly, pulling the tape back on itself with pressure placed on the skin as close as possible to the line of attachment of the tape.

Mulligan's Mobilization With Movement (MWM) For Knee: The patient is in standing position and s asked to place the painful leg on the chair. The therapist then places his hands proximally around the lower leg and rotates the tibia medially and hand on the fibular side carries the fibula forward at the same time. sustaining this rotation the patient is asked to forward flex his knee provided there is no pain.

Results and Statistical Analysis

Table 1: Gender Distribution in the Sample Size Selected

Group	No. of Male	No. of Females
Group	No. of Male	No. of Females
MWM	6	4
Taping	7	3
Total	13	7

Table 2: Showing Mean of The Pre and Post Vas Measures of Mobilization with Movement and Taping

Groups	PRE (mean +/- S.D)	Post (mean +/- S.D)	Difference (mean +/-S.D)
MWM	6.1+/-1.595	2.2+/-1.033	3.9+/-1.524
Taping	5.3+/-1.337	2.6+/-1.114	2.7+/-1.059
P Value	<0.0001	0.0001	0.0558

Discussion

Many studies have been carried out to determine the effect of mulligan's mobilization with movement and patellar taping on various joints. Although this topic is widely discussed in earlier studies, the results obtained vary in most of the studies both the techniques have been proved beneficial in decreasing pain in osteoarthritis.

The current study was undertaken to investigate and compare the effectiveness of the mobilization with movement and taping in knee osteoarthritis patients Evgeniya Dimitrova ct al. (2008) conducted a study to provide evidence based recommendations for prescription of mobilization with movement. This study demonstrated that strengthening of knee musculature was more effective after the MWM and was associated with significant improvement in quadriceps strength and function, when compared with controls in reducing pain and improving function in individuals diagnosed with knee osteoarthritis, Wayne Hing ct al. (2006) conducted a stud to evaluate the overall efficacy of MWMs[7]. This study found significant positive results with MWM applications, when compared to placebo or control groups. The most common significant results found were increase in strength reduction in pain levels and increase in pain pressure threshold and Cushnaghan ct al (1994) conducted a study to test the hypothesis that medial taping of the patella reduces the symptoms of osteoarthritis of the knee when the patella-femoral joint is affected. The aims of this study were firstly, to evaluate the symptomatic benefit of knee taping designed to realign the patella in older subjects with knee osteoarthritis and secondly to apply rigorous clinical trail methodology to a physical form of treatment[8].

For the purpose of the study 20 patients were taken which divided in two even groups. 10 patients were given McConnell Patella Taping and 10 patients were given mobilization with movement. VAS was taken pre and post treatment to assess the pain. For both the groups each treatment session last for 15-20minutes 4 days a week.

Study included 13 male patients and 7 female patients out of 20 patients chosen for experiment. In group A, no. of male patients were 7 & no. of female patients were 3. In group B,6 patients were male & 4 patients were females.

As the results indicate, there was statistical significant effects following two techniques i.e. MWM and taping on pain in OA knee patients. Group A (MWM) shows the pre treatment mean of vas 6.1 and post treatment mean value is 2.2. the difference between pre and post treatment is 3.9 with p value <0.0001 i.e. significant

While taping shows pre treatment mean value of vas 5.3 and post treatment mean value is 2.6. The difference between pre and post treatment is 2.7 with p value 0.0558

Statistical analysis shows that mobilization with movement technique is more effective than taping.

Conclusion

Based on statistical analysis, its interpretation and evidence in the present study strongly emphasis that mobilization with movement and taping both are significantly effective in reducing pain in OA knee patients.

The study also emphasis that mobilization with movement is comparatively more beneficial in reducing pain than taping in OA knee patients.

Clinical Implications: The study suggest there is significant difference between in the effects of both the techniques thus more beneficial technique i.e. Mobilization with movement may be used in the treatment of knee OA.

Mobilization with movement may be used to decrease the pain in knee in osteoarthritis patients and improve the quality of life in OA knee patients

Limitations: The study was conducted in a small group of population so cannot be generalized to whole population and large study is required

Ethical Clearance: Taken from institutional ethical committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. J. R. Roush, R. Curtis Bay Prevalence of anterior knee pain in 18-35 year-old females Int J Sports Phys Ther, 7 (4) (2012), pp. 396-401

2. S. Werner Anterior knee pain: an update of physical therapy, Knee Surg Sports Traumatol Arthrosc, 22 (10) (2014), pp. 2286-2294

3. M. Boling, D. Padua, S. Marshall, K. Guskiewicz, S. Pyne, A. Beutler Gender differences in the incidence and prevalence of patellofemoral pain syndrome, Scand J Med Sci Sports, 20 (5) (2010), pp. 725-730

4. J. P. Fulkerson Diagnosis and treatment of patients with patellofemoral pain, Am J Sports Med, 30 (3) (2002), pp. 447-456

5. V. Sanchis-AlfonsoAnterior Knee Pain and Patellar Instability, Springer-Verlag London Limited (2011)

6. S. J. Warden, R. S. Hinman, M. A. Watson, K. G. Avin, A. E. Bialocerkowski, K. M. Crossley Patellar taping and bracing for the treatment of chronic knee pain: a systematic review and meta-analysis-Arthritis Care Res, 59 (1) (2008), pp. 73-83

7. K. Crossley, K. Bennell, S. Green, S. Cowan, J. Mc Connell Physical therapy for patellofemoral pain a randomized, double-blinded, placebo-controlled trial-Am J Sports Med, 30 (6) (2002), pp. 857-865

8. D. Hryvniak, E. Magrum, R. Wilder Patellofemoral pain syndrome: an update- Curr Phys Med Rehabil Rep, 2 (1) (2014), pp. 16-24

Perception of Undergraduates and Postgraduates of the Scope of Periodontics

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ABSTRACT

Background and Aim: Periodontology is a fast evolving field where newer insights into existing concepts are changing the face of the traditional periodontal treatment. Constant research is taking place so as to develop a number of newer avenues in the treatment of the periodontal diseases. However, the protocol of management of periodontal diseases in the setup of general dental practice has undergone little change over the last decade. How do dental professionals view the scope of the specialty of periodontology? The aim of this study is to use a rank-order survey to determine the scope of periodontology according to undergraduates and postgraduates.

Method and Materials: Based on a previous study in which respondents were asked to list the answers to the question, ''Who is a Periodontist?'' The results were consolidated into eight statements. The eight statements were placed into a rank-order online survey. The responses primarily came from undergraduate dental students, interns, general dental practitioners and postgraduates of various departments.

Result: Undergraduates defined the scope of this practice by stating that the two most important aspects are surgical treatment of periodontitis and promotion of research towards better understanding of periodontal health and its relation with systemic diseases. The least important statement was that ''Periodontists are educators promoting health.'' Postgraduates perceive the specialty of periodontology differently than undergraduates in that they ranked surgical treatment and the esthetic surgical procedures as the two most important.

Conclusion: This study shows that there are differences between the two groups of respondents. With the information shown here, communication with a periodontist regarding their scope in the field, both undergraduates and postgraduates of other specialties will become knowledgeable and have a high diagnostic acuity.

Keywords: *Undergraduates; Postgraduates; Data analysis; Esthetics, Implant, Periodontics*

Introduction

The specialty of Periodontology is evolving in all aspects ranging from newer advances in diagnosis, to the use of growth factors and regenerative techniques in treatment. These evidence-based advances have given periodontal diagnosis and treatment a level of predictability of success, which was lacking just a decade ago. Quality dental institutes, which incorporate all these advances in their setup and curriculum, have evolved all over the country. Thus, today we see periodontology as a specialty reaching newer heights, and with a very bright future in front of it.

Historically periodontal therapy has been directed primarily at the elimination of disease and maintenance of a functional, healthy dentition and supporting tissues. More recently however it has become increasingly focused on esthetic outcomes, which extend beyond tooth replacement and tooth color to include the soft tissues framing the dentition. [1, 2]

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In spite of the developing of quality dental institutes, a majority of the population visits private dental clinics for their dental needs, especially in the urban areas. The development of Internet as a reliable source of knowledge, and the publication of quality journals has made knowledge of periodontal treatment freely accessible to all practicing dentists. However, Periodontists commonly complain that the knowledge of periodontal diagnosis and treatment in the minds of a general dentist is sometimes limited to the level taught in the BDS curriculum at the time of their graduation.

How is the practice of periodontology defined? In today's world, a Periodontist a dentist whose prime therapeutic focus is to help to preserve natural teeth in health, or is the prime focus replacing the natural teeth with esthetically pleasing and functional implants? Should specialists in Periodontology increase time and attention toward the research and techniques of dental implants and ridge preservation/ augmentation, and thus chance the dilution of periodontal research for the natural dentition?

The contrast from the origins of the specialty of Periodontology in 1947 to today is noteworthy. In describing the responsibility and the scope of practice of Periodontics, the American Academy of Periodontology (AAP) presently states:

A Periodontist is a dentist who specializes in the prevention, diagnosis, and treatment of periodontal disease, and in the placement of dental implants. Periodontists are also experts in the treatment of oral inflammation. Periodontists receive extensive training in these areas, in the three additional years of education beyond dental school. They are familiar with the latest techniques for diagnosing and treating periodontal disease, and are also trained in performing cosmetic periodontal procedures [3].

However, replacing missing teeth has always been a concern for dentists, and doing so through dental implantology is not a new phenomenon. History has evidence of Egyptians and Mayans implanting sea-shells[4, 5, 6, 7] and the Romans using metal implants as replacements for lost teeth. [8] In the early 20th century, E.J. Greenfield[9] used a dental implant similar to those later used by Branemark et al. in the mid- 20th century.[10] However, it was the discovery of titanium's biocompatibility and ability to osseointegrate with human bone that exponentially increased the success rate of dental implants.[4] Today, dental implants have become a major part of the periodontist's armamentarium.

In an International Journal of Periodontics & Restorative Dentistry guest editorial dated September/ October 2008, entitled "Where is periodontology heading?" the author's dilemma of "moving away from our primary professional competencies" is discussed.[11] Is periodontology transitioning toward dental implants and implant-related procedures as a prime focus for practice rather than as a subcategory of the overarching core ideals of creating and maintaining a clinically healthy periodontium with the natural dentition? This thought was also stated in 2007 in the preface of Edward Cohen's atlas, in which, regarding dental implants, he stated, "Too often teeth are now prematurely extracted for implant placement."[12, 13]. Case study by Ramesh et al [14] reports placement of implants in generalized aggressive periodontitis where the esthetics and functions had to be restored. After 4 months of placement, the radiographs showed successful osseointegration of the dental implants without any biological complications. Such cases are primarily handled and followed –up by Periodontists for better treatment outcome.

Because of the dynamic history of periodontology and the innovations that have occurred, what is the scope of today's periodontist? The purpose of this research project is to demonstrate how undergraduates and postgraduates view the specialty.

Materials and Method

Based on a pilot study conducted Dr. Paul A. Levi Jr., [3] Department of Periodontology, Tufts University School of Dental Medicine in which respondents were asked to list the answers to the question, "What is a periodontist?" the results obtained were consolidated into eight statements. The eight statements were placed into an anonymous rank-order online survey. The link to the survey form was delivered to the respondents in digital form using an online survey program. The respondents were able to open the link on their mobile devices and fill in the survey at location of comfort. The responses primarily came from undergraduate dental students, interns, general dental practitioners and postgraduates of various departments. All participants were advised of the nature of the study and consented to respond. The

responses were gathered from online forum and tabulated and maintained in a secure file on a PC.

The definitions returned from the pilot were categorized into the following themes: implants, education, advising, cosmetics, research, surgery, oral hygiene, and co-therapists with other professionals. One sentence was created for each theme. These sentences were then labeled as statements and placed into a rank-order survey, which was then distributed, in digital form using an online survey program to widen distribution to undergraduates and postgraduates. The online survey ensured that all eight statements were ranked to complete the survey. Information collected along with the survey responses included: 1) Name; 2) Email address; 3) Designation; 4) Department; 5) Gender.

Inclusive criteria: Dental students, interns, general dental practitioners, post-graduate students, post-graduate practitioners were included in the study.

Exclusive criteria: Dental technicians, dental assistants, dental hygienists, persons of other medical profession, patients were excluded from the study.

Survey response collection was terminated when the two main groups of respondents from Saveetha Dental College, undergraduates(65%) and post-graduates(35%), had provided 100 responses.

Online Survey form

Name:

Email address:

Designation:

Department:

Gender:

Who is a Periodontist? (Rank the statements in order o relevance)

Statement 1: Periodontists perform dental implants and related procedures

Statement 2: Periodontists surgically treat advanced gum and bone infection problems

Statement 3: Periodontists promote research to better understand periodontal disease, their effect on systemic health and their related therapies

Statement 4: Periodontists are advisors to other dental and medical professionals in regards to diagnosis, prognosis and treatment planning

Statement 5: Periodontists are educators promoting health

Statement 6: Periodontists treatments help general dentists and other specialists increase successful therapeutic outcomes with their patients

Statement 7: Periodontists assist in conserving patient's dentition in health by emphasizing the patient's oral hygiene plaque control

Statement 8: Periodontists treat esthetically compromised periodontal conditions through bone and soft tissue (gum) procedures

Data Analyses

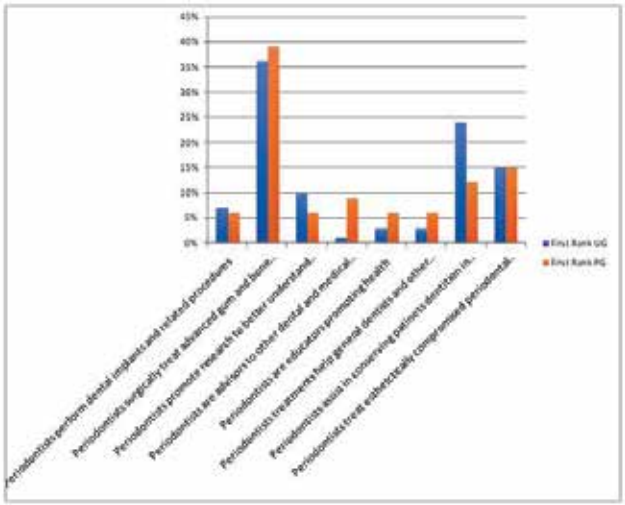
In total, 100 responses were received, and the information was compiled from the occupation variables to establish two general cohorts of responders: undergraduates (general practitioners, dental students), and postgraduates (which includes other specialists including periodontologists).

Descriptive analyses included frequencies and graphical outputs were obtained. The major cohorts were compared using manual data analysis to evaluate whether the rank order was different between the two groups for a specific statement.

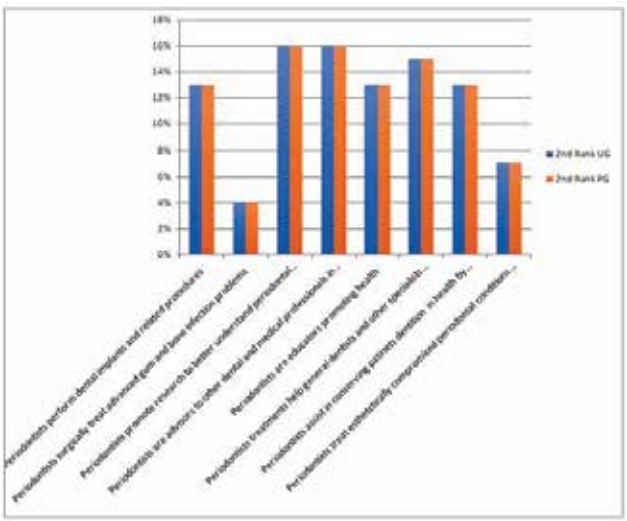
Results

The rank order of the Periodontists' responses shows that statement 2, ''Periodontists surgically treat advanced gum and bone infection problems (36%),'' was considered the most important statement expressing the scope of periodontics by undergraduates. Statements 3 and 8, i.e., "Periodontists promote research to better understand periodontal disease, their effect on systemic health and their related therapies" and "Periodontists treat esthetically compromised periodontal conditions through bone and soft tissue (gum) procedures" were the second and third most relevant statements to the undergraduate students. The least relevant statement was found to be statement 1 and 5, that is, "Periodontists perform dental implants and related procedures" and "Periodontists are educators promoting health".

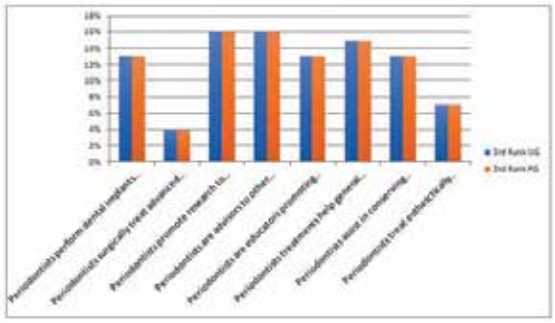
Postgraduates defined their scope of periodontics by stating that the most important aspect is statement 2, which states, "Periodontists surgically treat advanced gum and bone infection problems". The second and third most relevant points to them is statement 8, which states "Periodontists treat esthetically compromised periodontal conditions through bone and soft tissue (gum) procedures" and "Periodontists perform dental implants and related procedures. The least relevant statement was "Periodontists are educators promoting health". The results have been graphically represented form graph 1 to 8



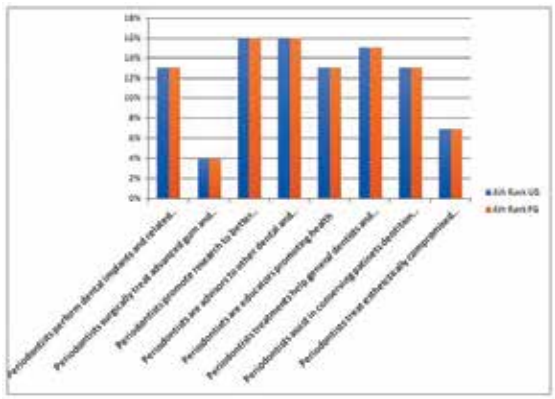
Graph 1: First Rank Given by Undergraduates and Postgraduates



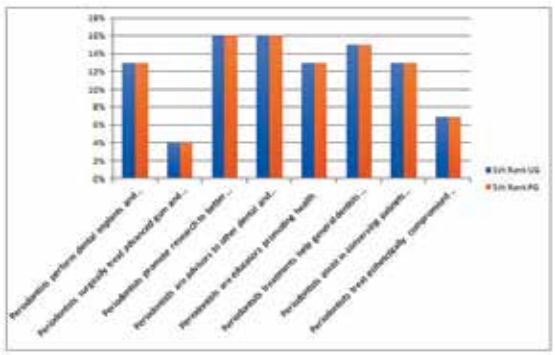
Graph 2: Second rank given by Undergraduates and Postgraduates



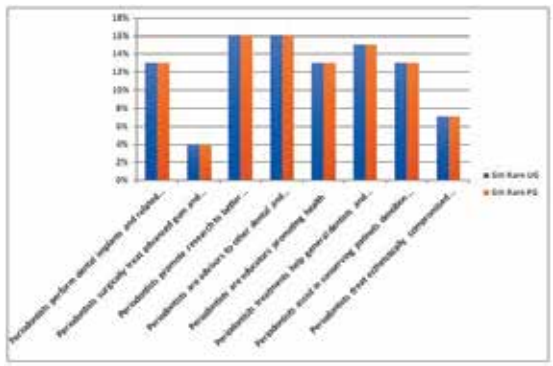
Graph 3: Third rank given by Undergraduates and Postgraduates



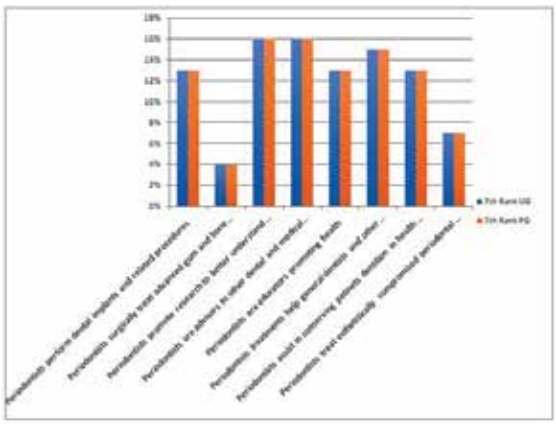
Graph 4: Fourth rank given by Undergraduates and Postgraduates



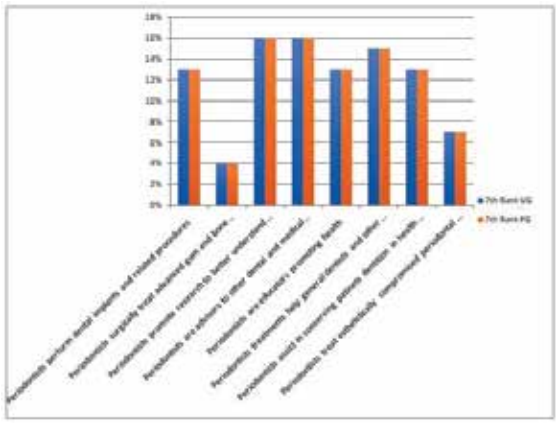
Graph 5: Fifth rank given by Undergraduates and Postgraduates



Graph 6: Sixth rank given by Undergraduates and Postgraduates



Graph 7: Seventh rank given by Undergraduates and Postgraduates



Graph 8: Eighth rank given by Undergraduates and Postgraduates

Discussion

The previously conducted study asked the respondents to list answers to the question "Who is a Periodontist?" and eight statements were compiled. All of the statements are important regarding the scope of the specialty; however, the purpose of this study is to determine how current-day undergraduates view the specialty of periodontology and how postgraduates view the specialty. [15]

In total, 100 responses were received, and the information was compiled from the occupation variables to establish two general cohorts of responders: undergraduates (general practitioners, dental students), and postgraduates (which includes other specialists including periodontologists).

Both groups of respondents ranked the statement "Periodontists surgically treat advanced gum and bone infection problems" the most important. This is because all dentists refer patients to Periodontists to have periodontal surgery; hence these results are not surprising. Along the same lines, both undergraduates and postgraduates of all specialties leave surgical periodontal therapy to the Periodontists. This also indicates that both undergraduates and postgraduates have a broad perception of the primary scope of periodontology.

In the past decade advances in implant surface technology and continuous clinical research have provided clinicians with innovative and efficient operative protocols for properly treating increasingly demanding clinical situations.[16]

The statements "Periodontists promote research to better understand periodontal disease, their effect on systemic health and their related therapies" and "Periodontists treat esthetically compromised periodontal conditions through bone and soft tissue (gum) procedures" were the second and third most relevant statements to the undergraduate students. This again indicates the importance given by undergraduates to the scope of periodontology with regards correlation of systemic health with periodontal health and in the growing field of esthetic dentistry.

The least relevant statement was found to be statements were, "Periodontists perform dental implants and related procedures" and "Periodontists are educators promoting health". This is a significant finding as it indicates a lack of awareness amongst undergraduates regarding the scope of periodontology in the field of implantology. Periodontists are the primary health advisors when it comes to maintenance of oral hygiene and undergraduates seem to have overlooked the role played by a periodontist in preventive therapy.

Among postgraduates, the second most important statement was considered to be "Periodontists treat esthetically compromised periodontal conditions through bone and soft tissue (gum) procedures" again giving importance to the scope of periodontics in esthetic dentistry.

The second and third most relevant points to them is statement 8, which states "Periodontists treat esthetically compromised periodontal conditions through bone and soft tissue (gum) procedures" and "Periodontists perform dental implants and related procedures. So here

we can see how postgradutes are more aware of the role of a periodontist in the placement of implants. The least relevant statement was "Periodontists are educators promoting health".

Thus, it appears that postgraduates feel that next to surgically treating periodontal infection, placing implants and doing implant associated osseous augmentation procedures is third most important in their scope of practice.

The survey provides insight into how undergraduates define the scope of this specialty and how the postgraduates perceive it. The overwhelming accord is that all cohorts feel that the most important aspect of the Periodontists is to surgically treat advanced gum and bone problems.

There are limitations to this study in that the interpretation of each statement is related to individual perceptions, which is influenced by training and experience. A similar study by physicians specializing in HIV found that their convenience sample could not necessarily be generalized to all physicians providing HIV care. The present study had a similar limitation. In addition, the results are limited by the nature of self-reported data just as the data were in the HIV–physician study [17].

Going forward, it would be interesting to see if there were further differences if a wider population of undergraduates and postgraduates were used.

Conclusion

Undergraduates defined the scope of this practice by stating that the two most important aspects are surgical treatment of periodontitis and promotion of research towards better understanding of periodontal health and its relation with systemic diseases. The least important statement was that ''Periodontists are educators promoting health.''

Postgraduates perceive the specialty of periodontology differently than Periodontists in that they ranked surgical treatment and the esthetic surgical procedures as the two most important. Communication by the periodontist to the general dentist is important to provide knowledge of their scope of practice and guidance for their therapies. From this, the undergraduates and postgraduates of other specialties will become knowledgeable and have a high diagnostic acuity.

This study shows that there are differences between the two cohorts. With the information shown here, periodontal care by Periodontists can be specifically targeted to better serve patients and referring dental health professionals.

Ethical Clearance: Clearance from the Institutional ethical committee was obtained.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Murugan Thamaraiselvan, Sugumari Elavarasu, Thangavelu Arthie. Comaprative Evaluation of coronally advanced flap with or without platelet rich fibrin membrane in the treatment of isolated gingival recession. *J Ind. Soc. Periodontology 2015*; 19(1); 66-71
2. Kontovazainitis G, Griffin TJ, Cheung WS. Treatment of gingival recession using platelet concentrate with a bioabsorbable membrane and coronally advanced flap: A report of two cases. *Int J Periodontics Restorative Dent. 2008*;28:301–7.
3. American Academy of Periodontology. What is a periodontist? Available at: http://www.perio.org/consumer/periodontist2.htm. Accessed May 27, 2013.
4. Langer B, Langer L. Subepithelial connective tissue graft technique for root coverage. *J Periodontol 1985*; 56:715-720.
5. Harris RJ. A short-term and long-term comparison of root coverage with an acellular dermal matrix and a subepithelial graft. *J Periodontol 2004*;75:734-743.
6. Allen EP. AlloDerm: An effective alternative to palatal donor tissue for treatment of gingival recession. *Dent Today 2006;*25:48, 50-52
7. *Rudy RJ, Levi PA, Bonacci FJ, Weisgold AS, Engler- Hamm D.* Intraosseous anchorage of dental prosthe- ses: An early 20th century contribution. *Compend Contin Educ Dent 2008;*29:220-222 , 224, 226-228
8. Bobbio A. The first endosseous alloplastic implant in the history of man. *Bull Hist Dent 1972;*20:1-6.

9. Academy of Osseointegration. Boston Annual Meeting provides rare opportunity to examine world's first known endosseous implant. Academy News 2003;14:7.

10. Irish JD. A 5,500 year old artificial human tooth from Egypt: A historical note. *Int J Oral Maxillofac Implants 2004;*19:645-647.

11. Crube´zy E,Murail P,Girard L, Bernadou J P. False teeth of the Roman world. *Nature 1998;*391:29.

12. Greenfield EJ. Implantation of artificial crown and bridge abutments. *Dent Cosmos 1913;*55:364-369.

13. Bra ̊nemark PI, Hansson BO, Adell R. Osseointegrated implants in the treatment of the edentulous jaw. Experience from a 10-year period. *Scand J Plast Reconstr Surg Suppl 1977*;16:1-132.

14. Asha Ramesh, Sheethalan Ravi, Gurumoorthy Kaarthikeyan. Comprehensive rehabilitation using dental implants in generalized aggressive periodontitis. *J Ind Soc. Of Periodont* 2017; 21: 160-163

15. Weber MD, Thein-Nissenbaum J, Bartlett L. Competency revalidation study of specialty practice in sports physical therapy. *N Am J Sports Phys Ther 2009*;4:110-122.

16. Gerbert B, Moe JC, Saag MS. Toward a definition of HIV expertise: A survey of experienced HIV physicians. AIDS Patient Care STDS 2001;15:321-330.

17. Villa R, Rangert B. Immediate and early function of implants placed in extraction sockets of maxillary infected teeth: A pilot study. *J Prosthet Dent 2007;*97 (Suppl. 6):S96-S108.

Knowledge, Attitude and Practices (KAP) Regarding Malaria and its Prevention among Patients with Suspected Malaria in Mangaluru

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ABSTRACT

Background: Malaria continues to be a devastating disease in India and Mangaluru is endemic to malaria. The success of malaria control programmes has been directly proportional to the awareness in the community; hence this study has been conducted to assess patients' knowledge, attitude and practices towards the disease and its prevention.

Methodology: This is a cross-sectional study. Patients with suspected malaria attending the District hospital were included in the study. A validated questionnaire developed by the authors examined the respondent's knowledge, attitude and prevention practices towards malaria.

Results: Majority of the participants (89%) showed a reasonable knowledge of malaria including its mode of transmission and symptoms. Majority of the study population (81%) considered malaria to be a serious health problem, thus reflecting their attitude to the disease. However, only a small proportion of the participants (21%) stated that they use preventive measures every day.

Conclusions: Despite having a reasonable knowledge of malaria and its preventive measures, there was a stark lack in practice of these measures, which is distressing. There is an urgent need to implement strategies to motivate communities to use of the available preventive measures.

Keywords: *Malaria, Mangaluru, Knowledge, Attitude, Practice*

Introduction

Despite global efforts for its control, malaria is still one of the most prevalent and devastating vector borne communicable diseases in the tropics. Currently the official statistics available at the National Vector Borne Disease Control Programme (NVBDCP) for malaria in India indicates 0.7–1.6 million confirmed cases and 400-1,000 deaths annually [1]. Mangaluru city has a tropical climate and is endemic to malaria. The Annual Parasitic Incidence (API) is the number of reported malaria cases per 1000 population per year. Mangaluru is one of the only two districts in Karnataka State with an API of >2 [2]. In the year 2013 the annual incidence of malaria in Mangaluru was 4714 which drastically increased to 11021 in 2015 and 11037 in 2016[3]. Currently the major challenges in controlling malaria in India, include insecticide resistance in mosquitoes and a rise in *Plasmodium falciparum* that are resistant to drugs throughout the country [4].

The success of malaria control programmes is directly proportional to the awareness of the community. Studies on knowledge, attitude and practices (KAP) have demonstrated that, direct interaction with the

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community plays an important role in circumventing malaria spread. In view of this, health education should be tailor-made to suit the individuals' and community's current knowledge, attitude, and practice (KAP) about malaria[5],[6]. Community insights, beliefs and attitudes about the aetiology, symptoms, efforts for prevention and treatment of malaria are often overlooked in malaria control measures[7]. These attitudes can vary among individuals in the same house and from one community to the other[8]. It is important to consider these challenges while developing strategies aimed at controlling malaria and reducing its burden [9]. Hence this study has been conducted to assess patients' knowledge, attitude and practices towards the disease and its prevention.

Methodology

The study was conducted at the District hospital in Mangaluru from 01 November 2016 to 31 May 2017. The sample size was 195, calculated based on the results of the study conducted by Siddharudha Shivalli *et al*[10]; considering the prevalence of knowledge and prevention practices of malaria as 12%, with a 95% confidence level, 5% absolute precision and a 20% dropout rate.

Study design and data collection: This was a hospital based cross-sectional study among participants with suspected malaria, attending the malaria clinic. The authors prepared a questionnaire which assessed the participants' knowledge, attitude and prevention practices towards malaria. The questionnaire prepared in English was validated by three experts (from the field of clinical medicine, community medicine and pharmacology) and translated to Kannada and Hindi. The translated version was also validated for content. Demographic details were also collected.

A 'knowledge score' which intended to record the participant's knowledge of malaria was worked out. To achieve a full score the respondents had to: state they had heard of malaria (1 point), consider that malaria can kill if untreated (1 point), mention sleeping under bed nets at night as one of the ways to prevent malaria (1 point), know the mode of transmission (1 point), be aware of symptoms of malaria (1 point), mention the time at which malaria-causing mosquitoes bite (1 point) and mention at least one way of prevention (1 point). The total score was 7 points.

Results

Data was collected from 195 consecutive patients with suspected malaria. Table 1 depicts the demographic details of the participants. The male to female ratio was 8:1.

Table 1: Demographic details of Participants

Mean age (± SD)	**32 (±12) years**
Male	173 (89%)
Female	22 (11%)
Occupation	
Construction workers and labourers	136 (70%)
Students	23 (12%)
Hotel worker	10 (5%)
Business	9 (5%)
Watchman	6 (3%)
Homemaker	4 (2%)
Others*	7(3%)

*Others included fishermen (2), Driver (2), police (1) and retired person (1)

Table 2: Basic knowledge about Malaria (n = 195)

Statements	**YES**	**NO**
Heard about Malaria	195 (100%)	0
Malaria can kill if it's not treated	(86%)	28(14%)
Sleeping under bed nets at night is one of the ways to prevent malaria	162(83%)	33(17%)
	Correct response	**Incorrect response**
Modes by which malaria spreads	177(91%)	18(9%)
Symptoms of malaria	180(92%)	15(8%)
Biting times of malaria mosquitoes	108 (55%)	87(45%)
The ways to prevent and control malaria	178(91%)	17(9%)

Table 2 depicts the knowledge of the participants towards malaria and its prevention. Overall 73% of the participants were able to achieve a score of 6 points and above, and 32% of participants achieved the complete score of 7 points suggesting that they had a very good knowledge about malaria.

Table 3: Sources of information and need for further information among the respondents (n = 195)

1. Have heard any information related to malaria	114 (58%)
2. Source of information about malaria	
Newspapers	60(31%)
Television	53(27%)
Health centre/clinic	53(27%)
Posters/pamphlets	41(21 %)
Neighbour	29(15%)
Radio	20 (10%)
Family member (at home)	19(10%)
Community health worker	7(4 %)
3. Have enough information about malaria	40(21%)
4. Desire more information about malaria	155(79%)
5. Aspect of malaria for which more information is desired*	
Control and prevention	113(58%)
Treatment	64(33%)
Signs and symptoms	31(16%)
Nature of the disease	31(16%)
Any information	25 (13%)
6. Preferred way/method to communicate this information*	
Health centre/clinic	135 (69%)
Newspapers	57(29%)
Posters/pamphlets	28(14%)
Community health worker	25 (13%)
Television	2(1%)

*Multiple responses are taken, hence the percentage does not add to 100 percent

Table 3 shows the need for more information about malaria felt by the participants. It was found that more than half of the participants (58%) received information related to malaria mainly through newspapers (31%), television (27%) and health centres (27%). Despite having basic knowledge, 79% of the participants felt they needed more information regarding the treatment, control and prevention strategies which should be communicated through health centres (69%) and newspapers (29%).

Table 4: Attitudes towards malaria

	Agree	**Disagree**
1. Malaria is a serious and life-threatening disease	158(81%)	37(19%)
2. Malaria gets transmitted from one individual to another	105 (54%)	90 (46%)
3. Anyone can get malaria	159(82%)	36(18%)
4. I am sure that I can treat myself if I get malaria	26(13%)	169(87%)
5. I can buy anti-malarial drugs from the drug/ pharmacy to treat myself when I get malaria	31(16%)	164(84%)
6. I believe that as soon as I suspect that I am suffering from malaria I should visit health centre/clinic to get my blood tested	142(73%)	53(27%)
7. I should seek medical advice when I get malaria	155(79%)	40(21%)

Table 4 shows the right attitude of the study population towards malaria.

Table 5: Practices towards malaria prevention

1. Preventive measures followed (can tick more than one option)			
Mosquito coil	95 (48%)		
Bed nets	87 (45%)		
To shut the windows and doors	20 (10%)		
Repellents	9 (5%)		
Mosquito mesh for windows	9 (5%)		
	Always	**Sometimes**	**Never**
2. How frequently do you sleep under a bed net?	58(30%)	66(34%)	71(36%)
3. How frequently do other family members sleep under bed nets?	35(18%)	61(31%)	99(51%)

Conted…

4. How frequently do you check for any holes/repair in the bed nets?	19(10%)	74(38%)	102(52%)
5. How frequently do you use mosquito repellent coils at your house?	62(32%)	72(37%)	61(31%)
6. How frequently do you use anti-mosquito spray in your house?	14(7%)	61(31%)	120(62%)
7. How frequently do you clean stagnant water near your house?	44(23%)	61(31%)	90(46%)
8.How frequently do you visit clinic/health centre when you fall ill?	55(28%)	109(56%)	31 (16%)
9. In the last 6 months have you or any other family member suffered from malaria	YES – 162(83%)		
10. If yes, where do you go for treatment	Health centre/clinic (80%) (n=195)		
11. How soon after suspecting Malaria would you seek treatment?	12 hours (78%) (n=195)2-3 days (15 %) 4-6 days (7%)		

Table 5 depicts the practices followed towards malaria prevention. Though a majority of the participants had a fair knowledge of the prevention practices, most did not follow them. This lethargy of putting into practice the awareness that the participants already had is all the more staggering in light of the fact that 83% of the participants or one of their family members had suffered from malaria in the last six months. Although 45% of the participants believed that sleeping under bet nets would be an effective way of preventing malaria, only 30% used bed nets every day and 34% used bed nets only sometimes. Worse still, only 18% mentioned that other members of the family used bed nets. Only 10% would check for holes in bed nets regularly.

Discussion

This study gives information on the knowledge, attitude and various prevention practices followed by patients attending the malaria clinic. A large number of participants were construction workers and labourers; which is probably why the gender ratio is skewed in favour of males. Further, such occupation puts these males at risk of getting bitten by mosquitoes. The awareness regarding malaria and its symptoms was high in our study population, similar to the findings of Dhawan G*et al*[11].The poor use of preventive measures detected in this study, especially bed net use, requires immediate attention and action. Similar outcomes were reported by a few studies across India in Mangaluru[10], New Delhi [6] and other parts of the world like Haiti [12], Turkey [13], Ethiopia [14] and Iran [15]. In contrast to this, higher knowledge and better practice on bed net use was reported among majority of the participants in Bangladesh [16], Nepal [17] and Ghana [18].

A staggering 46% of the participants stated they never cleaned stagnant water near their residence and only a third (31%) of the participants stated they cleaned stagnant water near their residence only sometimes. This shows that they were irregular in cleaning stagnant water near their residence which could be a major site for breeding of mosquitoes. Seventy percent of the study population is construction workers staying in and around construction sites. The construction sites are known to have stagnant water for curing concrete as well as for storage and other construction related activities, and thus are breeding sites for mosquitoes. Hence this could be the reason for a high risk of malaria in our study population. But in the study conducted by Dhawan G *et al*[11] more than 90% of the participants stated that preventing the accumulation of stagnant water in the surrounding premises was the most common prevention method followed. Hence awareness has to be created in the community regarding stagnant water which is a breeding zone for mosquitoes and cleaning the sources of stagnant water as an effective way of preventing malaria. This study indicates a lack of malaria control and preventive measures being implemented which might be one of the most important causes responsible for the high endemicity of malaria in Mangaluru.

Around 83% of the participants mentioned that either they themselves or other members of the family had suffered from malaria in the last 6 months. Despite this, the use of preventive measures for malaria was lacking. Hence there is an urgent need not only to increase the knowledge regarding preventive measures but also to motivate the community regarding the better usage of these preventive measures.

Almost 78% of the participants mentioned that within 12 hours of onset of malaria symptoms they would seek treatment, with health facilities as their first treatment option. This suggests that treatment seeking pattern among participants was good.

Based on the results of the study appropriate health education can be implemented to raise community awareness about the cause, transmission of malaria and proper uses of preventive measures. The results of this study suggest that participants had a fair knowledge about the disease and prevention methods. Thus strategies should be made to implement application of this knowledge especially regarding preventive measures like daily use of mosquito nets and clearing of stagnant water in their day to day life. This KAP survey can be utilized to provide inputs to improve the design of community-based malaria control programmes to promote the use of prevention methods already known to them.

There are a few limitations in our study. Firstly, since it is hospital based study the good knowledge and attitude depicted in the study population may not be applicable for the community. Secondly, the study population mainly included males and a smaller percentage of females. This could be because majority of the participants were construction workers and labourers. Thirdly, since it was a study based on their memory and there could be a recall bias. Fourthly, the practices mentioned were not directly observed and were assessed based on the interview.

Conclusion

Knowledge and attitude towards malaria among the participants were good but this knowledge did not necessarily translate into improved practice of preventive measures. This might be due to a poor socioeconomic background, low level of education and lack of motivation. Further emphasis should be made to improve awareness, availability of information through proper channels for adequate incorporation of strategies to prevent and control malaria. Measures need to be taken to implement strategies to increase the use of preventive measures and reduce the overall malaria burden.

Conflict of Interest: NIL

Source of Funding: Self

Ethical Considerations: The study was started after getting permission from the Institutional Ethics Committee, Kasturba Medcial College, Mangalore, India (IEC KMC MLR 10-16/250) . Written informed consent was taken from all the participants.

REFERENCES

1. Malaria situation. National Vector Borne Disease control Programme. Available athttp://nvbdcp.gov.in/Doc/malaria-situation.pdf(Accessed 29 Jan 2018)
2. Malaria Elimination Plan in Karnataka 2016-2025 Programme. Directorate General of Health & Family Welfare. Government of Karnataka. Available at http://www.karnataka.gov.in/hfw/kannada/Documents/Malaria%20Elimination%20Plan%20in%20Karnataka%20(2016%20to%202025) pdf. pdf. Accessed 03-03-2018
3. Kakkilaya BS. Malaria site [Internet]. Mangalore:Dr. B.S. Kakkilaya; 2004. [Updated, Feb 23 2018; cited 2018 April 19] Available from: http://www.malariasite.com
4. Dash AP, Valecha N, Anvikar AR, Kumar A. Malaria in India: Challenges and opportunities. J Biosci 2008;33:583–592.
5. Singh R, Musa J, Singh S, Ebere UV. Knowledge, attitude and practices on malaria among the rural communities in Aliero, northern Nigeria. J Fam Med Prim Care. 2014;3:39–44.
6. Tyagi P, Roy A, Malhotra MS. Knowledge, awareness and practices towards malaria in communities of rural, semi-rural and bordering areas of east Delhi (India) J Vector Borne Dis. 2005;42:30–5
7. Deressa W, Ali A, Enquoselassie F. Knowledge, attitude and practice about Malaria, the mosquito and antimalarial drugs in a rural community. Ethiop J Health Dev. 2003; 17:99–104.
8. Rodriguez AD, Penilla RP, Henry-Rodriguez M, Hemingway J, Betanzos AF, Hernández-Avila JE.. Knowledge and beliefs about malaria transmission and practices for vector control in Southern Mexico. SaludPublica Mex 2003;45:110–6.
9. Munguti KJ. Community perceptions and treatment seeking for malaria in Baringo District, Kenya: Implications for disease control. East Afri Med J. 1998;75:687–91.
10. Shivalli S, Pai S, Akshaya KM, D'Souza N. Construction site workers malaria knowledge and treatment-seeking pattern in a highly endemic urban area of India. Malar J. 2016; 15:168

11. Dhawan G, Joseph N, Pekow P, Rogers C, Poudel K, Bulzacchelli M. Malaria-related knowledge and prevention practices in four neighbourhoods in and around Mumbai, India: a cross-sectional study. Malaria Journal. 2014;13:303.

12. Keating J, Eisele TP, Benett A, Johnson D, Macintyre K. A description of malaria-related knowledge, perceptions, and practices in the Artibonite Valley of Haiti: implications for malaria control. Am J Trop Med Hyg. 2008;78:262–9.

13. Simsek Z, Kurcer MA. Malaria: knowledge and behaviour in an endemic rural area of Turkey. Public Health. 2005;119:202–208.

14. Jima D, Tesfaye G, Deresssa W, Woyessa A, Kebedi D, Alamirew D. Baseline survey for the implementation of insecticide treated mosquito nets in malaria control in Ethiopia. Ethiopian J Health Dev. 2005;19:16–23.

15. Rakhshani F, Moghadam ARA, Alemi R, Moradi A. Knowledge, perceptions and prevention of malaria among women in Sistanva Baluchestan, Islamic Republic Iran. Eastern Mediterranean Health J. 2003; 9:248–56.

16. Ahmed SM, Haque R, Haque U, Hossain A. Knowledge on the transmission, prevention and treatment of malaria among two endemic populations of Bangladesh and their health-seeking behaviour. Malar J. 2009;8:173.

17. Joshi AB, Banjara MR. Malaria related knowledge, practices and behaviour of people in Nepal. J Vector Borne Dis. 2008; 45:44–50.

18. De La Cruz N, Crookston B, Dearden K, Gray B, Ivins N, Alder S, et al. Who sleeps under bednets in Ghana? A doer/nondoer analysis of malaria prevention behaviours. Malar J. 2006;5:61.

Correlation between the Nature of Toothpaste and the Prevalence of Brushing Habits of Children Residing in Chennai

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ABSTRACT

Aim: To correlate the nature of toothpaste used to the brushing habits of children in Chennai.

Objective: To assess the preference of children in relation to the type of toothpaste used by them.

Background: A number of factors should be taken into account when designing toothpaste formulations for children at the different stages of their development. They all contribute to the formation of brushing habits of children. An ideal children's toothpaste formulation should maximise fluoride availability, along with the levels and types of surfactant that will decrease the interference with a child-friendly, pleasant brushing experience. The ultimate goal is to maximise the compliance by providing a more pleasurable brushing experience and oral health benefits.

Reason: To deliberate the nature of the tooth paste in correlation with the brushing habits of children in chennai.

Keywords: *toothpaste, nature, content, children, brushing habits, oral health.*

Introduction

Dental care has consistently persevered to improve the quality of dental health among the public. On the contrary however, children do not really grasp the importance of a well taken cared of dentition. [(1)] Children find brushing their teeth on a regular basis, a cumbersome task. Furthermore, using an oral hygiene aid, commonly associated with toothpaste, to brush their teeth can be challenging as children have unalterable preferences for whatever they put in their mouth[(2,3,4,5)].

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Dentists' best efforts to effectively educate their paediatric patients to brush their teeth are only as good as the products introduced. In this case, toothpaste has become the light of the subject at hand[(6,7,8)]. The uncertain nature of the toothpaste used can waver the child's perception towards maintaining a positive attitude in sustaining a healthy environment in the oral cavity[(9,10,11,12)]. Parents also have an influence in proper oral hygiene habits on their children. However, most parents are barely even equipped with basic oral hygiene habits and educate themselves only when the situation turns grave.

Technology on the other hand is always improving. People are always inventing something for the betterment of their community. In the field of dentistry, something as simple as toothpaste has rendered a huge change in terms of oral hygiene. As time went, the nature of toothpaste has been a major influence for the older generation as well as the new, especially children.

This research provides answers to whether the nature of toothpaste in terms of taste[(13)], texture[(14)], smell[(15)], appearance[(16)], colour[(17)], flavour[(18)], foam production[(19)]

and cooling effect affects the tooth brushing habit of children[20]. The queries are made into a set of 10 questions and were distributed to school children between the ages of 7-12. The aim of this survey is to correlate the nature of toothpaste to the brushing habits of children in Chennai.

Materials and Method

A questionnaire consisting of a series of 10 questions was made based on the topic of this survey. This survey was conducted to correlate the nature of toothpaste with the brushing habits of children . It was conducted among 100 school students. The students were randomly chosen, with ages ranging from the ages 9 to 12 years old as the constant variable. An official letter was written to the principal of the schools contacted to aid us conduct the survey at their institution. Each student was given one questionnaire, and was asked to answer the questions honestly. The students were also informed that if they were not able to understand the questions they could ask and they would be given a verbal explanation. The questionnaire was designed to provide adequate information to successfully carry out this survey. The results obtained were then statistically tabulated according to the questions asked. (Table 1)(Figure 1)

Results

Table 1: The results obtained from the questionnaire were tabulated in the table below

No.	Questions	A	B	C
1.	How often do you brush your teeth?	47	23	30
2.	Do you use toothpaste to brush your teeth?	19	11	70
3.	How much toothpaste do you use to brush your teeth?	0	33	67
4.	What is your immediate response after brushing your teeth?	12	0	88
5.	Do you brush your teeth under parental supervision?	40	50	10
6.	Do you like the smell of your toothpaste?	78	12	10
7.	Do you like the colour of your toothpaste?	68	22	10
8.	Does the taste of your toothpaste affect your brushing?	10	20	70
9.	Does your toothpaste taste sweet?	45	11	44
10.	Does the advertisement for the toothpaste you are using affect your preference in toothpaste choice?	50	35	15

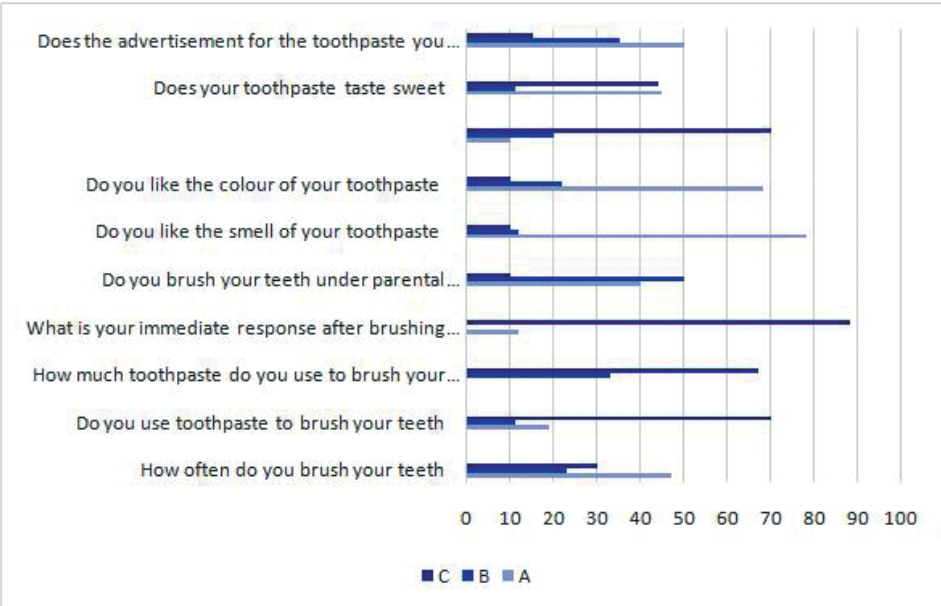


Figure 1: Correlation between the nature of toothpaste and the brushing habits of children in chennai

Table 1 shows 47 people chose option A which is that they brush their teeth once a day. 23 people brush their teeth twice a day. 19 people use toothpaste to brush their teeth while 70 of them occasionally use toothpaste to brush their teeth. 67 people use toothpaste amounting to the full length of the tooth brush while 33 of them use it to only half the length of the toothbrush. 88 people gargle after brushing their teeth while only 12 of them spit it out without rinsing. 50 of them do not brush their teeth under parental supervision while 40 of them still brush their teeth under parental supervision and 10 sometimes brush their teeth under parental supervision.

78 of them like the smell of their toothpaste, 12 of them do not like it while 10 of them do not even notice. 68 of them like the colour of their toothpaste, 22 of them do not like it while 10 do not even notice. 70 of them are unaware that the taste of the toothbrush affects their brushing habits, 20 of them disagree while only 10 agree that the taste of the toothpaste affects their tooth brushing habits. 45 people use sweet toothpaste however, 44 of them do not even notice the taste of their toothpaste and 10 of them do not use sweet tasting toothpaste. 50 people are influenced by the advertisement used to advertise the toothpaste that they are currently suing to brush their teeth. 35 of them disagree with the advertisement used to advertise their toothpaste so it does not affect their preference in the toothpaste they use to brush their teeth and 15 of them are not aware.

In a nutshell, most of the children brush their teeth once a day, and only sometimes use toothpaste to brush their teeth. The amount of toothpaste used is the full-length of the toothbrush. The immediate response after brushing their teeth is to gargle with water. The children seldom brush their teeth under parental. They like the smell of their toothpaste and are attracted to the colour of the toothpaste they use to brush their teeth. However, they do not pay attention to the taste of their toothpaste. Most of them have toothpaste that tastes sweet. The advertisement for the toothpaste they are using affects their preference in toothpaste choice while brushing their teeth.

Discussion

The results obtained shows that the children brush their teeth once with a reasonable amount of toothpaste everyday. This is because parents nowadays, tend to leave home for work very early in the morning and neglect their children. Some parents are homemakers but are unaware of the importance of brushing the teeth of their children twice a day because they themselves do not practice good oral hygiene habits. Ergo, the children do not comprehend that something as simple as brushing their teeth can help them prevent various other health problems that can relate to poor oral hygiene. Parents should get themselves involved in their children's health and hygiene routine to ensure that they are on track.

About 88% of the students gargle with water after brushing their teeth which is preferred as gargling cleans the mouth even more after brushing. The suds formed by the toothpaste will also be bothersome to the child as some toothpaste produce a lot of foam. However, another study showed that gargling after brushing increases the tendency to obtain caries on the teeth. The content of toothpaste, in general has fluoride which basically helps strengthen the enamel of the teeth. Gargling after brushing removes all the fluoride from the teeth leaving only the fresh taste of toothpaste without the needed function.

The sud that is formed is due to the presence of Sodium Lauryl Sulphate (SLS), a chemical that causes foam and sud to form in any product[21]. That chemical is responsible for the foam from the toothpaste during brushing. If the child does not prefer foam while brushing, then getting toothpaste with lesser SLS content will help boost the child's interest in brushing their teeth.

Colour, taste and smell may seem irrelevant when it comes to toothpaste but it actually plays a major role in ones toothbrushing habit especially children. As children, they are drawn to objects with a lot of colour and vibrant animation. The toothpaste designed for children should be colourful and striking to get more children to enjoy brushing their teeth as if it was a leisurely activity. Toothpaste in general has a minty taste and smell to allow the individual to feel fresh and clean after brushing their teeth. Children however have the tendency to develop preference in these matters and have difficulty liking the mint flavour as it may be too strong. Therefore, it is only fair that toothpaste with a variety of flavours is produced to increase the number of children who will enjoy brushing their teeth. The colour of the toothpaste may also help increase the child's preference in brushing their teeth. The probability of a child to brush his or her teeth with a toothpaste of their favourite colour, to a child brushing his with white-coloured toothpaste is almost

too good to be true. Children often overcompensate anything they can control. In this case, the amount of toothpaste they use while brushing their teeth. Children tend to think that more is better and ergo, they use a full-length of toothpaste to brush their teeth. It is up to the parents to educate their children to control the amount of toothpaste used. The more the amount of toothpaste, the higher the amount of foam and sud produced. That doesn't necessarily mean that it is good for the teeth. Too much of anything will cause an adverse effect. Based on this survey conducted, the nature of toothpaste plays a major role in influencing the children to brush their teeth. The colour, taste and smell all stimulate the main senses allowing the child to be more attentive to the nature of the toothpaste, thereby increasing the usage of toothpaste while brushing their teeth.

Based on a study conducted by Alex G. Stovell, Bernie M. Newton and Richard J. M. Lynch entitled Important Consideration in the Development of Toothpaste Formulation for Children[22], good oral hygiene habit can only be encouraged if the products used are appealing. As the child ages, psychological preferences for taste and smell, among other things will start to develop. They tend to compartmentalise the things they like and dislike. When they get used to not brushing their teeth, it becomes a habit and habits, good or bad, are hard to die. Hence, it is really important to start at an early age. Children should be encouraged to brush their teeth twice, every day to prevent caries which will eventually cause the kid pain and discomfort. To encourage oral hygiene habits, a child must be nipped in the bud to ensure positive results. In order to do that, the nature of the toothpaste used has to be child friendly and at the same time provide the child with oral hygiene care.It should allow the child to feel good about their oral hygiene and their efforts in maintaining it. An ideal children's toothpaste formulation should therefore aim to maximise fluoride availability, minimise abrasiveness and use levels and types of flavour and surfactant that will minimise interference with fluoride delivery and deliver a pleasant brushing experience. A pleasant brushing experience throughout the developing years should aid in the establishment of good brushing habits and good oral health for life. In a study by Adair,12 preschool-aged children were seen to use larger amounts of dentifrice, brush for longer periods of time, rinse and expectorate less when using a child-flavored dentifrice than when using an adult-flavored dentifrice[23]. Other studies have also determined that children use more dentifrice when the product is a dentifrice flavoured for children[24]. In conclusion, there are many factors that affect the brushing habits of the children. In this survey, it is derived that children are highly influenced by the nature of toothpaste especially children from a younger age group. Ergo, it can be fairly understood that the nature of toothpaste plays a vital role in the brushing habits of children.

Conflict of Interest: Nil

Statement of Informed Consent: There was no need for any informed consent of the participant as there was no personal information taken during this survey. The identity of the participants remain anonymous.

Statement of Human and Animal Rights: This research was done in accordance with the ethical standards of Helsinki Declaration of 1975, as revised in 2000. No animals or humans were harmed in this process.

Source of Funding: This research was self funded.

Ethical Clearance: Taken from International Committee of Medical Journal Editors.

REFERENCES

1. Rich JP, Straffon L, Inglehart MR. General dentists and pediatric dental patients: the role of dental education. Journal of dental education. 2006 Dec 1;70(12):1308-1315.
2. Liem DG, Zandstra L, Thomas A. Prediction of children's fla- vour preferences. Effect of age and stability in reported prefer- ences. Appetite 2010 55: 69–75.
3. Holst D, Schuller A, Grytten J. Future treatment needs in children, adults and the elderly. Community dentistry and oral epidemiology. 1997 Feb 1;25(1):113-118.
4. Stovell AG, Newton BM, Lynch RJ. Important considerations in the development of toothpaste formulations for children. International dental journal. 2013 Dec 1;63(s2):57-63.
5. Rinchuse DJ, Zullo T, Rinchuse DJ. Taste preferences among children and dental hygienists for sweetened and unsweetened toothpastes. Clin Prev Dent 1981 3: 6–8.

6. Spear CS, Sisisky LA. A study of children's taste and visual prefer- ences in dentifrices. ASDC J Dent Child 1991 58: 300–302.
7. Paraskevas S, Rosema NA, Versteeg P, Timmerman MF, Van der Velden U, Van der Weijden GA. The additional effect of a dentifrice on the instant efficacy of toothbrushing: a crossover study. Journal of periodontology. 2007 Jun 1;78(6):1011-1016.
8. Sjögren K, Birkhed D, Rangmar B. Effect of a modified toothpaste technique on approximal caries in preschool children. Caries research. 1995;29(6):435-441.
9. Stovell AG, Newton BM, Lynch RJ. Important considerations in the development of toothpaste formulations for children. International dental journal. 2013 Dec 1;63(s2):50-62.
10. Churchley D, Schemehorn BR. In vitro assessment of a toothpaste range specifically designed for children. International dental journal. 2013 Dec 1;63(s2):48-56.
11. Milgrom P, Söderling EM, Nelson S, Chi DL, Nakai Y. Clinical evidence for polyol efficacy. Advances in dental research. 2012 Sep;24(2):112-116.
12. Manella JA, Beauchamp GK. Early flavor experiences: research update. Nutr Rev 1998 56: 205–211.
13. Kajiura H, Cowart BJ, Beauchamp GK. Early developmental change in bitter taste responses in human infants. Dev Psycho- biol 1992 25: 375–386.
14. Birch LL. Development of food preferences. Annu Rev Nutr 1999 19: 41–62.
15. Beauchamp GK, Mennella JA. Flavor perception human infants: development and functional significance. Digestion 2011 83: 1–6.
16. Desor JA, Beauchamp GK. Longitudinal changes in sweet pref- erences in humans. Physiol Behav 1987 39: 639–641.
17. Liem DG, Mennella JA. Heightened sour preferences during childhood. Chem Senses 2003 28: 173–180.
18. As, aishwary, dr deepa gurunathan. Oral health maintenance in children with self brushing and parents guidence in Saveetha University: a pilot study. 2015 28:1-3
19. Chesters RK, Huntington E, Burchell CK, Stephen KW. Effect of oral care habits on caries in adolescents. Caries research. 1992;26(4):299-304.
20. Hill ID, inventor; WhiteHill Oral Technologies, assignee. Low foaming therapeutic toothpastes with improved cleaning and abrasion performance. United States patent US 5,993,784. 1999 Nov 30.121-211.
21. Devlin K. Toothpaste. Harrington Gay Men's Fiction Quarterly. 2002 Sep 1;4(4):65-93.
22. Stovell AG, Newton BM, Lynch RJ. Important considerations in the development of toothpaste formulations for children. International dental journal. 2013 Dec 1;63(s2):57-63.
23. Chhabra N, Chhabra A. Parental knowledge, attitudes and cultural beliefs regarding oral health and dental care of preschool. European Archives of Paediatric Dentistry. 2012 Apr 1;13(2):76-82.
24. Bruun C, Thylstrup A. Dentifrice usage among Danish children. Journal of dental research. 1988 Aug;67(8):1114-1117.

Effect of Structured Therapeutic Exercises Protocol on Physical Functional Status in Women with Varying BMI

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ABSTRACT

Objectives: To find the effect of exercises on strength, endurance, flexibility and quality of life in women with varying BMI.

Method: The study was conducted at physiotherapy department at Krishna Institute of Medical Sciences Karad. A total 62 participants were includes and divided into 4 groups according to their BMI (underweight (15), normal weight (15), overweight (17) and obese class I (15)). All groups were given same strengthening exercises and stretching for upper and lower limb.

Result: Statistical analysis was done by parametric repeated measures ANOVA test. p values for Bench press, Leg press, YMCA-Step test, Sit and reach test and SF-36 were calculated. While comparing the post exercises values, the result revealed that in all the 4 groups there was significant improvement in strength, flexibility and quality of life with p vale <0.0001 respectively. But for endurance there was significant difference seen in group B with p value < 0.0147 and group C with p value <0.0001.

Conclusion: The study concluded that strengthening and stretching exercises has showed effect in all 4 groups but more marked in group C.

Keywords: *BMI, Strengthening exercises, stretching, Bench press, Leg press, YMCA-Step test, SF-36.*

Introduction

Over the years women are performing high physically demanding tasks with increasing workforce and needs. Striving to achieve the goals they do not consider their well being along with fitness as a whole. Females belong to full time working categories or freelance or farming along with their regular household duties. Their basic health requirement to combat against tiredness and musculoskeletal fitness plays a significant role to overcome their daily activities with ease.

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According to recent report done in 2011 published by Census of India, it stated that from total population 48.43% were females, from these 16.96% females are between 30-40 years of age[1].Women in India ignore physical fitness, only few women participate in fitness exercises. A National Study of Physical activity pattern "Physical activity and inactivity patterns in India – results from the ICMR-INDIAB study (Phase-1)" conducted in four states Chandigarh, Jharkhand, Maharashtra and Tamilnadu it states that overall in rural area (n=10054) 59.6% females were inactive, and in urban area (n= 4173) 71.2% females are inactive. In Maharashtra from rural area (n=2656) 56.8% females are inactive and in urban area (n=1248) 68.5% females are inactive[2].

Health status of young and middle aged adult women to be targeted and perfect physical education is important. Many physiological changes occur in human body as we age. Maximum muscular strength and cross sectional area is between the ages of 20-30 years. After 30 years physiological degenerative changes start, the rate of these changes depends on the lifestyle of the individual[3].

Components of health in relative to physical fitness are strongly related to overall health which are characterized by the capacity to carry out activities of daily living with physical strength and are strongly interrelated with lower prevalence of chronic diseases and related risk factors [4].

Body mass index (BMI) is calculated simply by considering two components i.e. weight and height. BMI is weight for height, weight in kilogram and height in square meters (kg/m^2) [5, 6].

Muscular strength, endurance and power are combined into single term "muscular fitness" and it is considered as a vital part of taken as a whole health related fitness based on quality and amount of exercises, to build up and maintain fitness [7].

Cardio respiratory fitness (CRF) is the capacity of the vascular and pulmonary system through constant physical activity to supply oxygen to the skeletal muscle[8].

Flexibility is the competence of the joint to move throughout the range of motion[8].

There is paucity of literature that shows the relation of physical functions across varying BMI categories in adult women and very little is known about exercise performance, well being and physical functional capabilities in women.There exists a need to assess physical functional status in adult women across varying BMI categories. Till today studies are mostly done in general population, but less research work done as per varying BMI categories in women.

So the present study intended to find the influence of therapeutic exercises on women with varying BMI on their physical functional status and quality of life.

Method

The study was conducted at Physiotherapy department of Krishna institute of medical sciences. Ethical permission was obtained from institutional ethical committee, KIMS, Karad. 62 subjects were included and were divided into 4 groups according to their BMI. Subjects were selected according to inclusion and exclusion criteria. Before including in the study they were asked to fill Physical Activity Readiness questionnaire (PAR-Q). It consists of 7 questions which they have to answer in YES or NO. If the answer is yes to any of the questions they were not included in the study. Written informed consent form was taken and the whole study was explained to them. Inclusion criteria were as follows: (1) Age group 30-40 (2) Gender – females (3) BMI categories from under weight to obese classification I. The exclusion criteria were as follows: (1) Arthritic disorder (2) Hypertension or hypotension (3) Hyperthyroidism or hypothyroidism (4) Cardiac condition (5) Diabetes mellitus (6) Surgeries undergone in past 6 months (7) Recent pregnancy.

The nature of the study and intervention were explained to the subjects and those who willing to participate were included in the study. A written consent was taken from the subject. Then according to their BMI they were be allotted in to the respective group.

Group A – less than 18.50 Kg/m^2

Group B – 18.50- 24.99 Kg/m^2

Group C – 25- 29.99 Kg/m^2

Group D – 30-34.99Kg/m^2

Following therapeutic exercise protocol was given to all the groups, 4 times a week–

1. Warm-up - 5-7 minute Low intensity free exercises for 5-7 minutes.
2. Strengthening exercises- Strengthening exercise with dumb bells and sand bag are given for upper limb and lower limb. 3 sets of 12 repetitions with load of 60-70% of 1 RM.

Upper limb: Overhead press, Biceps curl, Lateral pull down, Triceps push-down, Bench press.

Lower limb: Hip extension, Hip abduction, Hamstring curls, Calf raise, Squats.

1. Stretching exercises- Stretching is given to various muscles of upper and lower limb for duration of 30 seconds hold for each stretch with 3 repetitions

Upper limb: Bicep stretch, Triceps stretch, Trapezius stretch.

Lower limb: Quadriceps stretch, Hamstring stretch, Hip flexor stretch, Gluteus stretch, Hip adductor stretch, Calf stretch.

1. **Cool down:** Low intensity free exercises to all the joints for 5-10 minutes.

Primary assessment was done on Day 1 and post exercises assessment was taken at the end of 2nd Week and 4th Week by Bench press, Leg press, YMCA-Step test, Sit and Reach test and SF-36.

Result

Outcome Measure

1. Strength test- 1-RM Test: Bench press and Leg press

Table1: Comparison of pre and post for strength within group

Group	Test	Pre Exercises Day 1		2Nd Week Post Exercises		4Th Week Post Exercises		F Value	P Value
		Mean	SD	Mean	SD	Mean	SD		
GROUP A	Bench press	0.36	0.15	0.36	0.15	0.41	0.14	28.778	<0.0001
	Leg press	1.12	0.16	1.14	0.17	1.17	0.17	26.692	<0.0001
GROUP B	Bench press	0.42	0.16	0.49	0.16	0.57	0.16	172.32	<0.0001
	Leg press	1.10	0.22	1.17	0.21	1.27	0.22	152.05	<0.0001
GROUP C	Bench press	0.40	0.16	0.47	0.16	0.55	0.16	232.70	<0.0001
	Leg press	1.02	0.20	1.11	0.21	1.19	0.22	86.414	<0.0001
GROUP D	Bench press	0.30	0.10	0.30	0.10	0.32	0.10	12.115	<0.0002
	Leg press	0.76	0.19	0.77	0.20	0.77	0.20	12.283	<0.0001

The table shows the comparison of mean and standard deviation of pre and post values of 1-RM strength test Bench press and Leg pressin Group A, B, C and D. The values are compared by applying Repeated Measures ANOVA test followed by Tukey Kramer multiple comparison test. In all 4 Groups there was significant improvement with p value <0.0001 respectively.

2. Endurance test: YMCA-Step test-

Table 2: Comparison of pre and post YMCA-Step test within group

Group	Pre Exercises Day 1		Post Exercises 2Nd Week		Post Exercises 4Th Week		F Value	P Value
	Mean	SD	Mean	SD	Mean	SD		
Group A	112.00	8.05	111.20	6.44	110.73	8.25	1.448	0.2521
Group B	113.00	9.41	110.73	8.42	109.53	9.66	4.924	<0.0147
Group C	114.53	7.27	111.59	6.11	107.29	6.65	12.551	<0.0001
Group D	122.00	6.66	120.33	5.27	121.47	6.01	0.9288	0.4069

The table shows the comparison of mean and standard deviation of pre and post values of Group A, B, C and D. The values are compared by applying Repeated Measures ANOVA test followed by Tukey Kramer multiple comparison test. In Group B and C showed significant improvement with p value <0.0147 and <0.0001 respectively.

3. Flexibility test: Sit and Reach test-

Table 3: Comparison of pre and post Sit and Reach test within group

Group	Pre Exercises Day 1		Post Exercises 2Nd Week		Post Exercises 4Th Week		F Value	P Value
	Mean	SD	Mean	SD	Mean	SD		
Group A	29.70	6.35	30.23	6.29	31.13	6.40	43.314	<0.0001
Group B	33.93	8.18	36.06	8.06	38.12	8.18	145.13	<0.0001
Group C	32.09	5.35	34.44	5.06	36.35	5.61	39.080	<0.0001
Group D	29.13	5.19	30.23	4.89	30.91	4.67	22.260	<0.0001

The table shows the comparison of mean and standard deviation of pre and post values of Group A, B, C and D. The values are compared by applying Repeated Measures ANOVA test followed by Tukey Kramer multiple comparison test. In all 4 Groups there was significant improvement with p value <0.0001 respectively.

4. SF-36 QOL

Table 4: Comparison of pre and post SF-36 within group

Group	Pre Exercises Day 1		Post Exercises 2Nd Week		Post Exercises 4Th Week		F Value	P Value
	Mean	SD	Mean	SD	Mean	SD		
Group A	34.52	7.48	35.95	7.45	39.52	7.57	58.500	<0.0001
Group B	53.57	5.05	57.62	5.54	62.62	5.21	134.67	<0.0001
Group C	51.89	6.45	56.93	5.85	63.45	5.72	98.372	<0.0001
Group D	36.19	6.60	40.24	6.54	45.24	7.95	57.863	<0.0001

The table shows the comparison of mean and standard deviation of pre and post values of Group A, B, C and D. The values are compared by applying Repeated Measures ANOVA test followed by Tukey Kramer multiple comparison test. In all 4 Groups there was significant improvement with p value <0.0001 respectively

Discussion

The study was conducted considering all the mentioned points and the aim of this study was to evaluate the effect of exercises on physical functional status of women according to their BMI categories.

In this study 62 women were selected and were divided into 4 groups according to their BMI. All the subjects were explained about aims and objective of the study. Each group was given same strengthening and stretching exercises. The pre and post exercises data was analyzed statistically using Repeated measures ANOVA (parametric methods) followed by Tukey Kramer multiple comparison test.

Strength of upper limb assessed by Bench Press shows post exercises (4th week) mean and standard deviation for group A is 0.41(0.14), group B is 0.57(0.16), group C is 0.55(0.16) and group D is 0.32(0.10); whereas for lower limb assessed by Leg Press post exercises(4th week) mean and standard deviation as for group A is 1.17(0.17) , group B is 1.27(0.22), group C is 1.19(0.22) and group D is 0.77(0.20) with p value <0.0001.

Step test used to assessed endurance (CRF) shows post exercises (4th week) mean and standard deviation for group A is 110.73(8.25), group B is 109.53(9.66), group C is 107(6.65) and group D is 121.47(6.01) with p value <0.0147 for group B and <0.0001 for group C.

Flexibility assessed by Sit and Reach Test shows post exercises (4th week) mean and standard deviation for group A is31.13 (6.40), group B is 38.12(8.18), group C is 36.35(5.61) and group D is 30.91(4.67) with p value <0.0001.

Quality was assessed by Sf-36 shows post exercises (4th week) mean and standard deviation for group A is 39.52(7.57), group B is 62.62(5.21), group C is 63.45(5.72) and group D is 45.24(7.95) with p value <0.0001.

Overall in GROUP C all study variables shows early and significantly large change and also the same was observed in further follow up times.

In this study an attempt was made to analyze the effect of strengthening and stretching exercises for upper and lower limb on strength, endurance, flexibility and quality of life in women with varying BMI. Though it is known that aerobic exercises improves endurance but in this study the subjects are given strengthening exercises and stretching for upper and lower limb to see its effect on endurance.

Many literature states that muscle strength that can improve and maintain the following[9]

1. Bone mass that is related to osteoporosis.
2. Musculo-tendinous reliability that is associated to a lower risk of injury including low back pain.

3. The aptitude to carry out the activities of daily living, which is related to apparent quality of life and self-efficacy among other indicators of mental health.
4. The Fat Free Mass and resting metabolic rate, which are related to weight management.

Resistance exercises have an effect on improving strength [10] and bone density [11]. Various studies shows benefit of resistance exercises is a significant component for enrichment of health and progress quality of life even when the exercise is done in advance ages[12-15].

The most vital criteria of health related Quality of Life is body weight in women whereas very less data is available on women's functional health status [16], so in this study an effort is made to find the relation of the women's BMI and functional health.

Conclusion

The present study concludes that the therapeutic exercises has a significant improvement in women pertaining to components of strength, flexibility and quality of life, in all four groups; whereas only in group B and group C showed significant improvement in Step Test (endurance). According to mean difference group C has shown more significant improvement then other three groups.

Conflicts of Interest: There were no conflicts of interest in this study.

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical science, deemed to be University, Karad.

Source of Funding: This study was funded by Krishna Institute of Medical sciences Deemed to Be University, Karad.

REFERENCES

1. "India Census 2011". Censusindia.gov.in. Retrieved 25 August 2015
2. Ranjit M Anjana , Rajendra Pradeepa "Physical activity and inactivity patterns in India – results from the ICMR-INDIAB study (Phase-1) [ICMR-INDIAB-5].
3. N.K.Multani. Principles of Geriatric Physiotherapy.1st edition 2007, pg 9.
4. Definitions—Health, Fitness, and Physical Activity [Internet]. Washington (DC): President's Council on Physical Fitness and Sports. 2000 [cited 2012 Jan 7]. 11 p. Available from: http://purl.access.gpo. gov/GPO/LPS21074
5. WHO. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. WHO Technical Report Series 854. Geneva: World Health Organization, 1995.
6. Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.
7. Garber CE, Blissmer B, Deschenes MR, et al. American College of Sports Medicine Position Stand. The quantity and quality of exercise for developing and maintaining cardio respiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. Med Sci Sports Exerc. 2011;43(7):1334–559
8. ACSM's guidelines for exercise testing and prescription / American College of Sports Medicine ; senior editor, Linda S. Pescatello ; associate editors, Ross Arena, Deborah Riebe, Paul D. Thompson. 9th ed. CHAPTER 4 Health-Related Physical Fitness Testing and Interpretation. pg 105. www.acsm.org
9. Williams MA, Haskell WL, Ades PA, et al. Resistance exercise in individuals with and without cardiovascular disease: 2007 update: a scientific statement from the American Heart Association Council on Clinical Cardiology and Council on Nutrition, Physical Activity, and Metabolism. Circulation. 2007; 116 (5):572–84.
10. Fiatarone M, O'Neill E, Doyle Ryan N, Clements K, Solares G, Nelson M, Roberts S, Kehayias J, Lipitz L and Evans W (1994): Exercise training and nutritional supplementation for physical frailty in very elderly people. New England Journal of Medicine 330: 1769-1775.
11. Nelson M, Fiatarone M, Morganti C, Trice I, Greenberg R and Evans W (1994): Effects of high-intensity strength training on multiple risk factors for osteoporotic fractures. A randomised controlled trial. Journal of the American Medical Association 272: 1909-1914.
12. CAMPBELL, W.W., L.J.O. JOSEPH, D.C. DAVEY, R.A. ANDERSON, AND W.J. EVANS.

Effects of resistance training and chromium picolinate on body composition and skeletal muscle in older men. J. Appl. Physiol. 86:29–39. 1999.6.

13. EVANS, W.J. What is sarcopenia? J. Gerontol. 50A:5–8. 1995. 7.

14. FIATARONE, M.A., E.C. MARKS, N.D. RYAN, C.N. MEREDITH, L.A. LIPSITZ, AND W.J. EVANS. High-intensity strength training in nonagenarians-Effects on skeletal muscle. JAMA 263:3029– 3034. 1990.

15. CAMPBELL, W.W., M.C. CRIM, V.R. YOUNG, AND W.J. EVANS. Increased energy requirements and changes in body composition with resistance training in older adults. Am. J. Clin. Nutr. 60: 167–175. 1994.

16. Jennifer T. Fine ScD, Graham A. Colditz MD et.al. A prospective study of weight change and health related quality of life in women. JAMA, December 8, 1999; 282:2136-2142.

Effect of Choice-Based Sensory Stimulation as a Coma Stimulation Technique on Traumatic Brain Injury

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ABSTRACT

Objectives: The purpose of this study was to check the effect of choice-based sensory stimulation as a coma stimulation technique on traumatic brain injury.

Method: 30 subjects diagnosed with traumatic brain injury were included in this study. These subjects were divided into two groups using convenient sampling method with random allocation. The subjects with Glass gow Coma Scale score 3-8 were included. Pre- treatment and post- treatment assessment for both the groups was carried out by using WNSSP(WNSSP). This outcome measure was analyzed.

Result: The choice-based sensory stimulation showed the significance improvement in arousal response according to WNSSP. The P value was <0.0001, which is statistically significant.

Conclusion: the present study provided evidence to support the use of choice-based sensory stimulation as it is more effective than conventional coma arousal techniques in coma arousal on traumatic brain injury.

Keywords: *Traumatic Brain Injury, choice- based sensory stimulation, Western Neuro Sensory Stimulation Profile (WNSSP).*

Introduction

Traumatic Brain injury is defined as brain damage caused by externally inflicted trauma to the head, may result in significant impairment of an significant impairment of an individual's functioning–physical, cognitive & psychosocial.[1]

Traumatic Brain Injury is known to be a leading cause of morbidity, mortality, disability & socio-economic losses in India.[2]

Traumatic brain injury causes long term effect on an individual's life. About 5.3 million people in United States are living with disability due to brain injury.[3]

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Traumatic brain injury secondary to road traffic accidents mainly leads to coma.[4-7]

Most of people are recovered frequently but suffer with altered consciousness and cognitive function for certain time period. If, these alterations persists for longer duration , then it will ultimately affect one's normal life.[8,9]

Patients with coma are been hospitalized for longer duration and a complete bed rest which decreases the sensation perception due to reduced sensory stimulus.[10]

Coma is a state which endure for about months and years that will ultimately affect the quality of life of patient. There is an assumption that implementation of well-planned sensory stimulation program on severe TRAUMATIC BRAIN INJURY patient will have an progressive effect on arousal, recovery and sensory loss.[10-13]

Coma Stimulation Techniques

Various types of sensory stimulations can be applied in patients with coma as a coma arousal technique. They are as follows:

1. **Auditory:** Allow one family member at a time to interact with the subject. Use of radio, TV, tape recordings of familiar voices, etc can also be useful.
2. **Visual:** For visual stimulation, subject must be surrounded with brightly colored pictures, family photo, any familier object and TV. Visual stimuli also include familiar faces (father, mother, brother, sister, husband, wife, friends etc.), familiar object, or a mirror.
3. **Tactile:** Touch senses is either inhibiting or facilitating, e.g. pain, light touch are inhibiting while light strokes to the back area result in facilitating. Face is the most sensitive area. Variety of textures such as, clothing, blankets, lotions etc. Squeezing technique of massage also can be applied. The pressure must be firm and should not hurt the subject.
4. **Olfactory:** In traumatic brain injury, olfactory nerve is most commonly affected. Maximum subjects are intubated (i.e. tracheostomy, Ryle's tube etc.). For olfactory stimulus perfume, coffee powder, shampoo, favourite food etc. can be used. Olfactory senses should not be stimulated for more than 10 seconds as subject may get adapted to that. The stimuli should not touch the skin as subject can adapt and become less responsive to the stimuli. Irritable stimuli must be svoided such as vinegar, ammonia etc.
5. **Gustatory:** Subject must not be prone to the aspiration. Cotton swab is dipped in sweet, salty or sour solution and applied in the subject's mouth. Sweet taste causes more salivation, so, in case of oral secretions, sweet taste must be avoided.
6. **Movement:** Range of motion exercises are used as movement stimulation
7. **Kinesthetic:** Various changes in position such as, rolling, rocking in chair etc. are used as kinaesthetic stimulation.

Choice-Based Coma Stimulation

Choice-based stimulation is applied directly by the family member of the subject. It is an intervention in which family members are directly involved for applying the coma stimulation technique to arouse the subject. This includes the interaction of the respective family member with the subject. The family members had freedom for making their choice in accordance with the subject's need for coma stimulation. The above mentioned techniques are the choices which are available for the family members in concern with the need of the subject. The family member was asked to tell their family stories, speak about the good and happy moments which subject had spent with the family, show the family photo, apply the taste stimulus using cotton swab(taste of subject's favorite food) etc. This stimulus was given by the member who was closest to the subject. Due to emotional attachment between the subject and their family member, the impact of sensory stimulation given by family member may help to gain better arousal response rather than stimulation given by the therapist.

Because of the visiting policies, there is lack of interaction between the subject and family member. So, this study will be the effective measure to establish the good interaction between subject and family member which can be one of the most contributing factor for arousing the subject from coma

Anyhow, little is known about the impact of family involvement in providing sensory stimulation. This study was beneficial, as the family member of the subject had the freedom for making their choice in accordance with the subject's need for coma stimulation

Method

Population: Total 30 patients diagnosed with Traumatic Brain Injury by neurologist of KIMS hospital karad were selected as subjects. Subjects fulfilling the inclusion and exclusion criteria were selected. Written consent was taken from family member of subject before starting the study. Then subjects were divided in two groups i.e. Group A (experimental group) and Group B (control group) by convenient sampling method. Out of 30 subjects there were 21 male and 9 female.

Both male and female with GCS score below 8 and subjects willing to participate in the study were included. Whereas subjects with systemic illness; GCS score 3 and auditory impairment were excluded.

Interventions: 30 subjects were divided into two groups with 15 subjects in each group i.e. Group A (experimental group) and Group B (control group). Pre-treatment

assessment was taken according to WNSSP. Group A received a conventional sensory stimulation whereas Group B received choice based sensory stimulation therapy (auditory stimulation, visual stimulation, kinesthetic stimulation, movement stimulation, gustatory stimulation). The list of the above mentioned techniques was provided to the family member. And, then he/she was asked to make their choice according to the subject's need. After making the choice for stimulation, family members were asked to apply the stimulus under the guidance of the therapist.

Choice based stimulation was given to patient using the information by family member (auditory, visual, movement and tactile) which was prepared by locally available and easily affordable material. Out of 15 relative of the subjects, 5 family members selected auditory stimulus, 7 family members selected visual stimulus, 1 family member selected tactile stimulus, 2 family members selected movement stimulus. The treatment was given for 6 weeks; 5 sessions per week, twice a day. Post treatment assessment was taken after completion of 6 weeks.

Group A (Experimental group) received choice-based sensory stimulation: Group A i.e. experimental group received auditory stimulus, visual stimulus, movement stimulus and tactile stimulus which was totally applied by relative of patient.

Auditory Stimulus: Auditory stimulus was given by the family member, the family member was asked to stand nearby the subject. And he/she was asked to tell their family stories (all the good and happy moments they had spent with the patient). The time duration given to the relative was 10 mins. They were asked to interact with patient throughout the time being given. Each patient received a different stimulus in form of different stories, different incidences, different voices etc.

Visual Stimulus: Initially, the bed of the subject was elevated. Visual stimulus was given by placing the family photo frame, familiar object, brightly colored pictures and mirror in front of the eyes of subject. The subject's eyes were opened passively by the family member. The time duration was same as above.

Tactile Stimulus: For applying tactile stimulus, the subject was turned towards one side. Light strokes on the back were applied. After that subject's face was moistened with help of wet cloth. Squeezing technique of massage was also applied on upper limbs.

Movement Stimulus: Passive range of motion exercises were given to both upper limb and lower limbs. Ten repetitions for each movement were given.

Group B (Control group) received conventional sensory stimulation:

- Group B i.e. control group received auditory stimulus which was applied by therapist.

Auditory Stimulus: This group too received auditory stimulation. The audio was same for all the subjects in this group. An instrumental music was made to hear with the help of earphones. The duration of the audio was 10 minutes. These audio was made to hear for two times a day for 5 days/week for 6 weeks.

The treatment duration was same for both the groups.

Measurement procedure:

WNSSP (WNSSP): For Pre-treatment and Post-treatment assessment was done by using WNSSP (WNSSP). The WNSSP has thirty-three items constituting nine cognitive- function subscales: Arousal attention(4 items), Auditory response (2 items), Auditory comprehension (6 items), Expressive communication (3 items), Visual tracking (7 items), Visual comprehension (5 items), Tactile response (2 items), Object manipulation (3 items), Olfactory response (1 item). The total score range is 0 to 113; low score indicates poorer function.[14]

Result

Statistical analysis of pre and post intervention within group was done by using non-parametric paired test. Statistical analysis of pre and post intervention within group of non-parametric data (WNSSP) was done by Mann-Whitney test. The Choice-based sensory stimulation showed the significance improvement in arousal response according to WNSSP with $P = <0.0001$, which is statistically significant. Among the 4 stimulus used for the choice-based stimulation i.e. auditory, visual, tactile and movement stimulation; visual stimulation showed considerable significance with $p=0.0156$.

1. **Gender Distribution in the Study:** Out of30 subjects 21 were males and 9 were females. Group A had 11 males and 4 females and Group B had 10 males and 5 females.

Table No. 1: Gender Distribution

	GROUP A	GROUP B	TOTAL
MALES	11	10	21
FEMALES	4	5	9
TOTAL	15	15	30

Age Distribution in the Study: In this study, comparison of the age between group A and group B was done. Mean and standard deviation of age for group A was 38.800± 13.143 while for group B it was 31.4000± 10.370. The minimum age which was involved was 17.000 in group A and 14.000 in group B. The maximum age which involved was 60.000 in group A and 50.000 in group B

2. Data Analysis WNSSP (WNSSP):

- Comparison of pre and post score of WNSSP within group A and group B.

Table No 2: Comparison of pre and post score of WNSSP within group A and group B.

	Pre test	Post test	P Value
	Mean ± SD	Mean ± SD	
Group A	17.4 $\pm$ 2.384	45.06 $\pm$ 8.614	< 0.0001
Group B	14.60 $\pm$ 2.798	37.66 $\pm$ 2.093	< 0.0001

The analysis was carried out by Mann-Whitney test with extremely significant p value for both the groups as < 0.0001

- Comparison of pre-interventional and post-interventional scores for auditory stimulation.

Table No. 3: Comparison of pre and post WNSSP for auditory stimulation

	Pre-Treatment	Post-treatment
Mean	16.80	44.60
SD	3.03	5.85
Median	18.000	48.000

- Comparison of pre-interventional and post-interventional scores for visual stimulation.

Table No. 4: Comparison of pre and post WNSSP for visual stimulation

	Pre-Treatment	Post-treatment
Mean	17.85	42.71
SD	1.952	10.73
Median	17.000	45.000

- Comparison of pre-interventional and post-interventional scores for tactile and movement stimulation.

Table No. 5: Comparison of pre and post WNSSP for tactile and movement stimulation

	Pre-Treatment	Post-treatment
Mean	17.33	50.66
SD	2.887	6.028
Median	19.000	50.000

Discussion

In this study, the main focus was on choice-based sensory stimulation on traumatic brain injury subjects as a coma arousal technique.

It is an intervention in which family members are directly involved for applying the coma stimulation technique to arouse the subject. This includes the interaction of the respective family member with the subject.

The aim of the study was to identify better arousal response by seeing the effect of choice-based sensory stimulation as a coma stimulation technique on traumatic brain injury.

Out of 30 subjects, 15 subjects were conveniently included in group A i.e. experimental group and 15 subjects in group B i.e. control group. Pre-treatment assessment was taken according to WNSSP. Group A i.e. experimental group received choice-based sensory stimulation which was applied by family members of the subject while group B i.e. control group received conventional sensory stimulation. Choice-based sensory stimulation was in the form of auditory, visual, tactile and movement stimulation. The family member who was very close to the subject was involved in the study. The time duration for each stimulation given was 10 minutes. This stimulus was applied twice a day for 5 days/week for 6 weeks. Conventional sensory stimulation was in the form of auditory stimulation. This was applied by the therapist. The stimulus was an instrumental music which was made to hear to the subject with the help of earphones by the therapist. The time duration was same for both the groups i.e. for 10 minutes twice a day for 5 days/week for 6 weeks.

The pre-treatment and post-treatment assessment was taken with the help of WNSSP (WNSSP) which was used as an outcome measure. Statistical analysis was performed by using Instat-graph pad. After the analysis of gender distribution was out of 30 subjects, 21 were male subjects and 9 were female subjects.Further analysis was performed to analyse the pre-treatment and post-treatment effect of choice-based sensory stimulation and conventional sensory stimulation on WNSSP (WNSSP). There was one study, Effectiveness of early Interventions of coma arousal therapy in traumatic head injury patients by Mandeep et al, in which experimental group received coma arousal therapy along with physiotherapy intervention (passive movement and chest physiotherapy) and control group received only physiotherapy intervention (passive movement and chest physiotherapy). Among these groups experimental group showed significant improvement on GCS and CRS with (p=0.05) .In present study, experimental group received choice-based sensory stimulation which was given by family members and control group received conventional sensory stimulation which was an instrumental music. Experimental group shows significant improvement on WNSSP with p=0.042.

Coma arousal therapy of sufficient duration arise the brain by improving neuronal organization, increased dendritic branching, increased numbers of dendritic spines; stimulating the reticular activating system and increasing the level of cognitive function. Maximum reorganization occurs within the first few week after brain injury.

Hence, it is proven that choice-based sensory stimulation as a coma stimulation show better arousal in subjects with traumatic brain injury.

Conclusion

The study was concluded as an evidence to support the use of choice-based sensory stimulation as coma arousal technique on traumatic brain injury. Among the 4 stimulus used for the choice-based stimulation i.e. auditory, visual, tactile and movement stimulation; visual stimulation showed considerable significance with p = 0.0156.

Conflicts of Interest: There were no conflicts of interest in this study.

Source of Funding: This study was funded by Krishna Institute of Medical sciences Deemed to Be University, Karad.

REFERENCES

1. Faul, M, et al: Traumatic Brain Injury in the United States:Emergency Department Visits, Hospitalizations and Deaths,2002–2006
2. Consensus conference: Rehabilitation of persons with traumatic brain injury. NIH Consensus development panel on Rehabilitation of persons with traumatic brain injury. JAMA 282:974, 1999.
3. Finkelstein, EA, Corso, PS, and Miller, TR: The Incidence and Economic Burden of Injuries in the United States. Oxford University Press, New York, 2006.
4. Toroyan T. Global status report on road safety. *Inj Prev.* 2009;15(4):286.
5. Majdzadeh R, Khalagi K, Naraghi K, Motevalian A, Eshraghian MR. Determinants of traffic injuries in drivers and motorcyclists involved in an accident. *Accid Anal Prev.* 2008;40(1):17–23.
6. Aghakhani N, Azami M, Jasemi M, Khoshsima M, Eghtedar S, Rahbar N. Epidemiology of traumatic brain injury in urmia, iran. *Iran Red Crescent Med J.* 2013;15(2):173–4.
7. Fakharian E, Mohammadzadeh M, Behdadmehr S, Reza Saberi H, Sadat Mirzadeh A, Mohammadzadeh J. Repetitive traumatic brain injury in kashan, iran. *Trauma Mon.* 2015.
8. Kashluba S, Hanks RA, Casey JE, Millis SR. Neuropsychologic and functional outcome after complicated mild traumatic brain injury. *Arch Phys Med Rehabil.* 2008;89(5):904–11. doi: 10.1016/j.apmr.2007.12.029. [PubMed: 18452740].
9. Sinha S, Gunawat P, Nehra A, Sharma BS. Cognitive, functional, and psychosocial outcome after severe traumatic brain injury: a cross-sectional study at a tertiary care trauma center. *Neurol India.* 2013;61(5):501–6. doi: 10.4103/0028-3886.121920. [PubMed: 24262453].
10. Oh H, Seo W. Sensory stimulation programme to improve recovery in comatose patients. *J Clin Nurs.* 2003;12(3):394–404. [PubMed: 12709114].
11. Ansell BJ, Keenan JE. The WNSSP: a tool for assessing slow-to-recover head-injured patients. *Arch Phys Med Rehabil.* 1989;70(2):104–8. [PubMed: 2916926].

12. Karma D, Rawat AK. Effect of stimulation in coma. *Indian Pediatr.* 2006;43(10):856–60. [PubMed: 17079828].

13. Megha M, Harpreet S, Nayeem Z. Effect of frequency of multimodal coma stimulation on the consciousness levels of traumatic brain injury comatose patients. *Brain Inj.* 2013;27(5):570–7. doi: 10.3109/02699052.2013.767937. [PubMed: 23473238].]

14. Ansell, B.J. (1993). Slow-to-recover patients: improvement to rehabilitation readiness. Journal head trauma rehabilitation . 8,88-98.

Knowledge Attitude Practice on the Oral Hygiene Practices in Children Below 12 Years

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ABSTRACT

The brushing techniques in children are different when compared with those in adults. Children of this age category are more prone to tooth decays. When the primary teeth has decays and is not treated, it may infect the primary teeth and hence this research is important to prevent infection. Two hundred participants aged between 3-12 were recruited through a survey. A questionnaire was administered to generate information on oral hygiene practices. This was an online survey undertaken by using the link https://surveyplanet.com//.Oral hygiene is of major concern and only 43.4% people take proper care. It is also seen that about 72% children use toothbrush to brush their teeth. It is also seen that majority of the children, about 72% use toothpaste. Whereas about 4% people use salt and water or oil for brushing. The level of individuals utilizing oral cleanliness helps other than toothbrush and toothpaste was less. Subsequently, the dental experts need to instruct and inspire individuals about the oral cleanliness support alongside legitimate choice and utilization of the different oral cleanliness helps.

Keywords: *Oral cavity, Plaque, Hygiene, Cleanliness, Brushing techniques.*

Introduction

Oral hygiene is a practice to maintain one's mouth clean and disease free by brushing and cleaning. Oral hygiene should be maintained in children as they're more prone to carries and an infection in primary teeth may cause infection in permanent ones.[1] Oral hygiene is the an effective medium to prevent caries and periodontal diseases. Ideally, brushing should be performed twice a day in order to maintain oral health. An important family level factor is the socio-economic status. Important community level factors are those associated with ease of access to health care.[16]

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Individual's oral health-related behaviours and their outcomes are influenced by individual, family and the community.[2] Over the last century, oral health has improved significantly. This improvement, however, has not been experienced equally across the population, being considerably greater among the better off.[3] High economic status alone cannot contribute to better health.[4] Although it is a major factor for improving the health [4,5,6,7] it can be a contributing factor for illness as well, like in the occurrence of coronary heart disease, diabetes, and obesity.

The purpose of oral hygiene is to prevent the buildup of plaque, the sticky film of bacteria and food that forms on the teeth. Plaque sticks to the fissures and crevices of the teeth and generates acids which, when not removed on a regular basis, slowly decay, the enamel surface of the teeth, causing cavities. Plaque also irritates gums and can lead to gum disease, periodontal disease, and tooth loss.[8]

Oral hygiene can be maintained by brushing and flossing. Regular brushing consists of brushing twice a day: after breakfast and before going to bed. Cleaning between the teeth is called interdental cleaning and is as important as tooth brushing.[9]

The primary risks arise from a lack of proper oral hygiene practices. These major oral health problems are plaque, tartar, gingivitis, periodontitis, and tooth decay.[10]

Excessive body weight in children is a major public health problem. One of the main reason for obesity is intake of excess sugar. Sugar containing snacks and soft drinks, is reported to be more common among overweight and obese children/adolescents than those with normal weight. Frequent sugar intake is also a recognized risk factor for dental caries. Sugar acts (and other fermentable carbohydrates such as highly refined flour) as a risk factor in the initiation and progression of dental caries. Sugar acts as a favoured substrate for the cariogenic bacteria that reside in dental plaque, particularly the mutans streptococci, and the acid by-products of this metabolic process induce demineralization of the enamel surface. Thus, the aim of the survey is to create awareness on the oral hygiene practices among children below 12 years.

Materials and Method

A cross-sectional survey was done to assess the oral hygiene habits. The questionnaire included the questions related to the demographic profile and assessment of the oral hygiene habits of the study population.

The questionnaire included information related to the patient's name, age, gender, occupation, and residential area. The oral hygiene habits of the study population were assessed including the use of oral hygiene aid, frequency of cleaning teeth, duration of cleaning teeth, frequency of changing toothbrush, rinsing of mouth with water, use of mouthwash, and tongue cleaning aid used.

Inclusion Criteria:

- Systemically healthy individuals aged between 3-12 years.
- The patients willing to give informed consent were included in the study.
- Patients with history of systemic disease (debilitating disease or any condition having a substantial effect on oral health)
- Pregnancy and lactation
- Undergone oral prophylaxis during the past 6 months.

Ethical Clearance: Informed consent was obtained from the patients who participated in the study.

Statistical analysis: Collected data was entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences version 21.0 software (IBM Inc., Chicago, USA). Descriptive statistics (number and percentage of responses for the questions related to the oral hygiene practices including the demographic information) were calculated for response items.

Table 1: The oral hygiene of children below 12 years has been analysed through questionnaires

Questions	Responses	Number	Percentage
How many times do you brush in a day?	Once in a day	110	54.4
	Twice in a day	80	38.8
	Never	16	7.8
How often do you floss?	Everyday	80	38.8
	Rarely	90	43.7
	Never	36	17.5
How often do you consult the dentist?	Once in a year	73	44.2
	During pain	91	20.4
	Once in 6 months	42	
For how long do you brush?	1 minute	44	21.4
	2minutes	120	58.3
	Less than a minute	42	20.48
How often do you consume chocolates?	Everyday	90	43.7
	Sometimes	82	39.8
	Rarely	34	16.5

Conted…

How often do you face the problem of bad breath?	Everyday	64	31.1
	Sometimes	88	42.7
	Rarely	54	26.2
Do you have any tooth caries?	Yes	70	34
	No	136	66

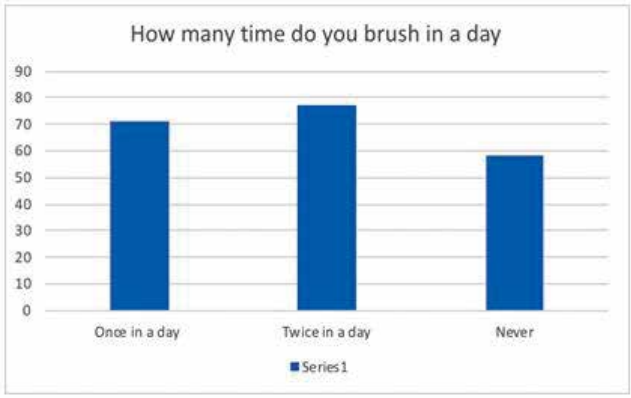


Fig. 1. Graph showing number of times brushing a day

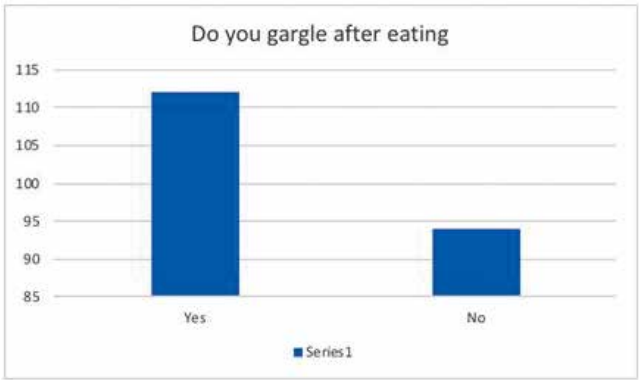


Fig. 2. Graph showing gargle after eating

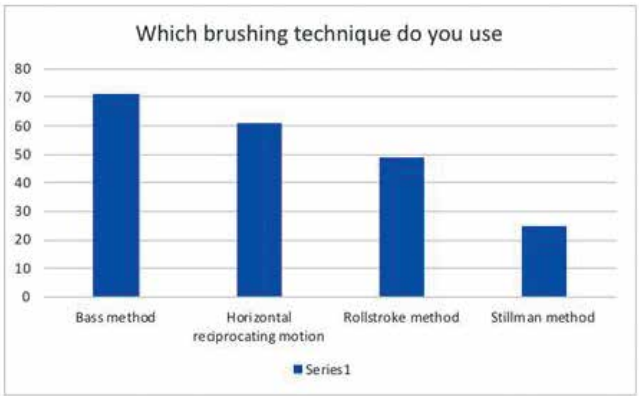


Fig. 3. Graph showing brushing techniques

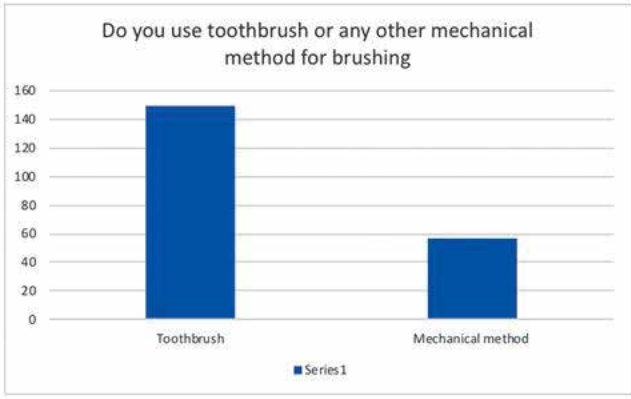


Fig. 4. Graph showing toothbrush usage percentage

Results

Oral hygiene is of utmost importance. In the present study, the oral hygiene of children below 12 years has been analysed (Table 1). Oral hygiene is of major concern and only 43.4% people take proper care. It is also seen that about 72% children use toothbrush to brush their teeth (Fig.1). It is also seen that majority of the children, about 72%, use fluoride containing toothpaste. Whereas about 4% people use salt and water or oil for brushing (Fig.2). The brushing techniques used more commonly is the bass method technique (34.5%), the second most common technique is the horizontal brush technique (29.6%) (Fig.3).

Discussion

This study is done to grow awareness about the healthy practices of oral hygiene. Children who had good knowledge of caries prevention measures had significant increased odds of brushing their teeth twice daily or more.[11- 15]

The toothbrush and toothpaste utilize is the best method for cleaning the teeth and keeping up the oral cleanliness. To amplify the oral wellbeing, the American

Dental Association and US Surgeon General suggest that people brush twice and floss in any event once every day and have customary prophylactic dental visits.

Rinsing of mouth with plain water was accounted by 54% of the kids in the present investigation with larger part washing their mouth after suppers (55%) (Fig.4). This was vastly improved than the investigation of Jain et al. [17] just 29% of the example populace washed their mouth subsequent to eating sustenance. This essential propensity for oral cleanliness was observed to be very among this investigation populace.

Money related contemplations, instructive status, and control of the patient essentially affect oral social insurance in India. The discoveries from the present and different investigations have demonstrated that the lower financial strata have poor oral cleanliness homes which may be identified with low moderateness and low level of mindfulness. This joined with the long working hours may prompt neglection of the oral cleanliness propensities. In this way, the further examination ought to be led to have a top to bottom information of the elements in charge of poor oral cleanliness propensities among this populace. This can shape reason for the appropriate general human services programs focusing on this populace. [18]

Different examinations have demonstrated an effect of SES on the oral strength of a person. It has likewise been demonstrated that there is a noteworthy affiliation exists between the person's oral wellbeing and mindfulness about the same. People with bring down financial gathering have less mindfulness and access to the oral social insurance. People from bring down financial gatherings unfit to utilize the oral cleanliness helps like mouthwash, interproximal brushes, and different sedated toothpaste as a result of their high cost. Nearly people from higher financial status approach all the previously mentioned oral wellbeing helps and furthermore the consciousness of its part in enhancing periodontal wellbeing.[19,20]

Conclusion

The level of individuals utilizing oral cleanliness helps other than toothbrush and toothpaste was less. Subsequently, the dental experts need to instruct and inspire individuals about the oral cleanliness support alongside legitimate choice and utilization of the different oral cleanliness helps.

The SES affects the oral cleanliness practices of the patients as it influences the moderateness of the populace. The advancement and usage of very much organized dental wellbeing training programs on occasional premise are expected to enhance and keep up appropriate oral wellbeing measures among civil representatives with uncommon accentuation on the lower SES strata.

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Darby ML, Walsh M. Procedures Manual to Accompany Dental Hygiene-E-Book. Elsevier Health Sciences; 2009 May 16.
2. Chen MS, Andersen RM, Barmes DE, Leclerq MH, Lyttle CS. Comparing oral health care systems: a second international collaborative study.
3. Park JE. Textbook of preventive and social medicine.(A treatise on community health.). Textbook of preventive and social medicine.(A treatise on community health.).. 1970.
4. Oliver RC, Brown LJ, Loe H. Variations in the prevalence and extent of periodontitis. The Journal of the American Dental Association. 1991 Jun 1;122(6):43-8.
5. Petridou E, Athanassouli T, Panagopoulos H, Revinthi K. Sociodemographic and dietary factors in relation to dental health among Greek adolescents. Community dentistry and oral epidemiology. 1996 Oct 1;24(5):307-11.
6. Freire M, Melo RB, Silva SA. Dental caries prevalence in relation to socioeconomic status of nursery school children in Goiâania-GO, Brazil. Community Dentistry and Oral Epidemiology. 1996 Oct 1;24(5):357-61.
7. Whittle JG, Whittle KW. Household income in relation to dental health and dental health behaviours: the use of Super Profiles. Community dental health. 1998 Sep;15(3):150-4.
8. Pate RR, Pratt M, Blair SN, Haskell WL, Macera CA, Bouchard C, Buchner D, Ettinger W, Heath GW, King AC, Kriska A. Physical activity

and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. Jama. 1995 Feb 1;273(5):402-7.

9. Delgado-Angulo EK, Hobdell MH, Bernabé E. Poverty, social exclusion and dental caries of 12-year-old children: a cross-sectional study in Lima, Peru. BMC oral health. 2009 Dec;9(1):16.
10. Claydon NC. Current concepts in toothbrushing and interdental cleaning. Periodontology 2000. 2008 Oct 1;48(1):10-22.
11. Petersen PE. Social inequalities in dental health. Community Dentistry and Oral Epidemiology. 1990 Jun 1;18(3):153-8.
12. Locker D. Deprivation and oral health: a review. Community dentistry and oral epidemiology. 2000 Jun 1;28(3):161-9.
13. Gillcrist JA, Brumley DE, Blackford JU. Community socioeconomic status and children's dental health. The Journal of the American Dental Association. 2001 Feb 1;132(2):216-22.
14. Diehnelt DE, Kiyak HA. Socioeconomic factors that affect international caries levels. Community Dentistry and Oral Epidemiology. 2001 Jun 1;29(3):226-33.
15. Hjern A, Grindefjord M, Sundberg H, Rosén M. Social inequality in oral health and use of dental care in Sweden. Community dentistry and oral epidemiology. 2001 Jun 1;29(3):167-74.
16. Daly B, Batchelor P, Treasure E, Watt R. Essential dental public health. OUP Oxford; 2013 May 23.
17. Jain N, Mitra D, Ashok KP, Dundappa J, Soni S, Ahmed S. Oral hygiene-awareness and practice among patients attending OPD at Vyas Dental College and Hospital, Jodhpur. Journal of Indian Society of Periodontology. 2012 Oct;16(4):524.
18. Malmström M, Sundquist J, Johansson SE. Neighborhood environment and self-reported health status: a multilevel analysis. American Journal of Public Health. 1999 Aug;89(8):1181-6.
19. Gounder R, Vikas BV. Comparison of disinfectants by immersion and spray atomization techniques on the linear dimensional stability of different interocclusal recording materials: An in vitro study. European journal of dentistry. 2016 Jan;10(1):7.
20. Sisson KL. Theoretical explanations for social inequalities in oral health. Community dentistry and oral epidemiology. 2007 Apr 1;35(2):81-8.

Role of Tumour Necrosis Factor Alpha (TNF-α) in Pulmonary Pathophsiology of Chronic Obstructive Pulmonary Disease

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ABSTRACT

Tumour Necrosis Factor (TNF-α) is one of the most commonly studied cytokine of TNF superfamily. Patho-physiologically generation of high levels of TNF-α is a development of inflammatory responses for many of the chronic diseases. Simultaneously in pulmonary diseases increased level of TNF-α in blood serum relates with the cytotoxicity. The Study was conducted on 100 patients of Rajan Babu Institute for Pulmonary Medicine & Tuberculosis (RJPIMT) Hospital. Patient diagnosis was confirmed via Spirometry. The result reveals that the serum TNF-α level increases with the COPD severity. The mean values of TNF were significantly increased with the decreased FEV/FVC. The present study showed that serum TNF-α level correlates with severity of airway obstruction in Spirometry among the COPD patients. It is worth mentioning that serum TNF-α level may plays an important role to diagnose chronic obstructive pulmonary disease as a useful marker to monitor the disease severity in addition to spirometric parameters like FVC, FEV1 and FEV1/FVC ratio.

Keywords: *TNF-α, COPD, Exacerbations, Spirometry.*

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is one of the crucial hazardous diseases with an increase in morbidity and mortality rate of life all across the world. It is among one of the disease-causing large amounts of economic burden over the globe. As reported by WHO, COPD will be the fourth largest leading cause of death by 2020.[1,2,3]

COPD is defined as characterized persistent airflow progressive limitation and associated with inflammatory responses in the airway to noxious particles or gases. Another variable of exacerbation and comorbidities contributes towards the severity of diseases.[4] Pathologically COPD consists of two major conditions of Emphysema; shortness of breath [5] and Chronic Bronchitis; production of a chronic cough and sputum for at least three months a year for two consecutive years.[6]

COPD is also associated with systematic oxidative stress, circulatory inflammatory cells and increase level of inflammatory cytokines. [7]. Around 30 million people in India are suffering from COPD [8] and almost half a million people die in India every year due to COPD. [9] One of the study conducted by WHO estimated that COPD was the fifth leading cause worldwide in 2001 with 250 million patients mortality and it is to be the leading cause by 2020. [10] Abe-Gunde *et al.* in his study revealed that out of a total number of deaths taken place in 2005, 7% of these were caused by chronic respiratory diseases and 80% of it occurred in under-developed and developing countries. [11] The world-wide studies conducted showcased that incidences of COPD in stage II or severe cases were 10.1% including 11.8% for men and 8.5% for women. [12] In one of the report of Economic Fabric of India (2001) it was stated that in total of 14.93 million cases of COPD; 5.02 million cases were females and 9.92 million males.

The systematic inflammatory process in the lungs activates the peripheral inflammatory cells by releasing several cytokines and chemokines. [3] TNF-α is responsible for cellular migration and activates the

secretion of various cytokines. [13] TNF-α is known as a factor produced by endotoxin-stimulated macrophages causing necrosis of a tumour. [14] Among various studies conducted all across the world increased serum TNF- α levels were seen from the sample of COPD patients. [15,16,17] The overproduction of TNF-α results into pulmonary emphysema and inflammation [18,19,20] and the counter effects are displayed as stimulation of release of enzymes like macrophage metalloelastase. [21] A meta-analysis study revealed positive association between COPD and inflammatory systemic markers. [22]. In this study, we have made an attempt to measure the TNF – α level in patients with COPD and to correlate with the severity of disease with special reference to Delhi-NCR population.

Methodology

For concise study, detection of the severity of disease complete and comprehensive medical history is required. Patient's detailed information are collected through structured and validated questionnaire.[23]

The study was carried out on patients attending the pulmonary medicine department of (RJPIMT) Hospital, New Delhi. The patients from various age groups were included in the study which was conducted on 100 patients suffering from COPD with or without smoking as a prime factor. The patient Blood samples were collected only after informed consent from each subject included in the study. All inclusion and exclusion criteria were fulfilled.

Inclusion Criteria: All patients who are diagnosed with COPD after spirometry confirmation as defined by the GOLD guidelines are included. Various symptoms are also added on as a key indicator helping in better accessibility of disease.

Exclusion Criteria: Patients, with Sputum positive pulmonary tuberculosis, asthma patients and patients with bronchiectasis, acute exacerbation or with any other co-morbidity like cardiovascular, diabetic or any other disease are excluded from the study.

Spirometry: For diagnosis of COPD, spirometry test is performed. The spirometry test is a technique and a qualitative analysis of post-bronchodilator FEV/FVC.

Serum TNF-α Estimation: Serum TNF-α level assay was conducted using Ray-Bio Human TNF-α Kit. It is an in vitro enzyme-linked immunosorbent assay for the quantitative estimation of human TNF-α in serum. This assay employs an antibody specific for human TNF-α which is coated on a well plate.

Samples and standards were pipetted into the well plate. TNF-α present in the sample binds to the well by immobilized Ab in the incubation period. Wells were then washed and human TNF-α antibody was added. After washing the unbound antibody the HRP-Conjugated Streptavidin was added to the well and colour was developed in amount of the TNF-α bounded. Stop solution was added to stop the reaction which changed the colour from yellow to blue and then plate was read in ELISA reader at the 450 nm.

Statistical Analysis: Data are expressed as mean ±S.D. The comparison of variables between smokers and non-smokers COPD and smoker and non-smoker control were performed using students t-Test. As per value below 0.05 was considered statistically significant. The Pearson's correlation was used to evaluate the relationship between variables.

Results

The TNF-α serum levels were significantly higher in the smoker group of COPD patients compared to the non smoker group of COPD patients ($P<0.05$). It was also identified that a strong negative correlation was seen between FVC/FEV and TNF-α for smoker group whereas weak correlation was seen between FEV/FVC and TNF- α in non-smoker group of COPD patients. The variables of the four study group are shown in **Table 1**.

Table 1: The characteristics of Smokers and Non-Smoker group

Variables	COPD		Non–COPD	
	Smoker	Non Smoker	Smoker	Non Smoker
Age	54.25 (10.47)	54.86 (10.01)	50.669 (9.71)	50.39 (9.47)
Male	100%	78.30%	100%	78%
Female	NA	21.60%	NA,	22%
Pack years	30.16	NA	12.18	NA
FEV/FVC	47%,	52%	83%	85%

The average age is not statistically significant between the smoker and non-smoker group of control and diseased patients. The result reveals that the serum level of TNF-α was significantly elevated in smoker group of COPD and control patients shown in Figure 1. The serum level of TNF-α between diseased smoker and control smoker group was statistically significant (p< 0.005) as shown in Figure 2.

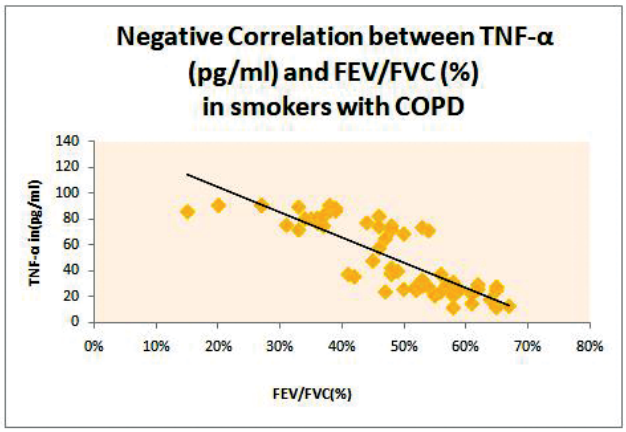


Figure 1: Depicting negative correlation of COPD smokers with TNF-α and FEV/FVC (%)

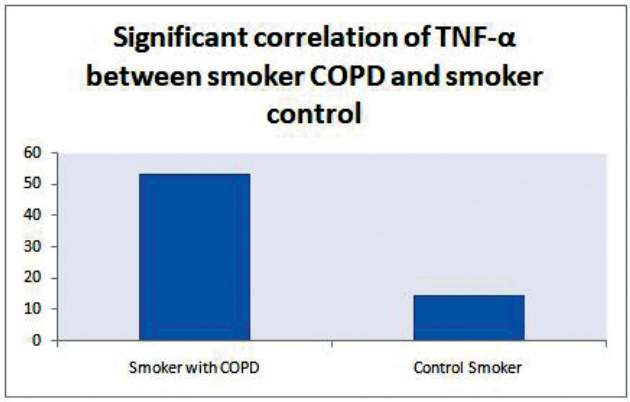


Figure 2: Histogram representing significant correlation of TNF-α between smoker COPD and smoker control

The high levels of TNF-α in the serum of smokers and strong negative relation correlation between efficiency of lung FEV/FVC were found. The TNF- α level value in serum indicates an imbalance between pro-inflammatory and anti-inflammatory factor due to smoke exposure. The study concludes by showing that serum TNF-α is directly proportional to the disease severity and indirectly proportional to the FEV/FVC (airway obstruction ratio) of the patients.

The serum level of TNF-α were significantly elevated in smoker group of COPD and control patients shown in **Figure 1**.The serum level of TNF-α between diseased smoker and control smoker group were statistically significant (p< 0.005) as shown in **Figure 2**.

Discussion

COPD as the disease has taken a challenging role in the medical industry. Total sample population collected were 220, male 206 (93.6%) and female 14 (6.8%). It is because of the smoking as one of the prime risk factors for COPD. 6.8% were females with a history of exposure to smoke either from cooking through biomass fuel or using Hay Stick.

Chapman *et al.* studied occurrence of COPD and showed increase rate of the disease in males than females. [24] Mahesh *et al.* based on his validated structured questionnaire for COPD in rural area of Mysore concluded the prevalence of disease to be more common in males (11.1%) in comparison to females (4.5%).[25] Bednarek *et al.* in his study revealed about the diagnosis of COPD and concluded that degree of post-bronchodilator airflow limitation was mild in 30.6%, moderate in 51.4%, severe in 15.3% and very severe in 2.7%. [26] Mathanraj *et al.* in his studies concluded that majority of the COPD cases were found to have moderate (44.4%) and severe (39.8%) airflow obstruction. [27]

It can be easily related that increasing awareness on health issues in western countries has more emphasizing effect on early diagnosis and detection of disease whereas in developing nations like India due to lack of awareness and overpopulation diseases are generally detected at the tertiary care stage.

Vigg A *et al.* studied the prevalence of COPD in a tertiary care hospital in southern India and concluded that among 946 patients studied 30% has mild and moderate disease and whereas 40% has severe COPD. [28] Haehling V.*et al.* [29] revealed that serum TNF-α was found significantly higher in COPD patients compared to controls.

This confirms previous studies similar to our proposed study i.e. the levels of TNF-α increases with the disease severity. In our study, we were also able to correlate that smoking was somehow associated with higher TNF-α -mediated systematic inflammation in COPD patients.

The main purpose of this study was to measure the TNF-α level in Delhi-NCR subjects and it implication as a biomarker for the early detection and diagnosis of COPD. To the best of our knowledge, this is the first study conducted in Delhi-NCR Population which showcases a clear strong correlation between decreased FEV/FVC and elevated serum TNF α level which indicates the activation of inflammatory responses in COPD. It also shows that levels of TNF-α can be used as an inflammatory marker for smoker group but it has not statistical significant role in non-smoker group of COPD which means that inflammation or poor prognosis of lung in COPD in the non-smoker is because of genetic role.

Furthermore, it was also identified that male smokers had higher TNF-α levels than male non-smokers which signal the presence of a smoke-induced inflammatory process in the lungs of healthy subjects.[30] The smoke-induced inflammatory response could also vary depending upon gender or ethnicity. Our findings also correlate with the observation of Zoppini *et al.* [(30)] who revealed marked increase of TNF with an increase in the number of cigarettes per day. Similar results were also reported by Fernandez-Real [(31)] and co-workers.

Conclusion

Heavy smoking or smoking for long duration significantly affects the efficacy of lungs and induce significant increase in serum TNF –α level in serum of the subject signifying the imbalance between the pro-inflammatory and anti-inflammatory factors. Based on our findings and available literature we speculate that Serum TNF–α can be a useful biomarker for the identification of heavy smoker with a risk of developing a smoke-induced pulmonary disease. However, further large group of study on various other parameters like age gender, ethnic group, genetic factor and other various patient's features needs to be assessed and confirm the validity of TNF-α as a key potential biomarker for detection of COPD as a disease.

Hence it can be used as a potential key biomarker for the detection and diagnosis of the disease. Hereafter further studies are required with large sample group. Furthermore, studies are required to focus on additional potential markers in order to develop a specific biomarker panel for easy detection and diagnosis of pulmonary diseases in susceptibility of smokers.

Conflict of Interest: The authors declare that there are no Conflicts of Interest.

Source of Funding: Self

Ethical Clearance: The study was conducted after the ethical clearance from the review board of Hospital (S.No 0591/RBIPMT/2016).

REFERENCES

1' Global initiative for chronic obstructive lung disease: global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease updated; 2015:3.

2. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med. (2006): 3;2011-2030. DOI. 10.1371/journal.pmed.0030442

3. World Health Report. Geneva: World Health Organization. (2000); available at http://www.who.int/whr/2000/en/statistics.html.

4. Global initiative for chronic obstructive lung disease: global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease updated; 2015:2.

5. Kim V and Criner G.J "Chronic Bronchitis and Chronic Obstructive Pulmonary Disease" Am J Respir Crit Care Med (2013):187; 228–237. DOI.10.1164/rccm.201210-1843CI

6. National Heart Lung and Blood Institute, National Institutes of Health. Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines, global strategy for the diagnosis, management and prevention of chronic obstructive lung disease: NHLBI/WHO workshop report. Bethesda, MD: NIH; 2001. NIH publication 2701.

7. Agusti AGN, Noguera A, Sauleda J, Sala E, Pons J, Busquets X "Systemic effects of chronic obstructive pulmonary disease". Eur Respir J. (2003): 21; 347–360. DOI.10.1183/09031936.03.00405703

8. Salvi S, Agarwal A. "India needs a national COPD prevention and Control program". J Assoc Physicians India. (2012): 60; 5-7.

9. Lopez AD, Shibuya K, Rao C, Mathers CD, Hansell AL, Held LS, Schmid. V, Bruist. S."Chronic

obstructive pulmonary disease: current burden and future projections". EurRespir J. (2006): 27; 397–412. DOI: 10.1183/09031936.06.00025805.

10. Hurd S. "The Impact of COPD on Lung Health Worldwide: Epidemiology and Incidence". Chest. (2000): 117; IS-4. DOI: https://doi.org/10.1378/chest.117.2_suppl.1S

11. Abe Gunde DO, Mathers CD, Adam T, Ortegon M, Strong K. "The burden and costs of chronic diseases in low-income and middle- income countries," Lancet, (2007):370;1929-1938. Doi: 10.1016/S0140-6736(07)61696-1

12. Buist AS, McBurnie MA, Vollmer WM, Gillespie S, Burney P, Mannino DM, Menezes AM, Sullivan SD, Lee TA, Weiss KB, Jensen RL, Marks GB, Gulsvik A, Nizankowska-Mogilnicka E. BOLD Collaborative Research Group. "International variation in the prevalence of COPD (the BOLD Study): a population-based prevalence study". PLoS Med. (2007): 370; 741–750. Doi: doi.org/10.1016/S0140-6736(07)61377-4.

13. Chung KF Cytokines in Chronic Obstructive Pulmonary Disease. Eur Respir J (2001): 18; 50–59. Doi: 10.1183/09031936.01.00229701

14. Parameswaran N and Patial S "Tumor Necrosis Factor-α Signaling in Macrophages". Crit Rev Eukaryot Gene Expr. (2010):20; 87–103.

15. FisunKaradag E Aslihan B. Karul E OrhanCildag E Mustafa Yilmaz E HaticeOzcan; Springer Science+Business Media, LLC 2008;Lung (2008) 186:403–40.

16. HigashimotoY,Yamagata Y, TayaS, Iwata T, Okada M, Ishiguchi T, Sato H, Itoh H "Systematic inflammation in chronic obstructive pulmonary disease and asthma: similarities and differences". Respirology (2008):13;128-133. doi: org/10.1111/j.1440-1843.2007.01170.x

17. Vernooy JH, Kucukaycan M, Jacobs JA, Chavannes NH, Buurman WA, Dentener MA, Wouters EF "Local and systemic inflammation in patients with chronic obstructive pulmonary disease". Am J RespirCrit Care Med (2002):166; 1218–1224. doi.org/10.1164/rccm.2202023

18. Lundblad LK, Thompson-Figueroa J, Leclair T, Sullivan MJ, Poynter ME, Irvin CG, Bates JH, "Tumour necrosis factor-a overexpression in lung disease: a single cause behind a complex phenotype". Am J RespirCrit Care Med (2005):171;1363–1370. doi.org/10.1164/rccm.200410-1349OC.

19. Vuillemenot BR, Rodriguez JF, Hoyle GW. "Lymphoid tissue and emphysema in the lungs of transgenic mice inducibly expressing tumour necrosis factor-a". Am J Respir Cell MolBiol (2004): 30; 438–448. DOI: 10.1165/rcmb.2003-0062OC.

20. Churg A, Zay K, Shay S, Xie C, Shapiro SD, Hendricks R, Wright JL. "Acute cigarette smoke-induced connective tissue breakdown requires both neutrophils and macrophage metalloelastase in mice". Am J Respir Cell MolBiol (2002):27; 368–374. DOI: 10.1165/rcmb.4791.

21. Churg A, Wang RD, Tai H, Wang x, Xie C, Dai J, Shapiro SD, Wright JL "Macrophage metalloelastase mediates acute cigarette smoke-induced inflammation via tumour necrosis factor-a release". Am J RespirCrit Care Med (2003):167; 1083–1089. doi.org/10.1164/rccm.200212-1396OC.

22. Global initiative for chronic obstructive lung disease: global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease updated. 2015; 10

23. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL, "Global burden of disease and risk factors," Washington DC: The World Bank,2006.

24.Chapman KR, Tashkin DP, Pye DJ. "Gender bias in the diagnosis of COPD". Chest. (2001): 119;1691-1695. DOI: 10.1378/chest.119.6.1691.

25. Mahesh PA, Jayaraj BS, Prahlad ST, Chaya SK, Prabhakar AK, Agarwal AN, Jindal SK. "Validation of a structured questionnaire for COPD and prevalence of COPD in rural area of Mysore: A pilot study". Lung India.(2009):3;63-69. DOI: 10.4103/0970-2113.53226.

26. Bednarek M, Maciejewski J, Wozniak M, Kuca P, Zielinski J. "Prevalence, severity and under diagnosis of COPD in the primary care setting". Thorax (2008):63; 402-407. doi.org/10.1136/thx.2007.085456.

27. Matanraj S, Kumar V, Yuvarajan S, Reddy V. "Correlation of serum TNF-α level with severity of chronic obstructive pulmonary disease" Int J Res Med Sci. (2017):5:1-8. doi.org/10.18203/2320-6012.ijrms20173020.

28. Vigg A,Vigg A, Vigg A, Mantri S. "Prevalence of chronic obstructive pulmonary disease in patients attending a chest clinic in a tertiary care hospital". Chest (2005):128;1-2. doi.org/10.1378/chest.128.4_MeetingAbstracts.249S.

29. Haehling SV, Hopkinson NS, Polkey MI, Niethammer M, Anker SD, Zotz SG "Elevated TNF-α production in whole blood in patients with severe COPD: the potential link to disease severity." The Middle European Journal of Medicine (2009):121;303-308. DOI 10.1007/s00508-009-1186-7

30. Zoppini G, Faccini G, Muggeo M, Zenari L, Falezza G, Targher G. "Elevated plasma levels of soluble receptors of TNF-a and their association with smoking and microvascular complications in young adults with type 1 diabetes". J Clin Endocrinol Metab. (2001):186; 3805–3808.

31. Fernandez-Real J-M, Broch M, Vendrell J, Ricart W. "Smoking, fat mass and activation of the tumor necrosis factor- α pathway". Int J Obes. (2003): 27;1552–1556.

Effect of Closed Kinematic Chain Exercises on Distal Muscle Weakness in Post Guillain Barre Syndrome

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ABSTRACT

Objectives: The purpose of this study was to check the effect of closed kinematic chain exercises on distal muscle weakness in post Guillain Barre Syndrome.

Method: 30 subjects diagnosed with post guillain baree syndrome were included in this study. These subjects were allocated by convenient sampling method. The subjects with manual muscle testing grade 3 and above were included. During Pre treatment and post treatment assessment upper limb muscle strength was measured by handheld dynamometer and for lower limb passive dorsiflexion range was measured by goniometer. These outcome measures were analyzed.

Result: Pre and post treatment protocol was analyzed by using paired t test. Data analysis showed extremely significance for handheld dynamometer (p=0.0001) and goniometer (p=0.0001).

Conclusion: The effect of closed kinematic chain exercises for distal muscle weakness has shown good progress in post Guillain barre syndrome subjects with the help of handheld dynamometer and Goniometer.

Keywords: *closed kinematic chain exercises, distal muscle weakness, Guillain Barre Syndrome.*

Introduction

Guillain-Barré syndrome (GBS) is defined as an acute, inflammatory, post-infectious autoimmune polyneuropathy which leads to demyelination of the peripheral and autonomic nerves which results in acute sensory and motor losses.[1, 2] It is also known as acute inflammatory demyelinating polyradiculoneuropathy. Symmetrical motor paralysis occurs due to the demyelination of peripheral nerve axons, which gradually progress and ascends from the lower extremities and leads to tingling, burning sensations and areflexia.[3,4,5] Altered soft-tissue length, muscle weakness, and sensory changes that affect the balance, posture, joint mobility and gait.[1,2,6,7]

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GB syndrome occurs at any age. It usually follows viral infection, rarely after surgery or immunization. The most common identified precipitant of GBS is Campylobacterial infection.[8]Symmetrical weakness of muscle present in this syndrome along with some wasting, hypotonia and partial or complete loss of deep tendon reflexes.[9]

Motor symptoms start distally and move proximally, first there is involvement of lower limb than upper limb then progressively it involves trunk and cranial muscles. Variable symptom is pain, tenderness occurs on deep pressure especially to motor points in muscle and nerve trunk and also parasthesia.[9, 10]

Annual incidence is 3.0 cases/100,000 populations throughout the world. Men are about 1.5 times more likely to be affected than are Women. And children < 1 year of age are affected very rare.[11]

Pathophysiology: GBS has complex pathophysiology. Immune system begins to attack the body itself, due to involvement autoimmune responses. Cross reaction is caused between immune responses and the neural

tissue. This disease affects the spinal roots and nerve, primarily the involve the Schwann cell. Initially this results in segmental demyelization of the nerve process and later proliferation of the Schwann cell. The axon remains intact and conduct an impulse with reduced velocity, later axonal degeneration may occur in some subjects which cause complete conduction block.[9] The peripheral nervous system is associated with perivascular lymphocytic inflammatory exudates. Recovery occurs by axonal regeneration and remylienation of peripheral axons. Internodal distance is less because of mylien sheet is thinner and there is increase in number of nodes of Ranvier. Nerve conduction velocity is within the normal limits in less severe cases. However conduction velocity may be permanently abnormal, where axonal damage are occur.[9,10]

Closed kinematic chain of movement: In a moving segment if one end of the joint is fixed(either proximal or distal),movement of one joint if it accompanies the movements are another joint involved with the segment is called as closed kinematic chain movement.

The exercises framed on this basis are called as closed kinematic chain exercises.

Examples; squatting, prone pushups, press up or pull up, lunges

Neurophysiology: Closed kinematic chain exercises stimulate the proprioceptive system by proprioceptive feedback to initiate and control muscle activation pattern.[12,15,16]During the early phase of training, conscious awareness of joint position or movement is one of the important factor of motor learning for neuromuscular control. Closed chain exercises provides greater proprioceptive and kinesthetic feedback than open chain exercises.[13] Because multiple muscle groups are activated which cross multiple joints during CKC . Therefore , more sensory receptors are activated which present in muscle ,intra-articular and extra-articular structures to control motion .The axial loading of CKC causes joint approximation to stimulate mechanoreceptor in muscles and in and around joints which enhance sensory input for movement control . It also facilitate co-activation of agonist and antagonist that is co-contraction of muscle occurs.[14]

Distal muscle weakness is major problem in post GBS individuals. There is delayed recovery in distal muscle weakness; so, we need to strengthen distal muscles of extremity in order to improve quality of daily living activities. Weight bearing position is an important element in distal muscle recovery. The effect of Closed-kinematic chain exercises on distal muscle weakness in post GBS have been elaborate in detail.

Method

Population: The subjects which willing to participate in the study was taken. The criteria for inclusion were: clinically diagnosed with recovery stage of GBS and MMT grade 3 and above. Subjects were excluded if they had any recent fracture, any recent surgery, any cardiopulmonary disorder and acute progressive stage of GBS.

30 post Guillain Barre Syndrome survivors were selected from outpatient department of physiotherapy. Out of 30 subjects 20 males/10 females participated in this study, written consent form was taken. All the subjects were informed about the protocol and gave written consent before their participation. The protocol and the consent form were previously approved by protocol and ethical committee.

Interventions: Subjects who were referred to physiotherapy department and they were diagnosed by Physiotherapist of Krishna Hospital, Karad, as recovery stage of guillain barre syndrome were selected. Further they were screened clinically and diagnosis was confirmed. Considering inclusion and exclusion criteria they were requested to participate in the study. The nature of study and intervention were explained to the subjects and those who were willing to participate were included. Before proceeding to intervention a written consent was taken from subject. A brief demographic data was recorded. By using convenient sampling method the participants was included; the subjects with manual muscle testing grade 3 and above were included. During Pre treatment and post treatment assessment upper limb muscle strength was measured by handheld dynamometer and for lower limb passive dorsiflexion range was measured by goniometer. The treatment was given for 6 weeks; 5 sessions per week.

Protocol was consisting of following exercises for upper limb and lower limb respectively;

For Upper limb:

Prone pushups: Subject was in prone lying position. Then taking weight on both hands and toes .He/she had to lift the whole body and go down.

Wall pushups: The procedure of wall pushups was same as prone pushups, but instead of lying in prone position he/she had to stand opposite to the wall.

Quadruped: The subject position with weight bearing on both hands with extension of both the elbows and on both the knees with hip and knee 90 degree flexion and ankle plantar flexed. Maintaining this position perturbation was given. Along with perturbation, subjects had to tuck in the abdomen and curve and flatten the back alternately to facilitate pelvic tilts that is cat and camel exercises.

Sitting press ups(pull up): Subject was sitting on firm surface. Then place his/her hands on both the sides respectively. Now ask the subject to press both the hands against the firm surface and lift up the pelvis off from the firm surface.

For Lower limb:

Squatting: Subject must stand opposite to wall with back resting on wall. He/she had to do mini squatting by flexing both the hip and knee at minimum ranges and then getting up back to standing.

Lunges: Subject was to stand with one leg in front of another leg and then had to go down with flexing the front leg and do the vice versa for another leg.

Step up and step down exercises: Subject was stand with weight bearing of the both the legs. Then asked to he/she to step one leg forward (i.e. step up) and take it back (i.e. step down), then vice versa for another leg.

Leg press: Subject while sitting on the therapeutic gymnasium sled had to extend the knee while pushing the footboard forwards.

After 6 weeks Post treatment assessment values was taken. Then by statistical analysis result was calculated.

Measurement Procedure:

Handheld dynamometer: Subject were in seated position with the shoulder Adducted and neutrally rotated, the elbow was flexed at 90º, and the forearm and wrist remain in neutral position[17,18] and ask subject to squeeze the hand grip of hand held dynamometer with the maximum efforts which is maintained for 5 sec. and after that the value is recorded. Three reading were taken and average final value is recorded.[19]

Goniometer: Testing position: subject was in supine position with knee flexed at 90 degree.

Goniometer alignment: The fulcrum of goniometer was placed over the lateral malloeolus. The stationary arm was aligned up along the fibula and movable arm with parallel to the fifth metatarsal bone.

Testing motion: The subject was asked to dorsiflex their ankle with the therapist's assistance.

Result

Pre and post treatment protocol was analyzed by using paired t test. Data analysis showed extremely significance for handheld dynamometer ($p = 0.0001$) and goniometer ($p = 0.0001$).

Statistical analysis: The data was entered into Microsoft office excels 2007 and analyzed using instat software. Descriptive statistics were used to analyze for demographic data : Pre and post treatment protocol was analyzed by using paired t test and p value <0.0001 was considered to be statistically significant.

As per the inclusion criteria 30 subjects were included in the study. During 6 weeks of protocol program closed kinematic chain exercises was given for both upper limb and lower limb. Pre and post analysis was done for 30 subjects. In Table.1 to Table.4

Table 1: Comparison of mean and SD pre and post treatment of Handheld dynamometer for right upper limb

Sr. No.	Parameters	Pre treatment HHD		Post treatment HHD		P value	Significance
		Mean	SD	Mean	SD		
1.	HHD	3.53	1.252	5.53	2.446	<0.0001	Significant

The values were compared by applying wilcoxon matched pairs test. Pre and post treatment values shows that there is extremely significant difference in HHD for right upper limb (<0.0001).

Table 2: Comparison of mean and SD pre and post treatment of Handheld dynamometer for left upper limb

Sr. No.	Parameters	Pre treatment HHD		Post treatment HHD		P value	Significance
		Mean	SD	Mean	SD		
1	HHD	3.36	1.37	5.36	2.50	<0.0001	Significant

The values were compared by applying wilcoxon matched pairs test. Pre and post treatment values shows that there is extremely significant difference in HHD for left upper limb (<0.0001).

Table 3: Comparison of mean and SD pre and post treatment of goniometer for right lower limb

Sr. No.	Parameters	Pre treatment Goniometer		Post treatment Goniometer		P value	Significance
		Mean	SD	Mean	SD		
1	Goniometer	3.13	1.306	7.93	2.463	<0.0001	Significant

The values were compared by applying wilcoxon matched pairs test.pre and post treatment values shows that there is extremely significant difference in Goniometer for right lower limb(<0.0001)

Table 4: Comparison of mean and SD pre and post treatment of goniometer for left lower limb

Sr. No.	Parameters	Pre treatment Goniometer		Post treatment Goniometer		P value	Significance
		Mean	SD	Mean	SD		
1	Goniometer	3.0	1.21	7.66	2.35	<0.0001	Significant

The values were compared by applying wilcoxon matched pairs test.pre and post treatment values shows that there is extremely significant difference in Goniometer for left lower limb(<0.0001).

Discussion

In GBS there is delayed recovery happened at the distal part of extremity. So, the recovery of these muscles is important factor on day today activities. In these studies we focus on closed kinematic chain exercise as a key treatment strategy.

The aim of studies was to find the effect of closed kinematic chain exercises on distal muscle weakness in post Guillain Barre Syndrome subjects. According to hypothesis the significant improvement in outcome measures observed after the treatment of closed kinematic chain exercise.

Subjects were included according to inclusion criteria. Both males and females were included. Out of 30 subjects, 20 were males and 10 were females. The closed kinematic chain exercises was given for 6 weeks; 5 sessions per week. Post treatment assessment was taken after completion of 6 weeks.

There was significant improvement in distal muscle strength after the entire treatment programmed. The measurement taken by handheld dynamometer for upper limb and goniometer for lower limb.

Wilcoxon matched-pairs t test used to analyze the effect of CKC exercises on distal muscle weakness on hand-held dynamometer shows extremely significant improvement in right upper limb strength with p value of 0.0001. Pre interventional value of mean and standard deviation was 3.53 ± 1.252 and post interventional value of mean and standard deviation was 5.53 ± 2.446 and also shows extremely significant improvement in left upper limb strength that is p value of 0.0001. Pre interventional value of mean and standard deviation was 3.36 ± 1.37 and post interventional value of mean and standard deviation was 5.36 ± 2.50.

Wilcoxon matched-pairs t test used to analyze the effect of CKC exercises on distal muscle weakness on goniometer shows extremely significant improvement in right lower limb range of motion with p value of 0.0001. Pre interventional value of mean and standard deviation was 3.13 ± 1.306 and post interventional value of mean and standard deviation was 7.93 ± 2.463 and

also shows extremely significant improvement in left lower limb range of motion with p value of 0.0001. Pre interventional value of mean and standard deviation was 3.0 ± 1.21 and post interventional value of mean and standard deviation was 7.66 ± 2.35.

These results from statistical analysis of present study supported the alternative hypothesis which stated that subjects treated by closed kinematic chain exercises improved distal muscle weakness in post GBS individuals. The above findings is due to the pattern of demyelination / remyelination in GBS where clinical recovery follows remyelination at the spinal root level such that the first nerve segments to be demyelinated are the last to be remyelinated.

So, we had seen improve the strength in distal muscles of upper limb and lower limb with closed kinematic chain exercises. Therefore, it's proven that interventions like CKC exercises shows better result with good prognosis in recovery of distal muscle weakness.

Conclusion

These studies shows that, closed kinematic chain exercises was effective for improving the distal muscle strength with the help of handheld dynamometer is extremely significant for upper limb and goniometer for lower limb. Based on the statistical results and interpretations, it was concluded that the closed kinematic chain exercises for distal muscle weakness has shown good progress in post Guillain barre syndrome subjects with the help of handheld dynamometer and Goniometer and thus alternative hypothesis that there is significant effect of closed kinematic chain exercises on distal muscle weakness in post Guillain Barre syndrome.

Conflicts of Interest: There were no conflicts of interest in this study.

Source of Funding: This study was funded by Krishna Institute of Medical sciences Deemed to Be University, Karad.

REFERENCES

1. Albiol-Pe´rez S, Forcano-Garcı´a M, Mun˜oz-Toma´s MT, et al. A novel virtual motor rehabilitation system for Guillain-Barre´ syndrome: two single case studies. Methods Inf Med. 2015;54(2):127–34.
2. Garssen MP, Bussmann JB, Schmitz PI, et al. Physical training and fatigue, fitness, and quality of life in Guillain-Barre´ syndrome and CIDP. Neurology. 2004;63(12):2393–5
3. Fisher TB, Stevens JE. Rehabilitation of a marathon runner with Guillain-Barre´ syndrome. J Neurol Phys Ther. 2008;32(4):203–9.
4. Pitetti KH, Barrett PJ, Abbas D. Endurance exercise training in Guillain-Barre syndrome. Arch Phys Med Rehabil. 1993;74(7):761–5.
5. Sackett DL. Rules of evidence and clinical recommendations on the use of antithrombotic agents. Chest. 1989;95(2 Suppl):2S–4S.
6. El Mhandi L, Calmels P, Camdessanche´ JP, et al. Muscle strength recovery in treated Guillain-Barre´ syndrome: a prospective study for the first 18 months after onset. Am J Phys Med Rehabil. 2007;86(9):716–24.
7. Ydemann M, Eddelien HS, Lauritsen AO. Treatment of critical illness polyneuropathy and/or myopathy—a systematic review. Dan Med J. 2012;59(10):A4511. Medline:23158890
8. Medicine ,prep Manual ; Fourth Edition ;K George Mathew, Praveen Aggarwal; Diseases of Nervous system; pg no 336
9. Cash's Textbook of Neurology for Physiotherapists; fourth edition; Patricia A.Downie; Polyneuropathy; pg no;445
10. Gilliatt, R.W.(1966). Nerve conduction in human and experimental neuropathies. Proceedings of the Royal Society of Medicine
11. Neurological Rehabilitation, management of clinical problems ;Fourth Edition ;Darcy Umphred , Neuromuscular Diseases ; pg no.386
12. Lo YL. Clinical and immunological spectrum of the Miller Fisher syndrome. Muscle Nerve. Nov 2007
13. Kisnerr C. Colby L:A:Therapeutic exercises 5th edition ch. No. 5 pg.no. 176
14. Davies, GJ, et al: The scientific and clinical rationale for the integrated approach to open and closed kinetic chain rehabilitation .Orthop phys ther clin north Am :247,2000

15. Kwon YJ, Park SJ, Jefferson J, Kim K. The Effect of Open and Closed Kinetic Chain Exercises on Dynamic Balance Ability of Normal Healthy Adults. J Phys Ther Sci. 2013 Jun;25(6).

16. Bynum EB, Barrack RL, Alexander AH. Open versus closed chain kinetic exercise. A prospective randomized study. Am J Sports Med. 1995 Aug;23.

17. Alireza Shamsoddini[1,*] and Mohammad Taghi Hollisaz[2] , Effects of Taping on Pain, Grip Strength and Wrist Extension Force in Patients with Tennis ElbowTrauma Mon. 2013 Sep; 18(2): 71–74.

18. Nidhi R. Samosawala , K.Vaishali , B. Chakravarthy Kalyana, Measurement of muscle strength with handheld dynamometer in Intensive Care Unit, Indian J Crit Med .2016 Jan; 20(1) : 21-26

19. Joy C. MacDermid, BScPT, MSc, PhD , The Patient-Rated Tennis Elbow Evaluation (PRTEE) User Manual June 2010

Rugoscopy: An Adjunctive Diagnostic Tool for Malocclusion?

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ABSTRACT

Context: Palatal rugae (PR) are regularly used in forensic dentistry for identification of individuals. PR gets established early in intra-uterine life and remains stable thereafter, thus considered as a stable land mark. Correlation of PR with different occlusal relations may aid in diagnosing malocclusions at an early stage.

Aims: Identification of distinctive features of PR in different classes of dental malocclusion and to identify the most common pattern in Malaysian students. To explore probability of PR as an adjunctive tool for categorizing malocclusions.

Method and Material: PR in casts of 70 Malaysian students aged 19-23 years demonstrating Class I, Class II and Class III malocclusions were studied. The number, pattern, orientation and strength of rugae both on left and right side of mid-palatal raphe were determined and statistically analysed by anova test for different categories of malocclusions.

Results: Class I malocclusion showed similar bilateral orientation of all the parameters when compared to other two types of malocclusion. PR in all malocclusions showed a predominantly wavy pattern but forking-diverging type was mainly in fragmentary rugae. The number of primary, secondary and fragmentary rugae was greatest in number in Class II malocclusion when compared to class I and class III.

Conclusions: This study provides evidence of a distinct pattern of PR in Class I and Class III patients and but to ascertain its statistical significance, further research may be conducted with a larger sample size.

Keywords: *malocclusion, palate,hard ,diagnosis*

Introduction

Palatal Rugoscopy has developed as an interesting and important method for human identification in forensic dentistry in recent years. Palatoscopy or palatal rugoscopy is the name given to the study of palatal rugae in order to establish a person's identity.[1] The use of palatal rugae was recommended as one of the method of identification in 1889 by Harrison Allen.[2] The term "Palatal rugoscopy" was proposed in 1932, by a Spanish investigator named Trobo Hermosa.[3]

Palatal rugae (Plica palatinae transverse) refer to the ridges on the anterior part of the palatal mucosa each side of the median palatine raphae behind the incisive papilla. Palatal relief design of the dentures may be used to compare and identify the individuals.[4,5] Several studies done in the past have shown and statistically proved that the rugae patterns exhibit hereditary pattern and there are differences between races and gender. [6-8]

Although some longitudinal studies have stated changes in the length and direction of palatal rugae with age [9-11], orthodontic influences like extraction of first premolar [12,13], trauma, extreme finger sucking and persistent pressure with orthodontic treatment [14,15] but stability in shape, direction throughout life have been extensively documented.[16,17,18]

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As both malocclusion and rugae pattern exhibit a strong hereditary predisposition, this common feature led to investigate whether palatine rugae can be used as an adjunctive diagnostic tool in categorising malocclusions.

This study was carried out to ascertain whether any correlation exists between pattern of palatine rugae in different classes of malocclusion in Malaysian students thereby helping in diagnosing, intercepting and treating malocclusion in early stage.

Objectives of the study

1. To identify common pattern of PR in the study population
2. To determine the pattern of PR in different classes of malocclusion.
3. To explore the probability of PR as an adjunctive diagnostic tool for classifying malocclusions.

Subjects and Method

The present study was performed on 70 dental and medical Malaysian students between the age group of 19- 23 years in Manipal University following institutional ethical clearance. Informed consent was obtained from the students prior to the participation in the study. Inclusion criteria were complete complement of permanent teeth till second molars, no history of previous extraction of teeth or orthodontic treatment, no deleterious habits. Exclusion criteria included were students with completed orthodontic treatment or undergoing orthodontic treatment. Irrespective of gender, the samples were classified into three groups based on Angle's classification of malocclusion following intra oral examination. Impression of the maxillary arch was made with irreversible hydrocolloid impression material. Casts were poured with type III dental stone and labelled according to type of malocclusion. Landmarks on palatal raphe and PR were marked using black permanent marker pen according to the classification given by Kapali etal [19] The traced palatal rugae were observed for length, orientation, shape and strength.

Length of PR: The length of the rugae was recorded using digital vernier caliper from medial end of rugae to the lateral end (figure 1) and categorised following classification given by Lysell [9] into

1. Primary >5mm
2. Secondary 3 to 5mm
3. Fragmentary < 3mm

The number of rugae falling under the category of primary, secondary and fragmentary rugae was recorded separately for left and right side.

Orientation of palatal rugae: The angle formed between mid-palatal raphe and first, second and third PR were recorded separately for left and right side and categorised using classification given by Hauser as:

1. Posteriorly directed rugae (p) - associated with negative angles.
2. Horizontal/perpendicular rugae (h) - associated with angles of zero degrees
3. Anteriorly directed rugae (a) - associated with positive angle

Shape of palatal rugae: The shape of first, second and third primary rugae were recorded separately for left and right side of each cast from their origin to termination and classified according to classification given by Hauser et al as :

1. **Curved(c):** The curved type had a simple crescent shape which curved gently.
2. **Straight(s):** Straight types ran straight directly from their origin to termination.
3. **Wavy (w):** The basic shape of the wavy rugae was serpentine;
4. **Forking (f):** Unification occurs when two rugae are joined at their origin or termination based on which, they were of two types:

   fd1: Converging: Rugae with different origins which joined on their lateral portions.

   fd2: Diverging: Unifications in which two rugae began from the same origin but immediately diverged.
5. **Island (i):** The rugae that displayed a definite continuous ring formation at the termination was termed as Island.
6. **Irregular (Ir):** Broken, irregular pattern of rugae.

Strength of Palatal Rugae: Based on thickness of first, second and third primary rugae strength of were classified according to Hauser et al as:

a. Strong(s)

b. Medium(m)

c. Weak (w)

Results

Data was collected and statistical analysis was performed in SPSS 17.0 (SPSS, Chicago III). Descriptive statistics (mean and standard deviation) were determined for the number of palatal rugae (primary, secondary and fragmentary) on each side of mid-palatal raphe for each malocclusion group. The most predominant pattern, orientation and strength of primary rugae (first, second and third) in each malocclusion group was studied. P value <0.05 was considered to be statistically significant.

Results of Table 1 showed number of primary rugae in Class I malocclusion on right side being greater in number with mean 4.41 ± 1.04 as compared to left side having mean value of 4.23 ± 1.23. In Class II malocclusion, number of primary rugaes were present more right side with values of 4.5 ± 0.57 and in class III malocclusion it was more on left side with value of 3.65± 0.81. The mean values of secondary and fragmentary rugae were less than 1 in class I malocclusion, however it was more than 1 in class II and class III malocclusion. The average number of rugae taking into account primary, secondary and fragmentary rugaes were greatest in Class II malocclusion but almost similar in rest of the classifications. ANOVA depicted significant p-value for primary rugae on right side in all three types of malocclusion.

Table 2 shows the mean of primary, secondary and tertiary rugaes in different classes of malocclusion.

The results of Table 3 did not depict any uniform pattern, orientation or strength for a particular malocclusion. The trend of orientation pattern in Class I from first to third rugae predominantly shifts from posterior to horizontal while Class II it was mostly posteriorly oriented. In Class III horizontal and posteriorly were two most predominant types. The secondary rugaes exhibited wavy pattern in all three types of malocclusion. The strength of rugae in class I and class III malocclusion showed a similar trend with the first primary rugae being strong gradually becoming weak till the third rugae. However in class II malocclusion all the rugae were weak.

The results of Table 4 depicts that class I malocclusion showed similar bilateral orientation of all the parameters when compared to other two types of malocclusion.

Table 1: Mean Scores of types of Rugae according to different class of occlusion

	Number of casts	Primary Rugae		Secondary Rugae		Fragmentary Rugae	
		Right	Left	Right	Left	Right	Left
Class I Malocclusion	40	4.41 ± 1.04	4.23 ± 1.23	1.35 ± 1.3	0.80 ± 0.8	0.93 ± 1.45	0.76 ± 0.9
Class II Malocclusion	10	4.5 ± 0.57	4 ± 0	0.75 ± 0.5	1.5 ± 1.0	1.75 ± 0.5	1.25 ± 0.9
Class III Malocclusion	20	3.45 ± 1.23	3.65 ± 0.81	1.25 ± 1.06	1.3 ± 1.0	1.25 ± 1.2	0.6 ± 0.8
F		5.704	2.009	0.431	2.364	0.879	0.840
.sig (p value)		0.005*	0.142	0.651	0.102	0.420	0.436

Table 2: Mean scores of Rugae according to malocclusion

	Primary Rugae	Secondary Rugae	Tertiary Rugae
	Mean ± SD	Mean ± SD	Mean ± SD
Class I malocclusion	8.65 ± 1.72	2.15 ± 1.71	1.69 ± 1.92
Class II malocclusion	8.5 ± 0.6	2.25 ±1.2	3 ± 0.82
Class III malocclusion	7.1 ± 1.45	2.55 ± 1.73	1.85 ± 1.42

Table 3: Commonly observed patterns of Rugae according to orientation, strength and shape

		Primary Rugae		Secondary Rugae		Fragmentary Rugae	
		Left	Right	Left	Right	Left	right
Class I Malocclusion	Orientation	P	P	P	H	P	H
	Strength	S	S	S	S	w	w
	Pattern	C,S	S	W	W	W/FDI/FD2	W/FD1/FD2
Class II Malocclusion	Orientation	P	P	P	P	P	A
	Strength	w	w	w	w	w	w
	Pattern	W	C	W	W	C/FD2	W/FD2
Class III Malocclusion	Orientation	P	H	P	H	H	H
	Strength	S	S	S	S	w	w
	Pattern	W	S	W	S	C,S,W/FD2	W/FD1/FD2

Orientation: P – Posterior, H - Horizontal, A – Anterior. Strength: s-strong, w-weak

Pattern: C-curved, W – Wavy, S - Straight, FD1 - Fragmented Anteriorly, FD2 - Fragmented Posteriorly

Table 4: Distribution of casts which have similar orientation bilaterally

	Cast with bilateral Posterior Orientation	Cast with Bilateral Horizontal Orientation	Cast with Bilateral Anterior Orientation
Class I Malocclusion	2	4	1
Class II Malocclusion	1	0	0
Class III Malocclusion	3	4	0



Figure 1: Measuring length of the rugae

Discussion

It is well-established fact that the palatal rugae once formed, do not undergo any change except in length and remain in the same position throughout individual's life time.[20] Palatal rugae pattern may be precise to racial groups facilitating the population recognition.[21] In the present study rugae patterns of the Malaysian population was studied to check if any co relation existed between malocclusion. Thomas and Kotze studied the rugae patterns of 6 South African populations and found that rugae were unique to each ethnic group and that it can be used successfully as a medium for genetic research.[22]

In the present study the average number of primary rugae has been approximately four in number in accordance with previous studies.[23] In the present study the number of primary rugae was seen to be greatest in Class II malocclusion, probably due to difference in degree of development of maxillary basal arch width and transverse morphology. Hauser et al. in 1989 that stated that size of the palate affected rugae development with broader palates showing greater rugae development.[11] Studies have compared maxillary arch width development in normal occlusion and patients with class II malocclusion and found that the order of normal occlusion having greatest, followed by Class II patients. However, the number of class II malocclusion in the present sample size was less as compared to class I and class III. The incidence of class II malocclusion is less in Malaysian population. This can correlated with study done by Arsalan [24] which reported highest incidence of class I malocclusion followed by class III and class II

being the least. However, to attain a conclusive evidence of this specific outcome, a larger sample size of Class II has to be studied.

The age group of sample in the present study was around 19-23 years. Studies have proved that orientation pattern gets established at birth and attain a final feature during adolescence. Any change that occurs thereafter may be in terms of length but not in shape.[25]

In the present study the strength of rugae decreases from first to third primary rugae in class I and class III malocclusion. This is in accordance with previous studies of decreasing regularity of rugae pattern, disappearance of posterior rugae and strength of anterior rugae becoming considerably more pronounced. [23]

PR number, shape as well as orientation have shown genetic predisposition in previous studies, thus supports its correlation with different malocclusions having strong genetic potential.[23] Kapali S et al compared the number and pattern of rugae in Australian Aborgines and Caucasians and found straight forms being more common in Caucasians, whereas wavy forms in Aborgines and emphasized that there was significant association between rugae forms and ethnicity.[19] Studies comparing Indian population with Japanese and Tibetan population have also revealed significant differences in PR pattern.[26] Both Class III and Class II display specific genes leading to a particular skeletal variability caused by polygenic nature of craniofacial traits and these could be explored in forthcoming studies for specific association with PR shape and number.[23]

Thus, prevalent malocclusions in various ethnic populations could also be investigated for a positive association with specific pattern, length and number of PR and serve as an adjunct in intercepting malocclusions at a very early age.

First and foremost limitation of the study is the smaller sample size. Larger sample size is required to validate the observations of this study and also to obtain results that are statistically significant.

Conclusion

1. Class I malocclusion showed similar bilateral orientation of all the parameters when compared to other two types of malocclusion.
2. The number of primary rugae on the right side were statistically significant in all types of malocclusion.
3. The most predominant pattern for first, second and third primary rugae was wavy.
4. The number of primary, secondary and fragmentary rugae was greatest in number in Class II malocclusion when compared to class I and class III, however it is cannot be considered statistically significant as the number of sample size is less.

Ethical Clearance: Taken from institutional ethics committee, Kasturba medical college and hospital, Manipal

Source of Funding: Self funded

Conflict of Interest: Nil

REFERENCES

1. Caldas IM, Magalhaes T, Afonso A. Establishing identity using cheiloscopy and palatoscopy. Forensic Science International 2007; 165:1-9.
2. Sanjaya PR, Gokul S, Prithviraj KJ. Significance of Palatal rugae: A Review. Int J Dent Update 2012; 2:74-82.
3. Bansode S, Kulkarni M. Importance of palatal rugae in individual identification J Forensic Dent Scie 2009; 1:77-81.
4. Dayal PK, Srinivasan SV, Paravatty RP. Textbook of Forensic Odontology. 1st edition. Baba Book Company: Paras Medical Publisher; 1998.
5. Mishra P, Gupta M, Singh N, Srivatsava K . An Overview of Chelioscopy & Palatoscopy: An Aid in Forensic Investigation. International Journal of Nursing Didactics, 5: 6 June 2015.
6. Thomas C.J. & vanWyk, C.W. The palatal rugae: an identification.J. Forensic Odontostomatol1988; 6: 21- 7
7. English WR. Robison SF. Summit JB. Oesterle IJ. Individually of human palatal rugae. J Forensic Sci 1988; 33: 718-26.
8. Shetty S.K. Kalia S. Patil K Mahima VG. Palatal rugae pattern in Mysorean and Tibetan populations Indian J Dent Res 2005; 16:51-5.

9. Lysell L. Plicae transeverse and papilla incisive in man; a morphology and genetic study. Acta Odontol Scand.1955;13:5–137.

10. Simmons JD, Moore RN, Erickson LC. A longitudinal study of anteroposterior growth changes in the palatine rugae. J Dent Res 1987;66:1512 5.

11. Hauser G, Daponte A, Roberts MJ. Palatal rugae. J Anat 1989;165:237 49.

12. van der Linden FP. Changes in the position of posterior teeth in relation to ruga points. Am J Orthod 1978;74:142 61.

13. Peavy DC Jr, Kendrick GS. The effects of tooth movement on the palatine rugae. J Prosthet Dent 1967;18:536 42.

14. Shukla D, Chowdhry A, Bablani D, Jain P, Thapar R. Establishing the reliability of palatal rugae pattern in individual identification . J Forensic Odontostomatol 2011;29:20 9.

15. Kapoor P, Miglani R. Transverse changes in lateral and medial aspects of palatal rugae after mid palatal expansion: A pilot study. J Forensic Dent Sci 2015;7:8-13.

16. English WR, Robison SF, Summitt JB, Oesterle LJ, Brannon RB, Morlang WM. Individuality of human palatal rugae. J Forensic Sci 1988; 33:718 26.

17. Almeida MA, Phillips C, Kula K, Tulloch C. Stability of the palatal rugae as landmarks for analysis of dental casts. Angle Orthod 1995; 65: 43-48.

18. Bailey LT, Esmailnejad A, Almeida MA. Stability of the palatal rugae as landmarks for analysis of dental casts in extraction and nonextraction cases. Angle Orthod 1996;66: 73-78.

19. Kapali S, Townsend G, Richards L, Parish T.Palatal rugae patterns in Australian aborigines and Caucasians. Aust Dent 1997; J 42: 129-133.

20. Hemanth M, Vidya M, Shetty N, and Karkera BV, Identification of individuals using palatal rugae: Computerized method, J Forensic Dent Sci 2010; 2(2): 86 – 90.

21. Paliwal A, Wanjari S, Parwani R. Palatal rugoscopy: Establishing identity. J Forensic Dent Sci 2010;2:27-31

22. Thomas CJ, Kotze TJ. The palatal rugae pattern: A new classification. J Dent Assoc S Afr. 1983;38:153–7.

23. Kapoor P, Ragini, Kaur H. Rugoscopy: A Diagnostic Appurtenance for Malocclusion or just a Forensic Aid? - A Pilot Study. J Forensic Res.2015; 6: 272

24. Sheikh A , Mathew T, Siew TB. Dental malocclusion among university students and its effect on self esteem :A cross sectional study. World J Dent 2014;5:204-208

25. Gandikota C, Venkata YP, Challa P, Juvvadi SR, Mathur A Comparative study of palatal rugae pattern in class II div 1 and class I individuals. J Pharm Bioallied Sci. 2012;4: S358-363.

26. Kashima K. Comparative study of the palatal rugae and shape of the hard palatal in Japanese and Indian children. Aichi Gakuin Daigaku Shigakkai Shi 1990;28: 295-320.

Effect of McKenzie Approach and Neck Exercises on Forward Head Posture in Young Adults

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ABSTRACT

Objective: To examine the effects of McKenzie approach, Neck Exercises and combination of both on Forward Head Posture in young adults.

Method: 30 subjects between of the age group 18-35 years were randomly allocated into 3 groups to receive McKenzie approach, neck exercise or combination treatment for 3 sessions per week, for 4 weeks. Outcome assessment was recorded at baseline, 2 weeks and 4 weeks post-treatment.

Results: There were significant differences in all outcome measures after 2 and 4 weeks of treatment within all 3 groups ($p<0.001$) except extension, right rotation and right lateral flexion in group A (>0.05), left lateral flexion and Neck Disability Index in group B ($p>0.05$) and left lateral flexion in group C ($p>0.05$). There were significant differences in Flexion, right rotation, CCFT ($p <0.01$) and left rotation ($p>0.05$), between group A and group B , left rotation ($p <0.05$) between group A and C, CCFT (<0.001) between group B and C after 2 weeks of treatment. There were significant differences in flexion (<0.05), left rotation and right rotation (<0.01) between group A and B after 4 weeks. There were significant differences in left and right rotation ($p <0.01$) and CCFT ($p <0.05$) between group A and B, flexion ($p <0.01$) between group A and C, CVA ($p <0.05$), left and right rotation ($p <0.01$) and CCFT ($p <0.001$) from 2nd to 4th week of treatment between group B and C.

Conclusion: Both McKenzie approach and Neck exercises were effective in treating Forward Head Posture but statistically significant difference was found between groups (A) and (B), (B) and (C) but there was no significant difference found between groups (A) and (C).

Keywords: *Forward head posture, McKenzie approach, Neck exercises, Young adults*

Introduction

In the modern era, the prolonged uses of mobile phones and computers have lead to a variety of musculoskeletal disorders, especially related to the neck namely, Forward Head Posture(FHP), rounded shoulders, upper cross syndrome, mechanical neck pain etc. FHP is one in which the upper cervical convexity is increased and the lower cervical convexity is decreased causing anterior weight bearing of the cervical spine[1)]. It is also known as Scholar's neck, Reading neck or Wearsie neck[2)].

The prevalence of FHP using anterior head translation in plain radiographs in neck pain patients was found to be 37%, out of the total subjects having FHP 58% were females and 42% were males [3)]. A review of different observational studies on neck pain around the world showed that its 1 year prevalence ranged from 16.5 to 75.1% for the entire adult population[4)].

To maintain the head in forward position and to counteract the excessive external flexion moment, there is constant isometric contraction of the cervical

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extensors[1] that take over the load of the inactive deep neck flexors. This leads to lengthening of the cervical extensors whereas shortening and weakness of deep neck flexors causing muscle imbalance[5] ultimately leading to injury to the soft tissues. This results in reduced range of motion as well as diffused pain in the neck, scapular and head regions[5]. Therefore, it is important to treat FHP to relieve neck pain, improve posture and increase the range of motion.

McKenzie approach is one of the most common therapies used for the management of spinal conditions including dysfunctions like FHP in which patients are managed with an appropriate repeated loading strategy which is progressed according to patient response along with postural correction.

The primary cervical muscles that undergo imbalance are the cervical flexors namely, Deep Cervical Flexors and the cervical extensors namely, Suboccipitals. Literature states that in order to correct the posture and maintain it to prevent recurrence, strengthening of deep cervical flexors and stretching of sub-occipitals is necessary

Methodology

Participants: Thirty subjects (10 men, 20 women) with FHP within the age group 18-35 years, having neck pain since 3 months, anterior weight bearing _>15mm in the lateral view of plain radiograph, Pectoralis minor length ≤ 2cm and falling under Dysfunction syndrome were included while subjects with history of cervical spine surgery, fractures, whiplash injury, rheumatoid arthritis and cervical disc herniation were excluded. All the subjects were provided with informed consent. The subjects were randomly allocated into 3 groups.

Interventions: Group A. The subjects in this group received McKenzie exercises in which exercises were repeated 10 times, 3 times /week for 4 weeks[6]. We used the regimen for the management of dysfunction syndrome under the guidelines of Mechanical Diagnosis and Therapy by the progression of retraction, retraction with overpressure, and retraction mobilization, extension and rotation depending on the patient response. The traffic light guidelines were used for the commencement or the discontinuation of the treatment.

Chin retraction was asked to be performed while the therapist supervised the movement to ensure that the head remained horizontal without any inclination of the head through the movement. Once the end range was gained and held momentarily, starting position was achieved again. Retraction was a precursor to any other cervical movements. When a good retraction range was achieved, progression was made. The subjects were demonstrated and taught self exercises and were advised to perform these exercises every 2-3 hourly.

Group B. The subjects were given neck exercises that included Deep Cervical Flexors strengthening which were performed 10 times, holding each for 20 seconds[7] with the subject in supine, head in neutral; nodding movement was performed while the therapist palpated to check whether superficial neck flexors were activated. Sub-occipitals stretching was done with the subject in sitting position; chin retracted and passively flexed until a stretch was felt, 4 times with hold of 30 seconds were done. The subjects were demonstrated, supervised and taught self exercises and were advised to perform these exercises every 2-3 hourly.

Group C. This group underwent a combination treatment of group A and B simultaneously.

Outcomes: Photogrammetric method. The subject was made to stand with neck and shoulder relaxed and the C7 was marked using a permanent marker to be used in the quantification process in the angles. The digital camera (Nikon Coolpix 7100™) was kept on a tripod stand 1.5m away from the subject and the height of the camera was adjusted. All the subjects were photographed thrice with a 2-week interval between. The photographs were then transferred to the laptop (Lenovo G505™) and the angles were measured by using Kinovea™.

Cranial vertical angle (CVA)**.** The angle was made by drawing a horizontal line passing through C7 which was parallel to the ground, a line passing through C7 and tragus of the ear[8].

Cranial rotation angle (CRA)**.** The angle was formed by the line connecting C7 with the tragus of the ear and the line connecting the tragus of the ear with lateral canthus of the eye[8].

Cervical ROM**.** For flexion, extension and lateral flexion range of motion, the patient was asked to be in sitting position, the Baseline Bubble Inclinometer™ was placed on the vertex of the head. For rotation, with the patient in supine, the inclinometer was placed on the

forehead. The pointer was adjusted to 0 degrees, the respective movement was asked to be performed and the readings were noted accordingly.

Craniocervical flexion test. The subject was in supine with the neck in neutral. The Chattanooga Pressure stabilizer unit™ was placed underneath the cervical lordotic curve. Baseline cuff inflation of 20mmHg was obtained. The subject was instructed to perform neck flexion at 5 different pressure levels progressively (22, 24, 26, 28, 30) and hold each level for 10 seconds. A 30 second rest period was provided between each neck flexion[9]. At the level where the subject could not hold for 10 seconds or the activation of superficial neck flexors was palpated, the test was stopped and the previous level of cuff inflation was taken as the reading.

Neck Disability Index. In this study, the subjects marked the option which was most suited to their symptoms. The total score was transformed into percentage points by using the following formula.

Total score/50 x 100 = %points

Statistical methods: The outcome assessment was taken at the baseline prior to the treatment after group allocation, 2 weeks and 4 weeks after the treatment period. Intra-group analysis was done using Repeated Measures ANOVA. Comparison between baseline and 2 weeks, 2 and 4 weeks, baseline and 4 weeks was done by Tukey- Kramer multiple comparison test. The inter-group analysis for parametric data was done using One-way ANOVA while for non-parametric data was done by Kruskal-Wallis test. The inter-group multiple comparison analysis was done using Tukey Kramer multiple comparison test. Statistical significance was accepted for the values of $p<0.05$ at 95% confidence interval. The analyses were performed using SPSS (version 25.0, Chicago, USA).

Results

There were significant differences in all outcome measures after 2 and 4 weeks of treatment within all 3 groups ($p<0.001$) except extension, right rotation and right lateral flexion in group A (>0.05), left lateral flexion and Neck Disability Index in group B ($p>0.05$) and left lateral flexion in group C ($p>0.05$). There were significant differences in Flexion, right rotation, CCFT ($p <0.01$) and left rotation ($p>0.05$), between group A and group B , left rotation ($p <0.05$) between group A and C, CCFT (<0.001) between group B and C after 2 weeks of treatment. There were significant differences in flexion (<0.05), left rotation and right rotation (<0.01) between group A and B after 4 weeks. There were significant differences in left and right rotation ($p <0.01$) and CCFT ($p <0.05$) between group A and B, flexion ($p <0.01$) between group A and C, CVA ($p <0.05$), left and right rotation ($p <0.01$) and CCFT ($p <0.001$) from 2nd to 4th week of treatment between group B and C.

Table 1: p and f values of intra-group analysis between all 3 groups

Variables p Value		A		B		C	
		F Value	p Value	F Value	p Value	F Value	
CVA		<0.0001	82.63	<0.0001	24.869	<0.0001	166.01
CRA		<0.0001	35.15	<0.0001	57.67	<0.0001	128.48
ROM	Flexion	<0.0001	50.92	<0.0001	26.401	<0.0001	97.80
	Extension	0.0071	6.599	<0.0001	53.24	<0.0001	137.35
	Left Rotation	<0.0001	24.224	<0.0001	25.89	<0.0001	103.95
	Right Rotation	0.0002	13.78	<0.0001	26	<0.0001	51.93
	Left Lateral Flexion	<0.0001	16.58	<0.0001	29.88	<0.0001	28.66
	Right Lateral Flexion	0.0050	7.203	<0.0001	24.515	<0.0001	46.85
NDI		<0.0001	25.266 (KW Value)	<0.0001	75.13 (KW Value)	<0.0001	60.264 (KW Value)
CCFT		<0.0001	22.55	<0.0001	37.45	<0.0001	171

CVA: Cranial Vertical Angle, CRA: Cranial Rotation Angle, ROM: Range of motion, NDI: Neck Disability Index, CCFT: Cranio Cervical Flexion Test

Table 2: p and f values of inter -group analysis between all 3 groups

Variables p Value		Pre Test		Post Test (2 Weeks)		Post Test (4 Weeks)	
		F Value	p Value	F Value	p Value	F Value	
CVA		0.9772	0.024	0.4743	0.768	0.025	4.249
CRA		0.9576	0.0443	0.686	0.383	0.328	1.162
ROM	Flexion	0.051	3.339	0.033	3.894	0.004	6.848
	Extension	0.751	0.289	0.667	0.411	0.329	1.160
	Left Rotation	0.025	4.237	0.045	3.472	0.008	5.805
	Right Rotation	0.019	4.582	0.012	5.195	0.001	8.520
	Left Lateral Flexion	0.805	0.218	0.941	0.061	0.286	1.310
	Right Lateral Flexion	0.505	0.701	0.187	1.783	0.072	2.906
NDI		0.639	0.455	0.283	1.321	0.115	2.346
CCFT		0.116	2.331	0.126	2.236	0.000	13.042

Discussion

Sustained bad posture causes stress as well as structural changes in the soft tissues. Postural correction and appropriate exercises are necessary for preventing further complications as well as decreasing the anterior weight bearing of the head.

In this study, 30 subjects (male to female ratio 1:2) diagnosed with Forward Head Posture were taken. A study reviewed 14 independent cohort studies which showed that development of non-specific neck pain was associated with female gender while another study showed no gender difference in relation with Forward Head Posture[10,11].

In this study, CVA was taken as an outcome measure. This study showed that there was increase in CVA within all the groups, but there was a significant difference in group B and C. A study showed the changes in CVA after incorporating McKenzie exercises on FHP for 4 weeks to be significant [12]. Another study also had a significant difference after giving McKenzie exercises on FHP [13]. In a study, examination of the change in Neck Flexion Angle after neck exercises showed a significant difference post test[14].

There was a significant difference in CRA within the groups. CRA was shown to have no significant difference between the groups in this study.

A study showed that there is a correlation between CVA with NDI and Range of motion, especially cervical flexion and endurance of deep cervical flexors [15]. In the assessment of cervical range of motion, a significant difference seen in group A and B, group B and C in cervical flexion and rotation. It was seen that forward head posture had a relation with reduced cervical range of motion, namely flexion and rotation[16]. Group C showed most improvement in flexion and rotation range due to which there was maximum reduction in CVA.

It was seen that there was improvement in the NDI scores in all the groups but there was no significant difference between the groups. This shows that both the treatment approaches were beneficial when it came to improving quality of life. Supporting this study, it was noted that using neck exercises led to decrease in NDI scores (mean difference 2.2) [17].

A study saw that subjects demonstrating chronic neck pain had a poorer ability to perform the CCFT[9]. The subjects in this study initially had a low CCFT score which may be because of increased upper cervical lordosis being developed due to forward head posture. At the end of 4 weeks, it was seen that there was a significant difference between group A and B, group B and C, concluding that solely relying on neck exercises did not improve the deep neck flexors strength.

Conclusion

It was concluded that McKenzie approach, neck exercises as well as their combination were individually effective in reducing forward head posture. Although not statistically significant, the combination of both the treatments got better outcomes that the former.

Source of Funding: This study was funded by Krishna Institute of Medical Sciences Deemed To Be University, Karad.

Ethical Clearance: This study was approved by the institutional ethics committee of KIMSDU. Registration was done in Clinical Trials Registry- India with the registration no. CTRI/2018/01/011073.

Conflicts of Interest: Nil

REFERENCES

1. Levangie P, Norkin C. Joint Structure & Function, 5th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd 2012: 502.
2. Calliet R. Soft tissue pain and disability. FA Davis Comany 1977.
3. Wan S.K. et.al. Prevalence of Anterior Head Translation in Patients with Neck Pain, International Jorunal of Current Medical and Applied Sciences 2016, January; 9(2):78-83.
4. Fejer R et.al. The prevalence of neck pain in the world population: A systematic critical review of the literature, Eur Spin J, 2006; 15(6):834-48.
5. Phil Page et.al. Assessment and Treatment of Muscle Imbalance. Human Kinetics 1967.
6. Robin McKenzie et.al. The cervical and thoracic spine mechanical didagnosis and therapy, New Zealand: Spinal Publications (P) Ltd 2006.
7. Vijay Kage et.al. To compare the effects of Deep Neck Flexors strengthening exercise and McKenzie Neck exercise in subjects with forward neck posture: A randomised clinical trial, IJPR, 4(2):1451-58.
8. Lee KS et.al. Analysis of the change of the forward head posture according to computer using time. Korean Soc Phys Med, 2009, 4: 117-124.
9. Thomas Tai Wing Chiu et.al. Performance of the craniocervical flexion test in subjects with and without chronic neck pain. J Orthop Sports Phys Ther 2005.35:567-571.
10. McLean SM et.al. Risk factors for the onset of non-specific neck pain: a systematic review, J Epidemiol Community Health, 2010 Jul; 64(7): 565-72.
11. Netaji P et.al. The relationship of forward head posture and rounded shoulders with neck pain in Iranian office workers. Med J Islam Repub Iran 2014; 28: 26.
12. Jung YW et.al. Effects of McKenzie exercise on the functional recovery and forward head posture of chronic neck pain patients. The Korean Society of Physical Medicine 2006; 1(1): 93-108.
13. Jeong-Il Kang et.al. The effect of feedback exercise on muscle activity, cranivertebral angle, and neck disability index of the neck flexors of patients with forward head posture. J. Phys. Ther. Sci. 2016; 28: 2477-2481.
14. Myoung-Hyo Lee et.al. Effects of neck exercise on high-school students' neck-shoulder posture. J. Phys. Ther. Sci. 2013; 25: 571-574.
15. Gong W et.al. Correlations between cervical lordosis, forward head posture, cervical ROM and the strength and endurance of the deep neck flexor muscles in college students. J Phys Ther Sci, 2012, 24: 275-277.
16. June Quek et.al. Effects of thoracic kyphosis and forward head posture on cervical range of motion in older adults. Man Ther. 2013; 18(1): 65-71.
17. Iqbal ZA, et.al. Effect of deep cervical flexor muscles training using pressure biofeedback on pain and disability of school teachers with neck pain. J. Phys. Ther. Sci. 2013; 25: 657-661.

Socio-economic, Hygiene and Nutritional Status of Indian Slums: A Scoping Review

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ABSTRACT

In the third millennium, the growth of urbanization is rapid, especially the fast developing country like India move faster towards urbanization, which is lopsided with the expansion of slums. This scoping review aims to present the socio-economic, hygiene and nutritional status of the slums in India. The methodology of the study analyses the previous studies on the selected research problem in back-and-forth method. Through intense and diverse studies, this paper has arrived at the results that the socio-economic status of the Indian slums is very low. The hygiene and sanitation of those slums are in need of an immediate call. Above all, the nutritional status of the slum dwellers, especially the women and children is terrifically low. The authors also report the lack of studies on the selected topic in the southern part of India and also recommend such studies to be carried out in the future.

Keywords: *Slum; Slum Dwellers; Socio-economic Status; Hygiene and Sanitation; Nutritional Status.*

Introduction

In the third millennium, there is a remarkable development in the urban populace [1, 2]. The speed of urbanization has been increasing worldwide [3]. The fast developing countries like India [4] move faster towards urbanization, with the average rate of 2% yearly when compare with 0.5% in more developed countries [5]. This growth, however, is not uniform in terms of urbanization [6]. This rapid urbanization pressures the previously overwrought and dense infrastructure of the cities' and upshots to the formation of slums.

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The term slum speaks volumes about the plight of the poor and the deprived [7]. The slum is an overcrowded and squalid portion of a district or city or town usually inhabited by the very poor and downtrodden, who generally inhabit in the debris, dirty and infective areas [8]. Pure air, healthy environment and spacious living places are all denied to them.

According to Article 21 of Indian Constitution, Health is a basic right for every human being, despite their socio-economic and cultural status [8, 9]. The living condition of an individual has its own impact on one's health. Health and nutritious meals is a big question mark for such people, who struggle for their basic needs of the day in and day out, facing all kinds of challenges [9]. Most of the slums are situated in vulnerable locations such as river margins, underneath the over bridges, waterlogged areas and road margins etc [7, 10, 11]. These people are forced to live in such areas because of their economic condition.

The prime objective of this study is to disclose the despairs of the slum dwellers in India. More specifically, the aim of the present study is to explore the different

forms of their deprivations, sufferings and miseries for basic needs including social, constitutional and economic rights by reviewing previously published studies.

Methodology

The study adopts a Scoping Review, which is not a linear process (as typically dictated by the protocol for a systematic review) but a back-and-forth between early studies and new insights and changes in search terms and even questions [12, 13]. The purpose of the scoping review is to analyze all the studies available on the topic without any restrictions on the studies resourced. Considering this approach, the study has analyzed and reviewed the kinds of literature related to slums.

The investigation was done on the review of kinds of literature, methodologies of various studies were understood, the conclusions and interpretation of many studies were collectively reviewed in order to compare and contrast the results of secondary studies. Thus, the methodology was mainly comprised of content analysis. The mentioned analysis was carried out by auditing the journals and identifying and scrutinizing the studies that were related to socio-economic, hygiene and nutritional status of slums of India. The researchers went through the studies and gathered the information on the selected topic. Moreover, from this wide range of searching, it was found that there was no study conducted on the selected topic in the Southern part of India.

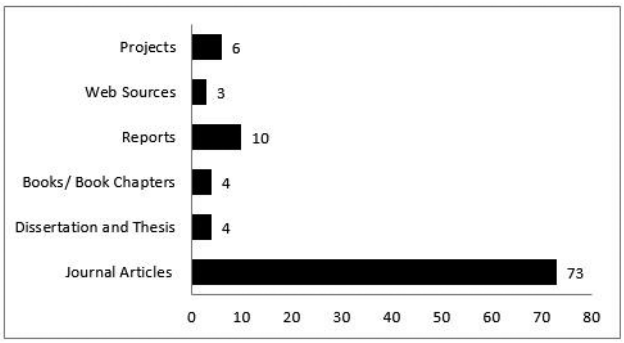


Figure 1: Percentage of various scoping reviewed literatures

(Source: Authors' own design)

From the above figure 1, it is understood that the authors have reviewed various literatures in relation to the selected research problem. Through the diverse study, the authors have identified the handful number of studies. Out of which, 73% of studies are from the journals, 10% of data are from the reports of various studies, 6% is taken from the government and non-governmental projects, books, book chapters, dissertation and thesis comprise of 4%, and 3% of the studies come from the web sources.

Socio-economic Status of Slums: Through the diverse studies, it is unveiled that the slum dwellers' socio-economic condition is very pathetic [14]. Many studies argue that slums are poverty traps and therefore they do not have better financial opportunities. Slum population remains deprived, particularly in health, education and socio-economic aspects [15]. It is disclosed that the financial status of the families in slums is very poor and it influences their health condition and social status too [10]. From many studies, it is profound that 25 per cent of slum families earn less than 2,000 INR and sink below the poverty line [16]. Most of the slum dwellers, men work as skill-based workers, in other words daily waging labors and most of the slum women are servant maids. Low socio-economic status of the slum children is significantly responsible for the specific morbidities of the same [17].

The overall socio-economic status of slum dwellers is in miserable condition. Maximum slum dwellers are deprived of education and almost one-fourth of the slum dwellers is non-literate [10]. The utmost number of women dwelling in the slums is uneducated, illiterate and their status is also lower. Females are less educated than the males in many of the slums. A survey study among the women slum of Vishakhapatnam discloses that the percentage of women who have received undergraduates, secondary education and primary education is just 2%, 28% and 70% respectively [18].

Hygiene and Sanitation in Slums: To any civilized man, the slum is a virtual hell and it is unhygienic for human settlements. These underprivileged people, who live in such unhygienic environments, are vulnerable to infections and prone to all infections and as the consequences easily susceptible to communicable diseases. Any area with the inadequacy of safe water, inadequate access to sanitation and other infrastructures, ghastly housing, congestion and insecure inhabited status is an informal settlement. Children from poorest urban slum are three times more likely to die before the age of five than those from wealthiest urban and rural areas. Worldwide, the slum dwellers do not have the access to such essential requirements [19]. Many studies strongly profound that the slum households lack the following:

- Sturdy home of a permanent nature that gives shelter even in all typical weather conditions
- Adequate living area wherein not more than three people sharing the same room
- Inexpensive potable water
- Sufficient hygiene by means of private or public lavatory shared by the rational number of populace
- Residential protection, which avoids enforced evictions.

The major notorious problems in the slums are: (a) be short of drinkable water (b) no appropriate sanitation and waste discarding, domestic as well as public lavatories (c) mosquitoes and rodents threat (d) lack of health services at the locality (e) lack of monetary prop up for women. A study, which is conducted among the slums of Delhi, reveals that 83 per cent toilets are contaminated with fecal and other waste manners [20]. Admittance to safe drinking water and accessibility to sufficient sanitation are necessary to the health of every individual [8]. Slum population is posing problems such as poor housing conditions, overcrowding, reduced access to safe water and sanitation and lack of personal hygiene[21].

A study in Mumbai slum shows that water-related infection is the root for 30% of all morbidity. But, after inculcating the practice of proper hand washing, there are 25% lesser diarrheal episodes, 15% lesser Acute Respiratory tract Infection (ARI) episodes and 27% lesser sick leave in school [21]. The study carried out on the menstrual hygiene of slum women asserts that more than half of the slum women use and reuse cloth instead of using disposable sanitary pads during menses and the additional fact is those women have more prevalence of STD/RTI (Sexually Transmitted Disease/Reproductive Tract Infection), when compared to those women using disposable sanitary pads [22]. Thus, two things can be understood from the intense review of the diverse studies: Firstly, the hygiene and sanitation condition of most of the slums in the nation is in a dangerous condition with poor livelihoods, which also demeans the ecology. Secondly, though the hygiene and sanitation are worst, it can be reversed by appropriate intervention policies by the governmental and the non-governmental organizations.

Nutritional Status of Slums: The occurrence of under-nutrition is higher among girls than that of boys [23]. Some studies mismatch with these findings by saying that there is higher under-nourished boy children rather girls and some more state that there is no significant gender differential [24], but anyways all the studies significantly accept the presence of under-nutrition among the children of sub-standard settlements. In the scenario of the children less than two years, more than half of the children -- 55.7% are under-weight and 42.6% are stunted and 36.5% suffers from muscle wasting [25]. The whooping fact is that most of the children in the slums experience Protein Energy Malnutrition (PEM), Iron deficiency anemia, Iodine deficiency disorders, and Vitamin A deficiency [26].

The study by Deka et al. (2016) confirms the prevalence of anemia in adolescent girls from ten randomly selected slums and declares that the probable reason for this may be worm infestation and this finding matches with the findings of Vasanthi et al. [27]. The malnutrition and under-nutrition in the adolescence period is the common nutritional problem in the slum, which may lead to different types of life-threatening difficulties during pregnancy. The nutritional status of women is destitute in the poorer socio-economic cluster.

In slums, underweight is concerted among women in the poorer households [16]. Poor nutrition starts before birth and extends into adolescence and adulthood period and as a consequence, continues to next generations too. Evidently, malnourished girl children are more likely to remain malnourished during adolescence and adulthood and when pregnant more likely give birth to low birth weight infants [2].

Results and Discussion

The present study brings the socio-economic, hygiene and nutritional status of the slum dwellers in India into the limelight by analyzing the previous studies using scoping review method. It is understood that slums are without essential amenities, occupied by uneducated and altogether, their state of living is very pathetic. They are not given much consideration towards their health and their children's health and thus, there are more illnesses and sick among slum individuals. Many studies stand as proof for the fact that poor sanitation, the nonexistence of toilets, open poo, debased drinking water, and so forth are the probable explanations behind the sickness of ladies and children in slum ranges. Because of these reasons, the hygiene and nutritional status of Indian slum

regions is a somber issue. Crucially, the authorities need to make essential strategies, because 70% of the slum dwellers respond negatively while asking whether they feel that their families eat a balanced diet and receive proper nutrition and are satisfied or happy with their living condition and livelihood [18]. These people with their eyes opened wide, hands stretched long, waiting for the helping hands from the governmental and the non-governmental agencies.

Through intensive reviewing of many studies on the selected research topic, the authors discover the big gap in the literature, where is the lack of studies undergone in the southern part of India.

Conclusion and Implications

From the keen audit, this work tries to throw light on another side of the coin -- the darker shades of the nation, which really needs to be emphasized and thus, it concludes that the socio-economic, hygiene and nutritional status of slums of India are in very pathetic condition moreover, many studies are not published on the slums of South India, particularly in Tamil Nadu and covering all theses context in a single study. By identifying this gap, the present study motivates the researchers to get interested with more society-oriented studies especially about such underprivileged and the economically downtrodden people. The researchers believe that this study may motivate further researches in socio-economic condition, hygiene and nutritional status of the slums of Tamil Nadu.

Conflict of Interest: The authors declare no conflicts of interest.

Source of Funding: This research received no external funding.

Ethical Clearance: An ethical clearance is not required for this study.

REFERENCES

1. Shrivastava R, Choudhary AK, Nagar JK, Kaushal R. A cross- sectional study to assess health status of children in urban slum in Sagar city. National J of Community Med. 2015;6(4): 601-604.
2. Deka C, Achyut C. Baishya OJ, Barua K. A study of nutritional status of adolescent girls residing in urban slums of Guwahati city, Assam, India. Int J of Community Med and Pub Health. 2016;3(8): 2169-2173.
3. Shukla M, Agarwal M, Rehman HM, Yadav K, Imchen T. Housing and sanitary conditions in slums of Lucknow, capital of Uttar Pradesh. Int J of Med Sci and Pub Health. 2015;5(6): 1153-1157.
4. Hariharasudan A, Gnanamony SR, Rajaram S. An eye view of technical English language among engineering students in southern Tamil Nadu (India): an analysis in the postmodern era. Global J of Business and Soci Sci Review. 2017;5 (1): 9-17.
5. Jaiswal V. Water and sanitation situation in urban slums of India: evidence from NSSO. J of Health Sci and Research. 2016;6(5): 248-253.
6. Mahabir R, Crooks A, Croitoru A, Agouris P. The study of slums as social and physical constructs: challenges and emerging research opportunities. Reg Stud, Reg Sci. 2016;3 (1): 399–419.
7. Hanchett S, Akhter S, Khan MH, Blagbrough SM, Vicky. Water, sanitation and hygiene in Bangladeshi slums: an evaluation of the water aid – Bangladesh urban programme. Environment and Urbanization. 2003;5 (2): 43-56.
8. Sau A. A study on water supply and sanitation at a slum in Kolkata. International J of Med Sci and Pub Health. 2016; 6(3): 634-637.
9. Rani JK, Maheswari SK. A systematic review on the hygiene and nutritional status of the women living in the slums of India. J of Adv Research in Dynamical and Control Sys 2017;7: 303-313.
10. Kaviarasu SJ, Xavier GG. Status of women's health in urban sub-standard settlements of Chennai, Tamil Nadu state, India. European Acd Research. 2015;2(11): 14473-14483.
11. Jogdand SS, Naik DJ. Pattern of behavior problems amongst the urban slum dwellers aged 6 to 18 years. National J of Med Research. 2013;3(3): 245-249.
12. Hariharasudan A, Kot S. A scoping review on digital English and education 4.0 for industry 4.0. Soci Sci. 2018;7(11): 1-13.
13. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. International J of

Soci Research Methodology: Theory and Practice. 2005;8: 19–32.

14. Minh HV, Viet HN. Economic aspects of sanitation in developing countries. Environmental Health Insights. 2011;5: 63-70.
15. Agarwal R, Tiwari N, Malhotra AK. Water, sanitation, and hygiene practices among population living in slums, Jhansi, Uttar Pradesh, India. Int J of Med Sci and Pub Health. 2017;6(10): 1533-1537.
16. Roy D, Palavalli B, Menon N, King R, Pfeffer K, Lees M, Sloot PMA. Survey-based socio-economic data from slums in Bangalore, India. Scientific Data. 2018;5: 1-9.
17. Syed S, Gangam S, Syed S, Rao R. Morbidity patterns and its associated factors among school children of an urban slum in Hyderabad, India. Int J of Med Sci and Pub Health. 2015;4(9): 1177-1181.
18. Kiranmai K, Saritha V, Mallika GP, Lakshmi VNR. Assessment of health status of women in urban slum. Indian J of Innovations and Developments. 2012;1(4): 220-224.
19. Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, Jha P, Mills A, Musgrove P. Disease Control Priorities in Developing Countries. New York: The World Bank and Oxford University Press; 2006.
20. Goswami S. A study on women's healthcare practice in urban slums: Indian scenario. Evidence Based Women's Health J. 2014;4: 201–207.
21. Paul AV, Kalidas R. A study on hand washing practices among mothers of under-five children in urban slums. J of Preventive Med and Holistic Health. 2017;3(1): 37-40.
22. Shingade PP, Suryavanshi1 J, Yasmeen K. Menstrual hygiene among married women: a hospital based cross-sectional study in an urban slum of Mumbai, India. International J of Community Med and Pub Health. 2015;3(1): 57-61.
23. Gupta V, Mohapatra D, Kumar V. Nutritional assessment among children using various anthropometric indices. Int J of Biomedical Research. 2015;6 (09):629-634.
24. Suri S, Kumar D. Nutritional status and the factors associated with it among children aged 1-5 years in a rural area of Jammu. Int J of Scientific Study. 2015;3(3): 60-64.
25. Akhtar K, Haque ME, Islam MZ, Yusuf MA, Sharif AR, Ahsan AI. Feeding pattern and nutritional status of under two years slum children. J of Shaheed Suhrawardy Medical College. 2012;*4* (1): 3-6.
26. Rahman MH, Alam SS. Nutritional status of children in slums of Dhaka, Bangladesh. J of Food and Nutritional Sci. 2015;5(6): 1-7.
27. Vasanthi G, Fawashe AB, Susie H, Sujatha T, Raman L. Iron nutritional status of adolescent girls from rural area and urban slum. Indian Pediatrics. 1993;31(2):127-133.

Study of Correlation between Serum Lipid Profile and Thyroid Function in a Tertiary Care Hospital

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ABSTRACT

Introduction: Hypothyroidism is strongly related to increased risk of cardiovascular diseases due to its potential association with atherogenic lipid profile. Hypothyroidism also can even cause premature atherosclerosis. Untreated hypothyroidism is the most common cause of reversible hyperlipidemia.

Method: Blood samples received from either OPD or IPD in plain and EDTA vacutainer was separated from blood to plain vacutainer by centrifugation at 3000rpm for 10 minutes. For HbA1c EDTA vacutainer samples are used. By using different methods serum urea, creatinine estimated on fully automated analyzerEM360.

Results: Age wise distribution show a more number in <50years group, indicating early occurrence of hypothyroidism, might be because of more stressed lifestyle resulting in deranged thyroid metabolism. Our study shows in gender wise distribution more number for female subjects, since hypothyroidism is more common in females. Regarding VLDL levels, significant correlation was found with T4, indicating changing impact on triglycerides metabolism with severity of hypothyroidism.Since our objective of the study is to establish a correlation between lipid profile and TSH as our finding show negative correlation TSH and total cholesterol and LDL cholesterol.

Conclusion: Since our objective of the study is to establish a correlation between lipid profile and TSH as our finding show negative correlation TSH and total cholesterol and LDL cholesterol. But this need more research work on this aspect of independent correlation of TSH and total cholesterol. This can further help to diagnose early hypothyroidism with only two parameters TSH and total cholesterol, if proved and thoroughly researched.

Keywords: *Hypothyroidism, thyroxin, hyperlipidemia.*

Introduction

Thyroid hormones regulate metabolism of number of biochemical parameters. Because of this, disorders of thyroid gland are the most common endocrine disorders. Diseases of thyroid gland affect lipid metabolism, since thyroxin favors lipolysis and lipid turnover. Hypothyroidism is associated with increased cholesterol levels because of defective transport by HDL.TSH stimulates thyroid hormones synthesis and controls overall metabolism and significantly influences serum cholesterol level.[1] Hypothyroidism is strongly related to increased risk of cardiovascular diseases due to its potential association with atherogenic lipid profile. Since hypothyroidism has a great impact on lipid metabolism, especially serum cholesterol level and other risk factors which can result in complications like atherosclerosis, obesity and hypertension responsible for cardiovascular disease. Thyroid gland is regulated by TSH, which is produced by pituitary gland, present at the base of brain.

This scenario aroused interest for this study to find out relationship of especially TSH with lipid profile and other complications as cardiovascular disease[2].

A number of studies reported that high level of TSH has deleterious effect on serum lipid levels but

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this study is still in debate because many studies are not supporting this correlation as it is influenced by factors like BMI, age, gender etc. But several studies established well inverse relation between cholesterol with thyroxin but not much research work is available in Indian population. Also there is not much research work available on independent correlation between TSH and cholesterol level.

One study has confirmed that TSH is independent of thyroid hormones, as TSH can up regulate the expression of hepatic 3-hydroxy-3-methyl glutaryl coenzyme A reductase which is a rate limiting enzyme in cholesterol synthesis. This indicates there might be an independent correlation between TSH and cholesterol level[2,3].

Material and Method

This study was conducted in tertiary hospital, biochemistry laboratory after obtaining approval from institutional ethics committee. Since this is a retrospective study, data collected from the records of tertiary care hospital for two months study period.

NAME OF PARAMETER	METHODS USED
SERUM T_3	FUOROIMMUNOASSAY
SERUM T_4	FUOROIMMUNOASSAY
SERUM TSH	FUOROIMMUNOASSAY
SERUM TOTAL CHOLESTEROL	COLORIMETRIC
SEUM TRIACYLGLYCEROL	COLORIMETRIC
SERUM HDL CHOLESTEROL	COLORIMETRIC
SERUM VLDL	COLORIMETRIC
SERUM LDL CHOLESTEROL	COLORIMETRIC

For all parameters, controls from BIORAD run on same machine before analysis to check the quality. Even external quality control program participated, results are excellent. Data for 287 patients, diagnosed cases of hypothyroidism collected during two months study period. Statistical analysis was done by using software INSTA-STAT.

Results

Table 1: Age & Gender Wise Distributions of Subjects

Age (No.)	%	Gender	No. of Participants	%
≤50yrs (158)	55.05	Males	88	30.66
>50yrs (129)	44.94	Females	199	69.33
Total	100	Total	287	100

The total number of subjects included is 287. The number of subjects in ≤50 years group is 158, number is 129 in >50 years group, number of females is 199 while for males it is 88, indicating more number of females suffering from hypothyroidism.

Table 2: Gender wise Comparison of T3, T4, TSH

Study Variables	Gender	N	Mean	SD	t-value	p-value
T3	Males	88	92.06	66.70	-0.23354	0.815501
	Females	199	94.19	75.29		
T4	Males	88	9.22	15.22	-2.04843	0.0414
	Females	199	6.83	4.49		
TSH	Males	88	6.50	20.96	-0.2297	0.818484.
	Females	199	5.90	19.61		

T3- The t-value is -0.23354. The p-value is .815501. The result is not significant at $p < .05$.

T4- The t-value is -2.04843. The p-value is .0414. The result is significant at $p < .05$.

TSH- The t-value is -0.2297. The p-value is .818484. The result is not significant at $p < .05$.

Table 3: Gender wise comparison of Lipid Profile

Study Variables	Sex	N	Mean	SD	t-value	p-value
TG	Males	88	152.55	84.95	0.4760	0.6344
	Females	199	147.48	82.52		
Cholesterol	Males	88	169.61	52.86	0.9027	0.3674
	Females	199	162.75	63.73		
HDL	Males	88	48.23	22.25	0.1533	0.8782
	Females	199	47.86	17.94		
LDL	Males	88	95.09	51.08	-0.3757	0.7074
	Females	199	92.10	68.30		
VLDL	Males	88	30.73	17.81	0.6190	0.4978
	Females	199	29.57	16.46		

TG - The t-value is 0.47602. The p-value is .634411. The result is not significant at $p < .05$.

Cholesterol- The t-value is -0.90271. The p-value is .367414. The result is not significant at $p < .05$.

HDL- The t-value is 0.15337. The p-value is .878208. The result is not significant at $p < .05$.

LDL- The t-value is -0.3757. The p-value is .707413. The result is not significant at $p < .05$.

VLDL The two-tailed P value equals 0.6190 t = 0.4978 The result is not significant at $p < .05$.

Table 4: Correlation between T3 and Lipid Profile

T3 vs. Lipid Profile	T3MEAN 93.53S.D. ± 72.73			
	Mean	S.D. ±	Pearson Correlation	P value
TG	149.1376	83.32481	0.0086.	0.8820
Cholesterol	164.896	60.63439	-0.082	0.1565
HDL	47.97987	19.39503	-0.0055	0.9312
LDL	93.04027	63.44663	-0.0901	0.1198
VLDL	29.93266	18.0534	0.0127	0.8286

TG: The value of R is 0.0086.Although technically a positive correlation, the relationship between variables is weak P-Value is .882077. The result is not significant at $p < .05$.

Cholesterol: The value of R is -0.082.Although technically a negative correlation, the relationship between variables is weak P-Value is0 .1565. The result is not significant at $p < .05$.

HDL: The value of R is -0.0055.Although technically a negative correlation, the relationship between variables is weak P-Value is 0.9312 the result is not significant at $p < .05$.

LDL: The value of R is -0.0901.Although technically a negative correlation, the relationship between variables is weak P-Value is 0.1198 the result is not significant at $p < .05$.

VLDL: The value of R is 0.0127.Although technically a positive correlation, the relationship between variables is weak P-Value is 0.8286 the result is not significant at $p < .05$.

Table 5: Correlation between T4 and Lipid Profile

T4 vs. Lipid Profile	T4 MEAN 7.582651S.D.9.341445			
	Mean	S.D. ±	Pearson Correlation	P value
TG	149.1376	83.32481	0.1454	0.1169
Cholesterol	164.896	60.63439	0.0877	0.1296

Conted…

HDL	47.97987	19.39503	-0.0057	0.9312
LDL	93.04027	63.44663	0.0745	0.1981
VLDL	29.93266	18.0534	0.1458	0.01146

TG :The value of R is 0.1454.Although technically a positive correlation, the relationship between variables is weak P-Value is 0.1169. The result is not significant at $p < .05$.

Cholesterol: The value of R is0.0877.Although technically a positive correlation, the relationship between variables is weak P-Value is0 .1296. The result is not significant at $p < .05$.

HDL: The value of R is -0.0057.Although technically a negative correlation, the relationship between variables is weak P-Value is 0.9312 the result is not significant at $p < .05$.

LDL: The value of R is0.0745.Although technically a positive correlation, the relationship between variables is weak P-Value is 0.1981 the result is not significant at $p < .05$.

VLDL: The value of R is 0.1458, a positive correlation; the relationship between variables is significant as P-Value is 0.01146 the result is at $p < .05$.

Table 6: Correlation between TSH and Lipid Profile

TSH vs. Lipid Profile	**TSH MEAN 6.110527 S.D. ± 20.04**			
	Mean	**S.D. ±**	**Pearson Correlation**	**P value**
TG	149.1376	83.32481	-0.086	0.1372
Cholesterol	164.896	60.63439	-0.1188	0.0411
HDL	47.97987	19.39503	-0.0375	0.5232
LDL	93.04027	63.44663	-0.0828	0.1565
VLDL	29.93266	18.0534	-0.0908	0.1198

TG: The value of R is -0.086.Although technically a negative correlation, the relationship between variables is weak P-Value is 0.1372. The result is not significant at $p < .05$.

Cholesterol: The value of R is -0.1188.Although technically a negative correlation, the relationship between variables is weak P-Value is 0.0411. The result is significant at $p < .05$.

HDL: The value of R is -0.0375.Although technically a negative correlation, the relationship between variables is weak P-Value is 0.5232 the result is not significant at $p < .05$.

LDL: The value of R is-0.0828.Although technically a negative correlation, the relationship between variables is weak P-Value is 0.1565 the result is not significant at $p < .05$.

VLDL: The value of R is -0.0908, a negative correlation; the relationship between variables is significant as P-Value is 0.1198 the result is at $p < .05$.

Discussion

Hypothyroidism increases the oxidation of plasma cholesterol mainly because of an altered pattern of binding and due to the increased levels of cholesterol, which presents substrate for oxidative stress. Hypothyroidism is often accompanied by diastolic hypertension that, in conjunction with the dyslipidemia, may promote atherosclerosis. However, thyroxin therapy, in a thyrotropin (TSH) suppressive dose, usually leads to a considerable improvement of the lipid profile [4,5]. From this study it can be concluded that hypothyroidism is associated with lipid disorders that are characterized by normal or lightly elevated total cholesterol levels, increased LDL-cholesterol and lower HDL-cholesterol

Age wise distribution show a more number in <50years group, indicating early occurrence of hypothyroidism, might be because of more stressed lifestyle resulting in deranged thyroid metabolism. Our

study shows in gender wise distribution more number for female subjects, since hypothyroidism is more common in females. In one study, researchers did not find that total cholesterol level was higher in women with subclinical hypothyroidism than euthyroid women[6].

Gender wise comparison of T3,T4, shows decrease in case of females as well as males but within normal ranges with significance in case of T4 ascompared to T3.This indicating severity of hypothyroidism is more in females than males.Comparison of TSH show a rise in both genders but within normal. Lipid profile comparison in males and females show increase in case of males. This might be because of more utilization of cholesterol and other lipids for synthesis of female hormones like estrogen and progesterone.

When T3 correlated with lipid profile it's showing weak positive correlation only with triglycerides,since decrease in T3 is very little and within normal limits therefore not much increase in triglycerides. Remaining all parameters in lipid profile show negative correlation and increase in lipid profile is within normal range. Similarly when T4 correlated with lipid profile its showing positive correlation as decrease inT4 and increase in lipid profile is within normal range.Correlation with VLDL is significant, only HDL showing negative correlation with T4, but within normal limits. TSH show negative correlation with all lipid profile parameters, in case of cholesterol it is significant. This might be because of increased TSH,there is rise in T3,T4 regulating the lipid profile resulting in decreased levels but within normal limits.

Hypothyroidism is a common metabolic disorder. The prevalence of primary hypothyroidism is 1:100, but it may be 5:100 if patients with subclinical hypothyroidism (normal T4, raised TSH). According to a study done by Ajay Arsana [7], hypothyroidism is a common disorder with a prevalence rate up to 20%. In another cross-sectional study on twelve hundred and twelve subjects of both sexes and age 20-60 years, the incidence of subclinical hypothyroidism was 19.7%**.** In our study, mean total cholesterol, LDL cholesterol and triglycerides were found slightly increased whereas HDL cholesterol not decreased in cases of hypothyroidism. JUNG[8] found mean plasma total cholesterol and LDL cholesterol levels elevated in hypothyroid cases than in normal controls. In another study, average serum total cholesterol level was found elevated in primary and secondary hypothyroidism. Keyes &Heimbergfound triglyceride level elevated in hypothyroid patients. So, our study findings were consistent with the previous studies done by other investigators like Keyes WG [9]and Abrams JJ[10]. Venditti P [11]have stated decreased activity of LDL receptors as the main cause of hypercholesterolemia in hypothyroidism. Serum concentrations of high density lipoprotein cholesterol was reported to be higher among newly diagnosed hypothyroid patients (subclinical or clinical) whereas serum concentrations of HDL cholesterol were significantly lower among euthyroid and previously reported hypothyroid cases who were on thyroxin replacement therapy [12]. Studies done by Michalopoulou showed average serum concentration of HDL higher in subclinical or clinical hypothyroidism, similar to our finding. Abrams J J& Grundy S M[13] has shown in their studies reduction of HDL cholesterol in hypothyroidism[13]. So, decrease in HDL cholesterol level in our study might be due to increased activity of CETP and lipoprotein lipase in hypothyroid patients.

There was no significant difference in serum total cholesterol concentrations among the groups, males and females. But the different pattern of decreasing cholesterol with increasing severity of hypothyroidism revealed in this study. This is further supported by our finding of no correlation of HDL with T3, T4.This might be due to our small sample size.

Regarding VLDL levels, significant correlation was found with T4, indicating changing impact on triglycerides metabolism with severity of hypothyroidism. It is claimed that thyroid hormones facilitate the LPL activity [14]**,** but deficiency of thyroid hormones to inhibit LPL probably follows a ceiling point beyond which further reduction of thyroid hormones does not cause further inhibition of LPL. In our study T4 has shown negative correlation with HDL cholesterol level. Positive correlation was found between serum T4 level and serum total cholesterol level, serum triglycerides, LDL and significant withVLDL. Total cholesterol and LDL cholesterol were found to maintain negative correlation with serum TSH. TSH was found to show significant negative correlation with serum cholesterol.Significant negative correlation of TSH with cholesterol level and negative correlation of TSH with triglycerides appear to make a sense of functional disharmony between T4 and TSH and, therefore, a large scale study is recommended to make it clear. Results of our study suggest the findings of mild dyslipidemia in hypothyroid patients.

Since our objective of the study is to establish a correlation between lipid profile and TSH as our finding show negative correlation TSH and total cholesterol and LDL cholesterol. But this need more research work on this aspect of independent correlation of TSH and total cholesterol. This can further help to diagnose early hypothyroidism with only two parameters TSH and total cholesterol, if proved and thoroughly researched. So, our study is consistent with some of the studies and inconsistent with the others. A large scale study on overt hypothyroid patients is recommended to come to a final conclusion. It does however have some limitations; measurements of TSH and T4 and lipid profiles were performed just once. Our results must be cautiously interpreted for the general population. This study is not a prospective study and therefore it demonstrates only association and not causation of various variables.

Ethical Clearance: Taken from Institutional ethics committee

Source of Funding: ICMR

Conflict of Interest: NIL

REFERENCES

1. Gutch M, Rungta S, Kumar S, Agarwal A, Bhattacharya A, Razi SM. Thyroid functions and serum lipid profile in metabolic syndrome. Biomed J. 2017 Jun;40(3):147-153. doi: 10.1016/j.bj.2016.12.006. Epub 2017 May 30.
2. Yun Zhang, Ping Lu, Ling Zhang and Xinhua Xiao Association between lipids profile and thyroid parameters in euthyroid diabetic subjects: a cross-sectional study.BMC Endocrine Disorders201515:12
3. Canaris GJ, Manowitz NR, Mayor G, Ridgway EC. The Colorado thyroid disease prevalence study. Arch Intern Med. 2000;160:526–34. [PubMed
4. Tsimihodimos V, Bairaktari E, Tzallas C, Miltiadus G, Liberopoulos E, Elisuf M. The incidence of thyroid function abnormalities in patients attending an outpatient lipid clinic. Thyroid 1999;9:365-368
5. Guyton AC, Hall JE. The thyroid metabolic hormones. In: Textbook of medical physiology. 10th edn. New York: W B Saunders Company, 2000:858-868.
6. Pearce EN. Hypothyroidism and dyslipidemia: Modern concepts and approaches. CurrCardiol Rep. 2004;6:451–6. [PubMed]
7. Ajay Asranna, R. S. Taneja, and BinduKulshreshtaDyslipidemia in subclinical hypothyroidism and the effect of thyroxine on lipid profileIndian J EndocrinolMetab. 2012 Dec; 16(Suppl 2): S347–S349.
8. Jung KY1, Ahn HY2, Han SK3, Park YJ4, Cho BY2, Moon MK5.Association between thyroid function and lipid profiles, apolipoproteins, and high-density lipoprotein function.JClinLipidol. 2017 Nov - Dec;11(6):1347-1353. doi: 10.1016/j.jacl.2017.08.015. Epub 2017 Sep 4.
9. Keyes WG, Heimberg M. Influence of thyroid status on lipid metabolism in the perfused rat liver. J Clin Invest 1979;64:182-190.
10. Abrams JJ, Grundy SM. Cholesterol metabolism in hypothyroidsm and hyperthyroidism in man. J Lipid Res 1981;82:323-338
11. Venditti P, Di Meo S. Thyroid hormone-induced oxidative stress. Cell Mol Life Sci. 2006;63:414–34.[PubMed]
12. Kuusi T, Taskinen MR, Nikkilä EA. Lipoproteins, lipolytic enzymes, and hormonal status in hypothyroid women at different levels of substitution. J ClinEndocrinolMetab. 1988; 66: 51-56
13. Abrams JJ, Grundy SM. Cholesterol metabolism in hypothyroidsm and hyperthyroidism in man. J Lipid Res 1981;82:323-338
14. Nikkilia EA, Kekki M. Plasma triglyceride metabolism in thyroid disease. J Clin Invest 1972;51:2103-2114.

Self Management and Knowledge among People with Type 2 Diabetes

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ABSTRACT

Purpose: The purpose of the study was to assess the knowledge and self management among people with type 2 diabetes.

Method: This study was carried out among 180 people with type 2 diabetes who admitted to tertiary care hospital at Udupi from June 2015 to January 2016. Data collected were basic demographic information and clinical items like HbA1c and BMI, knowledge, self management among people with type2 diabetes. Self management is assessed with diabetes self management questionnaire.

Results: This study revealed moderate level of self management among 95% participants and moderate level of knowledge was observed among 85% participants.

Conclusion: Considerable number i.e. 15% had inadequate knowledge regarding diabetes and its management which calls for appropriate intervention focusing on enhancing self management ability of people with type 2 diabetes.

Summary Statement:

What is already known about this topic?

- Self management is essential in diabetes management.
- Knowledge is the crux of effective management of diabetes.

What this paper adds?

- This study focuses on various aspects of self management among people with type 2 diabetes.
- Awareness about different dimensions of self management will help to design interventions to improve it.

The implications of this paper

- Shift of focus from symptomatic care to holistic approach where overall quality of life will be the goal of intervention.
- Innovative approaches to strengthen the ability of self management of their condition to maintain a good quality of life of people with type 2 diabetes

Keywords: *Type 2 diabetes; Self management, Diabetes knowledge*

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Introduction

New case of diabetes is diagnosed every 40 seconds[1]. Across the world approximately 415 million people are living with diabetes and it may increase to 642 million by the year 2040 Developing countries constitutes 75% of them. About 69.2 million of them live in India and

estimated number for South East Asia is 78.3 million[2]. In India due to diabetes 1.1 million deaths occurred and in South East Asia it is 1.2 million[3].

In urban India about 8.7% is the prevalence rate. 40-59 years is the age group which constitutes majority, which is found to be a decade earlier with comparison of western population. This means young people are affected with diabetes in their productive years of their life[4], which poses a risk of diabetes related complications, since they have to live with diabetes for longer duration. From this perspective self management plays pivotal role in adopting healthy lifestyle and preventing or delaying diabetes related complications and there by leading a good quality of life.

Self management poses a challenge, due to the complex nature of diabetes. However patients need to be supported and empowered to maintain the self management behaviours[5]. Behavioral change oriented patient empowerment will aid them to manage their condition with effectiveness[6]. Self-management programmes acts as a foundation for the empowerment approach[7]. Since people with type 2 diabetes take responsibility in managing their condition, the cost effectiveness of health care may also be evident in self-management.

Knowledge, attitude and self-management ability influences the quality of life of people with type 2 diabetes [8]. Understanding disease and its management are the major factors that influence self-management and glycaemic control[9]. Diabetes education can be effective if we are aware of their knowledge, attitude and practice [10]. Success of management of chronic disease is associated with patient education[11], Self-management education found to be effective in behavior modification[12] and even in old age people in improving knowledge and treatment adherence[13, 14]. Diabetes management can be improved by focusing on self care activities[15]. This study aimed to assess the knowledge and self management among people with type 2 diabetes.

Method

Study Design: A descriptive survey design was used to determine the knowledge and self management among people with type 2 diabetes

Setting and Sample: This study was conducted in Kasturba hospital, Manipal from June 2015 to January 2016. Samples were selected after satisfying inclusion criteria. This study included 180 people with type2 diabetes who were admitted in the medical wards. Inclusion criteria were concerning age 30 years and above, diagnosed at least 3 months or more, language Kannada, voluntary participation in the study, whose HbA1c is 6% and above.

Ethical Consideration: Clearance obtained from institutional ethical committee (IEC) and written informed consent from the people with type2 diabetes who are under study. IEC approval no: ECR/146/Inst/KA/2013

Instruments

Data Collection: Data collection was done thorough questionnaires which were translated to Kannada, the regional language. Instruments used in the study were demographic proforma, diabetes knowledge questionnaire and diabetes self management questionnaire.

Demographic Proforma: Demographic proforma consisted items like age, gender, religion, dietary habit, education, family monthly income, occupation, and clinical items like duration of illness, onset, regular check up, BMI and HbA1c.

Diabetes Knowledge Questionnaire: This questionnaire was developed by the investigator which is made up of 20 multiple choice questions (MCQ's) on diabetes and its management which includes diet, physical activity, foot care and diabetes related complications. Scoring was done as '1' mark for right answer and '0' mark wrong answer. Tool was validated by panel of seven experts i.e. three were from the field of medicine, three were from the field of medical surgical nursing speciality and one was from psychiatric nursing specialty. After validation tool was assessed for its reliability and it was found to be r (20) = 0.88 which was statistically significant. This indicates that the tool was reliable.

Self Management Tool: Diabetes self management questionnaire developed by Andreas Schmitt et.al. was used in the study with authors' permission to collect self care activities associated with glycemic control. Diabetes self management questionnaire consists of four subscales i.e. 5 items about glucose management, 4 items about dietary control, 3 items about physical activity, 3 items about health-care use and one item on overall rating of self-care. Items were scored 0 to 3, maximum possible score was 48 and minimum was 0. The self management scores were categorized into good (33-48), moderate (17-32) and poor (0-16)[16].

All the tools were in English and were translated to regional language Kannada. Translation was done by a professional language translator. Accuracy of the translation was ensured by retranslating it back into English. Pre testing of the Kannada versions of tools were done by administering it to 20 people with type 2 diabetes. No modifications were done as there were no confusions expressed by the participants.

Data Collection

From June 2015 to January 2016 data collection was done in medical wards. It is convenient sampling technique was used to collect the data. Permission was obtained from medical superintendent of the hospital. Informed consent was taken from the study participants. A total of 180 people with type 2 diabetes participated in the study.

Data Analysis

As per the study objectives data analysis and interpretation was done using descriptive and inferential statistics with the use of SPSS 16 version.

Results

Sample Characteristics: Sample characteristics reveals that 50 to 69 years is the age group constitutes the majority (57.8%) of the patients. 67.2% were males, 92.8% were Hindus, for 67.2% participants schooling was not more than high school, 86.7% were married, 5001 to 10,000 Indian Rupees was monthly family income for 58.3% and 60% were non vegetarians.

About 41 to 50 years is the age of onset diabetes for 31.7% and 77.8% of them had diabetes for more than 1 year. 49.4% had thrice or more regular check up in a year, 51.1% had information on diabetes. 8 gm% of HbA1c was observed among 52.2% and 53.3% had BMI more than 25.

Self management and knowledge among people with type 2 diabetes

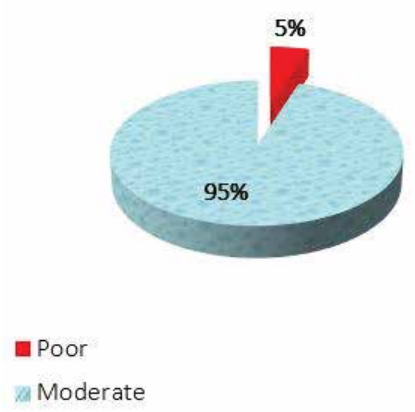


Figure 1: Self management among people with type 2 diabetes n = 180

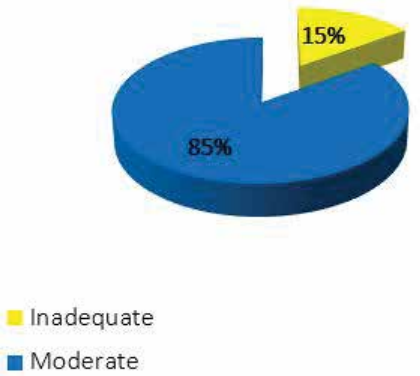


Figure 2 : Diabetes knowledge among people with type 2 diabetes n = 180

Pie chart on self management (Figure 1) and diabetes knowledge (Figure 2) among people with type 2 diabetes.

Table 1: Self management with regard to different domains n = 180

Self management	Minimum	Maximum	Max. possible score	Mean	Std. deviation	Median	Std. error
Glucose management	2	12	15	7.255	2.050	7	0.152
Dietary control	1	10	12	5.838	1.846	6	0.137
Physical activity	0	9	9	4.361	1.726	4	0.128
Health-care use	0	9	9	4.394	1.838	5	0.137
Overall rating of self-care	0	3	3	1.361	.955	1	0.071
Over all self management	13	31	48	23.21	3.892	23.5	0.290

Self management among people with type 2 diabetes was assessed in 4 different domains. Mean and standard deviation of glucose management is 7.255 ± 2.050, dietary control is 5.838 ± 1.846, physical activity is 4.361 ± 1.726, health-care use is 4.394 ± 1.838, self-care rating is 1.361 ± .955 and over all self management 23.21 ± 3.892

found to be moderate among people with type 2 diabetes. About 95% of the study participants had moderate level of self management, for remaining 5% self management was at poor level and no study participants were found with adequate level of self management which stresses the need for an intervention to improve self management.

Table 2: Diabetes knowledge with regard to different domains n = 180

Diabetes knowledge	Minimum	Maximum	Max. possible score	Mean	Std. deviation	Median	Std. error
Diabetes in general	0	5	5	2.25	1.133	2	0.119
Diet	0	4	4	1.61	0.899	2	0.094
Physical activity	0	2	2	0.81	0.644	1	0.067
Management	1	8	9	3.81	1.505	4	0.158
Over all diabetes knowledge	2	13	20	8.48	2.089	8.5	0.217

Knowledge among people with type 2 diabetes was assessed in 4 different domains. Mean and standard deviation of diabetes in general is 2.25 ± 1.133, diet is 1.61 ± .899, physical activity is 81 ± .644, diabetes management is 3.81 ± 1.505 and overall knowledge is 8.48 ± 2.089. Knowledge about diabetes and its management among people with type 2 diabetes is found to be moderate among 85% of the study participants, 15% found to be inadequate and no study participant had adequate knowledge regarding diabetes and its management which calls for an intervention.

Association between self management, diabetes knowledge and selected variables: Significant association was found between self management and regular check up (P=.001) and information about diabetes (P=.029). No association was found with items like age, gender, religion, dietary habit, education, family monthly income, occupation and clinical items like duration of illness, onset, BMI and HbA1c.

Significant association was found between knowledge and gender (P=.017) and family monthly income (P=.024). No association was found with items like age, religion, education, occupation, dietary habit and clinical items like onset, duration of illness, regular check up, HbA1c and BMI.

Discussion

A study conducted by Kueh Y H, 2015 shown diabetes knowledge and self-management essential aspects in maintaining quality of life of people with type 2 diabetes[8].

In present study association was found between knowledge and gender and family monthly income. Similar results were seen in study conducted by Jackson IL, 2014 which revealed association between Self-care knowledge and duration of diabetes, educational level and income[17]. This study revealed that 15% had poor level of knowledge regarding diabetes and its management. Diabetes knowledge was at poor level among people with diabetes and in general population, which calls for immediate educational interventions specially focused on risk factors[18, 19]. Education programmes may be effective in addressing critical gaps in patients knowledge[20]. Contribution of educational intervention was evident in enhancing the quality of life people with type 2 diabetes and their family[21].

Patients' knowledge and practice are the key factors which influence self-care behavior; hence there is a need in developing countries for effective diabetes education[14] and self-management programmes on regular basis[7]. A study conducted by Kumpatla S, 2010 revealed that HbA1c awareness had a positive impact on controlling blood glucose level[22] and better self-management behavior was evident[23]. Better self-efficacy was observed among those who had higher knowledge, attitude, and perception scores and it is resulted in better self care behavior[24].

Conclusion

This study revealed about the level of diabetes knowledge and self management among people with type 2 diabetes with respect to various domains. Understanding knowledge and practice becomes

essential in effective management of diabetes. Strategies to enhance knowledge regarding diabetes and its management and translation of that knowledge into practice specifically self management skills will empower people with type 2 diabetes to lead a good quality of life.

Conflicts of Interest: Nil

Source of Funding: Nil

REFERENCE

1. King H, Aubert RE, Herman WH. Global burden of diabetes 1995–2025: Prevalence, numerical estimates and projections. Diabetes Care, 1998, 21:1414–31.
2. International Diabetes Federation. IDF Diabetes Atlas, 7th ed. Brussels, Belgium: International Diabetes Federation, 2015.
3. International Diabetes Federation. IDF Diabetes Atlas, 6th ed. Brussels, Belgium: International Diabetes Federation, 2013.
4. Gen L, Mehta SR. Diabetes Mellitus in India : The Modern Scourge. Med J Armed Forces India [Internet]. 65(1):50–4.
5. Atak N, Gurkan T, Science E, Kose K. The effect of education on knowledge, self management behaviours and self efficacy of patients with type 2 diabetes. 26(2):66–75.
6. Bodenheimer T. Patient self-management of chronic disease in primary care. Journal of the American Medical Association, 2002, 288(19), 2469–75.
7. Wu SV, Liang S, Wang T, Chen M, Jian Y. A self-management intervention to improve quality of life and psychosocial impact for people with type 2 diabetes. 2011;2655–65.
8. Kueh YC, Morris T, Borkoles E, Shee H. Modelling of diabetes knowledge, attitudes, self-management, and quality of life : a cross-sectional study with an Australian sample. Health Qual Life Outcomes [Internet]. 2015;1–11.
9. Clarke A. Effects of routine education on people newly diagnosed with type 2 diabetes. 2009;6(3):88–94.
10. Shah VN, Kamdar PK, Shah N. Assessing the knowledge, attitudes and practice of type 2 diabetes among patients of Saurashtra region, Gujarat. 2017;29(3):118–22.
11. Karakurt P, Kaşıkçı MK. The effect of education given to patients with type 2 diabetes mellitus on self-care. Int J Nurs Pract [Internet]. 2012;18(2):170–9.
12. Moriyama M, Nakano M, Kuroe Y, Nin K, Niitani M, Nakaya T. Efficacy of a self-management education program for people with type 2 diabetes: Results of a 12 month trial. Japan J Nurs Sci. 2009;6(1):51–63.
13. Omar MS, San KLAI. Innovare Academic Sciences Diabetes knowledge and medication adherence among geriatric patient with type 2 diabetes mellitus. 2014;6(3):4–7.
14. Ghannadi S, Amouzegar A, Amiri P, Karbalaeifar R, Tahmasebinejad Z, Kazempour-ardebili S. Evaluating the Effect of Knowledge, Attitude, and Practice on Self-Management in Type 2 Diabetic Patients on Dialysis. 2016;2016.
15. Wu SFV, Liang SY, Lee MC, Yu NC, Kao MJ. The efficacy of a self-management programme for people with diabetes, after a special training programme for healthcare workers in Taiwan: A quasi-experimental design. J Clin Nurs. 2014;23(17-18):2515–24.
16. Schmitt A, Gahr A, Hermanns N, Kulzer B, Huber J, Haak T. The Diabetes Self-Management Questionnaire (DSMQ): development and evaluation of an instrument to assess diabetes self-care activities associated with glycaemic control. Health Qual Life Outcomes [Internet]. 2013; 11(1):1.
17. Jackson IL, Adibe MO, Okonta MJ, Ukwe C V. Knowledge of self-care among type 2 diabetes patients in two states of Nigeria. 2014;12(3):1–10.
18. Binh T, Phuong P, Nhung B. Knowledge and associated factors towards type 2 diabetes among a rural population in the Red River Delta region, Vietnam. Rural and Remote Health. 2015; 15: 3275.
19. Shrestha N, Sb Y, Am J, Bdp P, Shrestha J, Dl B. Diabetes Knowledge and Associated Factors among Diabetes Patients in Central Nepal. 7(5):82–91.

20. Perera DP, Silva REE De, Perera WLSP. Knowledge of diabetes among type 2 diabetes patients attending a primary health care clinic in Sri Lanka. 2013;19(7).

21. Magurová D, Majerníková Ľ, Hloch S, Tozan H, Goztepe K. Knowledge of diabetes in patients with type 2 diabetes on insulin therapy from eastern slovakia. 2012;95–102.

22. Kumpatla S, Medempudi S, Manoharan D, Viswanathan V. Knowledge and Outcome Measure of HbA1c Testing in Asian Indian Patients with Type 2 Diabetes from a Tertiary Care Center. 2010;35(2):290–3.

23. Yang S, Kong W, Hsue C, Fish AF, Chen Y. Knowledge of A1c Predicts Diabetes Self-Management and A1c Level among Chinese Patients with Type 2 Diabetes. 2016;1–10.

24. Ku GM V, Kegels G. Knowledge, attitudes and perceptions of people with type 2 diabetes as related to self-management practices : Results of a cross-sectional study conducted in Luzon, Philippines. 2015;

Anti-Inflammatory Activity of Silver Nanoparticles Prepared From Ginger Oil—An Invitro Approach

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ABSTRACT

Background: Ginger(zingiber officinale) is a widely used spice in cooking and is a medical herb in traditional herbal medicine. Ginger is herb which is widely used for treating inflammatory conditions and their associated pain. The utilisation of various plant products for the synthesis of metallic nanoparticles is called green nanotechnology. It is safe and does not utilise any harmful chemical protocols.

Aim: To evaluate the antiinflammatory potential of ginger oil mediated silver nanoparticle.

Materials and Method: The Silver nanoparticles were synthesised using ginger oil and was confirmed by UV- visible spectroscopy. The synthesised silver nanoparticles were evaluated for its antiinflammatory activity by studying the inhibitory effect on albumin denaturation assay.

Result: The present study showed the production of silver nanoparticles at 460nm and was with very good anti inflammatory activity.

Conclusion: Biosynthesis of nanoparticles using ginger oil was eco friendly, reliable and suitable. So may be used for large scale production. It was easy to handle and rapid.

Keywords: *nanoparticles, nanotechnology, zingiber officinale, ginger oil*

Introduction

Nanotechnology is likely to prominently manipulate science, economy and day to day life in this twenty first century and their potential effects are used widespread in both *in vivo* and *in vitro* biomedical applications[(1)]. Nanotechnology is mainly concerned with the synthesis of nanoparticles of variables size, shape, chemical compositions and controlled dispersing for their potential use for human benefits[(2)]. Nano sized particles are basically small objects that act as a whole unit in accordance with their transport and properties[(3)]. As specific surface area of nanoparticles are increased, their biological effectiveness are also increased with increase in surface area[(4)]. The unique feature of nanoparticles may play a crucial role in biomedicine, energy science, optics and other health care sector[(1)]. Although chemical and physical methods may successfully produce pure, well defined nanoparticles, these methods are quite expensive and potentially dangerous to the environment[(2)].

Nanosilver has many important applications. It is used as anti microbial agent; it is applied in textiles, home water, purification systems, medical devices, cosmetics, electronics and household appliances [(5,6,7)]. Silver has been recognised as having an inhibitory effect towards many bacterial strains and microorganisms commonly present in medicinal and industrial processes. The most widely used and known applications of silver and silver nanoparticles are in the medical industry. These include topical ointments and creams containing silver to prevent infections of burns and open wounds[(8)]. Besides their anti microbial features, silver nanoparticles exhibit

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strong optical features making the nanoparticles suitable for biological sensing and imaging. Silver nanoparticles are also used as catalyst in several chemical reactions.[9]

Nanobiotecnology is a promising field especially for biodiversity rich countrified like India. Biological diversity can thus be used as a major resource for biotechnological products and processes, which may be suitable for large scale synthesis. In recent years, plant mediated biological synthesis of nanoparticles is gaining importance due to its simplicity and eco friendliness. Ginger, the rhizome of *Zingiber officinalis* Roscoe, is one of the most widely used spices and a traditional remedy in Indian, Chinese, and oriental medicine against pain, inflammation and gastrointestinal disorders(10). Ginger is used to treat many inflammatory conditions and associated pain(11). The essential oil of ginger has been found to possess antibacterial, antiviral and antifungal properties. In modern usage, particular attention has focused on cyclooxygenase-inhibiting effects of gingerols, phenolic compounds that are responsible for gingers pungent taste, and their potential use in treating inflammatory disorders such as arthritis(12). In this study, ginger oil mediated silver nanoparticles were prepared and further evaluated for its anti-inflammatory activity.

Materials and Method

Preparation of ginger oil: 1 milli molar of silver nitrate solution was prepare by dissolving it in double distilled water. 90 mL of this was mixed with 10 mL of the ginger oil suspension. The solution was kept in magnetic stirrer/orbital shaker for the formation of nanoparticles synthesis for 24 hours. The colour change was observed visually and photographs were taken.

Preparation of nanoparticles: The nanoparticle solution was centrifuged using Lark refrigerator centrifuge at 8000 rpm for 10 minutes and the pellets were collected and washed with distilled water. The final purified pellets were collected and dried at 60 degree Celsius for 2 hours. The powder was finally stored in air tight Ependorff tube.

UV–Vis analysis of Ginger oil mediated silver nanoparticles: The synthesized ginger oil mediated silver nanoparticles was initially confirmed by UV visible spectroscopy. 3 ml of the solution was taken in a cuvette and scanned in double beam UV visible Spectrophotometer from 300nm to 700nm wavelength. The results were recorded for the graphical analysis.

Inhibition of albumin denaturation assay: 2ml of 1% bovine albumin fraction was mixed with 400 µL of plant extract in different concentration(50-150 µL) and the pH of reaction mixture was adjusted to 6.8 using in 1N HCl. The reaction was incubated at room temperature for 20 minutes and then heated at 55 degrees for 20 minutes in a water bath. The mixture was cooled to room temperature and the absorbance value was recorded at 600nm. An equal amount of plant extract was replaced with DMSO for control. Diclofenac sodium in different concentrations was used as standard. The experiment was carried out in triplicate to avoid manual error.

% inhibition was calculated using the following formula:

$$\% \text{ inhibition} = \frac{\text{Control O.D.} - \text{Sample O.D.}}{\text{Control O.D.}} \times 100$$

Result and Discussion

Medicinal plants are the major source of therapeutic agents to cure human diseases. They are widely used in traditional medicine to cure different diseases due to their worldwide availability and fewer side effects. The herbal medicines occupy the distinct position right from the primitive period to present day.. India has a wealth of medicinal plants and most of which have been traditionally used in Ayruveda, Unani systems of medicine, and by tribal healers for generations.

In medicines, silver and silver nanoparticles have many applications including skin ointments and creams containing silver to prevent infection of burns and open wounds. Ginger is widely used as spice in cooking and as a medicinal herb in traditional herbal medicine(13). The oil of ginger is a mixture of constituents, consisting of monoterpenes and sesquiterpenes. Alcohols and aldehydes are also present(14).

In the last decade, biosynthesis of nanoparticles has received increasing attention due to a growing need to develop environment friendly technologies in material synthesis(15). Nanotechnology is becoming increasingly important in the food and health sectors(16). Biosynthesis of AgNPs using plant sources offers several advantages such as cost-effectiveness, eco-friendliness, and the elimination of high pressure, energy, temperature, and toxic chemicals necessary in the traditional synthesis methods. Among the various inorganic metal nanoparticles, AgNPs have received substantial attention

as preservatives, effective antimicrobial and anticancer agents, and biomedical sensors and detectors that exhibit low toxicity for *in vitro* and *in vivo* applications[17,18].

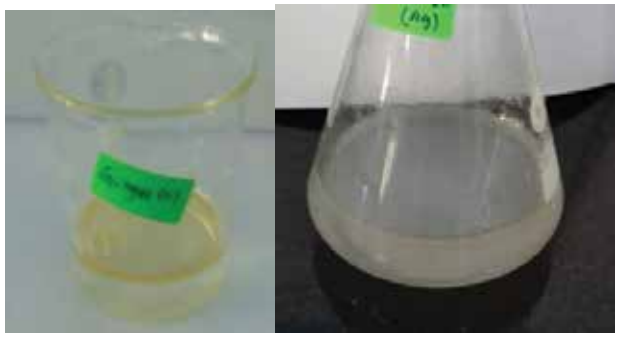


Figure 1: Ginger oil extraction (right) and formation of silver nanoparticles which is identified by the change of colour(left)

It is well known that silver nanoparticles exhibit yellowish- brown colour in aqueous solution due to excitation of surface plasmon vibrations in silver nanoparticles. Reduction of the silver ion to silver nanoparticles during the exposure of the plant extract could be followed by colour change. The reduction process from silver nitrate to silver ions was observed by direct visual observation of the solution. The conversion of pale yellow to dark brown clearly indicated the silver nano particle production.

UV spectroscopy:

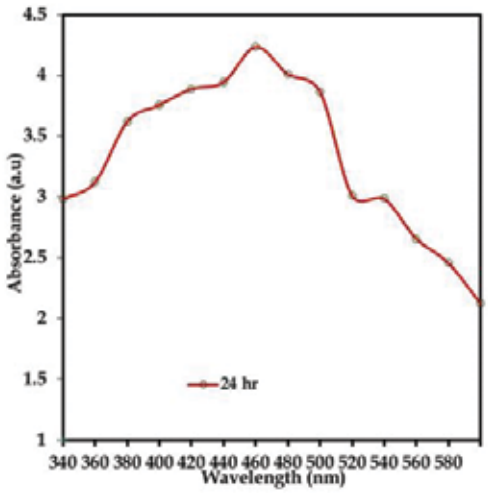


Figure 2: UV spectroscopy from the extract which shows the production of silver nanoparticles after various periods of time

The uv- visible analysis of the silver nanoparticles were analysed in the absorbence range of 340nm to 540nm. The peak was found to be maximum at 450nm. Reduction of aqueous metal ions with the ginger oil indicates the formation and synthesis of the silver nanoparticles.

Antiinflammatory activity: The anti-inflammatory activity of the ginger extract was measured by the inhibition of albumin denaturation assay. Inflammation is the reaction of living tissues to stimuli evoked by inflammatory agents such as physical injuries, heat, microbial infections, and noxious chemical irritations. The response of cells toward inflammation will lead to certain pathological manifestations characterized by redness, heat, swelling, and pain with even impaired physiological functions. Inflammation has been implicated in the pathogenesis of many diseases including arthritis, stroke, and cancer[19].Protein denaturation has been well correlated with the occurrence of the inflammatory response and leads various inflammatory diseases including arthritis[20]. The ability of the material to inhibit the denaturation of proteins signifies the potential for antiinflammatory activity. The synthesised nanoparticles showed maximum anti inflammatory activity with 90% of inhibition at a concentration of 60. The extract showed a greater % of inhibition when compared to the standard diclofenac used in the study.

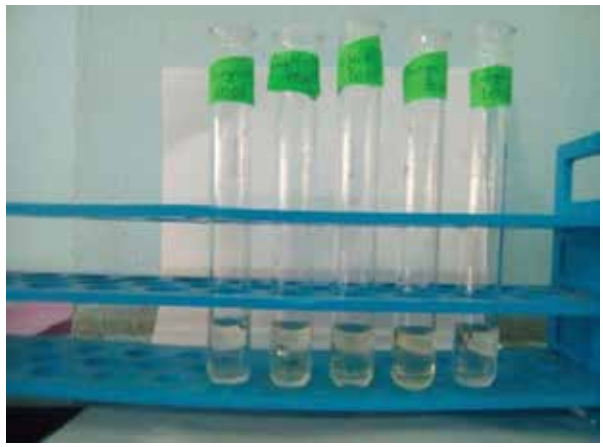


Figure 3: silver nanoparticles of ginger extract in various concentration for anti inflammatory activity

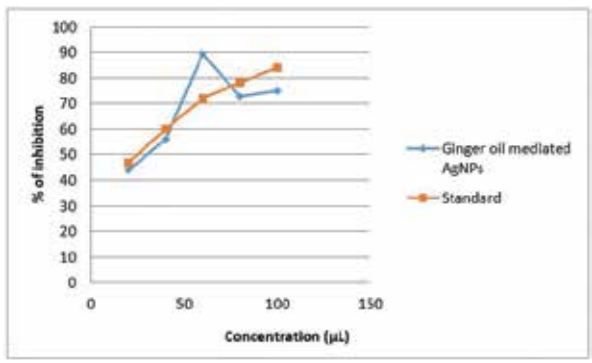


Figure 4: anti inflammatory activity of silver nanoparticles

BAS (Bovine Serum albumin) was used as a reagent for the assay. Bovine serum albumin (BAS) makes up approximately 60% to all proteins in animal serum. It

is commonly used in cell cultures, particularly when protein supplementation is necessary and the components of serum are unwanted. BAS undergoes denaturation upon heating and starts expressing antigens associated with type III hypersensitivity reaction which are related to disease such rheumatoid arthritis, glomerulonephritis, serum sickness and systemic lupus erythematosus.

The most commonly used drugs for inflammation include ibuprofen and diclofenac sodium which belong to NSAID group of drugs. Though these drugs have shown good prognosis, they are routinely associated with adverse effects in the gastro intestinal tract leading to the formation of gastric ulcer and may also cause cardiovascular problems as well. Ginger oil can be used as a natural home remedy as it is readily available and is economic. According to the research silver particles produced from ginger oil showed good antiinflammatory activity and thus can be considered as a potential candidate as an antiinflammatory agent. Thus reducing the risk of gastric ulcers and many other health problems.

Conclusion

The silver nanoparticles were synthesised from the plant *Zingiber officinale* Roscoe. The study proved that sliver nanoparticles produced from ginger oil had potent anti inflammatory property. The present study emphasises the use of plants for the medicinal purposes. Further investigations are required for the development of new classes of analgesics and anti- inflammatory drugs from ginger oil mediated silver nanoparticles.

Acknowledgement

The authors thank Synthite Industries, Kerala for providing the ginger oil to carry out this research project.

Conflict of Interest: Nil

Ethical Clearance: Not required as it is an *in vitro* study.

Source of Funding: Self

REFERENCES

1. Mahendran Vanaja, Guruswamy Annadurai,Coleus aromatics leaf extract mediated synthesis of silver nanoparticles and its bactericidal activity,ApplNanosci 25 2012;9(3):243-246.
2. Ek. Elumalai, T.N.V.K.V. Prasad,Extracellilae synthesis of silver nanoparticles using leaves of Euphoria Hirta and their antibacterial activities, J. Hemachandaran, S. Viviyan Theresa, T.Thirumali, E David, J. Pharm. Sci. Vol 2. (9), 2010, 549-554.
3. Krishna, R Nilesh; Gayathri R, Priya Vishnu, Nano particles and their Applications- A review, journal of pharmaceutical sciences and research, 2017, 9(1):24-27.
4. Jaw Yong song et all,Rapid biological synthesis of silver nanoparticles using leaf plant extracts Bioprocess,BiosystEng(2009) 32:79-84
5. Rajeshkumar S and Bharath L V Mechanism of plant-mediated synthesis of silver nanoparticles - A review on biomolecules involved, characterisation and antibacterial activityChemico-Biological Interactions 273 (2017) 219-227. http://dx.doi.org/10.1016/j.cbi.2017.06.019.
6. Santhoshkumar J, Venkat Kumar S Rajeshkumar S, Phyto-assisted synthesis, characterization and applications of gold nanoparticles – A reviewBiochemistry and Biophysics Reports 11 (2017) 46–57. http://dx.doi.org/10.1016/j.bbrep.2017.06.004.
7. Soumya Menon, Shrudhi Devi KS, Santhiya R, Rajeshkumar S, Venkat Kumar S, Selenium nanoparticles: A potent chemotherapeutic agent and an elucidation of its mechanism, Colloids and Surfaces B: Biointerfaceshttps://doi.org/10.1016/j.colsurfb.2018.06.006.
8. Naheed Ahmed, Seema Sharma et all,Rapid synthesis of silver nanoparticles using dried medicinal plant of basil, Biointerfaces 81(2010)81-86.
9. Vijay raj et all, In Vitro anti inflammatory activity of silver nanoparticles synthesised Avicenna marina: a green synthetic approach, int. J of green pharmacy 12(3) s528.
10. Mustafa M.H. Khalil et all, Green synthesis of silver nanoparticles using olive leaf extract and its anti bacterial activity, Arabian Journal of chemistry 2013;58(2):61-74.
11. Jia YL et all., Analgesic and Anti- inflammatory effects of Ginger oil, Chinese Herbal Medicine, 2011,3(2):150-155
12. KottarapatJeena et all,Antioxidant, Anti-inflammatory and Antinociceptive activities

of essential oil from ginger, Indian J physiolPharmacol 2013; 57(1):51-62

13. H.Agarwal,S.Menon,S.V.Kumar,S.Rajeshkumar, Mechanistic study on antibacterial action of zinc oxide nanoparticles synthesized using green route, Chemico-Biological Interactions (2018), doi: 10.1016/j.cbi.2018.03.008.
14. Vijay raj et all, In Vitro anti inflammatory activity of silver nanoparticles synthesised Avicenna marina: a green synthetic approach, int. J of green pharmacy 12(3) s528.
15. Karthikeyan, Haripriya; Priya, V. Vishnu; Gayathri, R., Awarness on use of nanoparticles among medical professionals.Drug Invent. Today 2018;10(10):1906-1909.
16. Manojkanna et all, Synthesis and characterisation if silver nanoparticles from Plectranthudambionicus Extract, Journal of Pharmaceutical Sciences and Research; 2018:9(12);2423-2425.
17. suekawa M et all, Pharmacological Studies On Ginger, J. Pharmacobiody. 1984;7:836-848.
18. Abe S et all, Supression of Neutrophil Recruitment in mice by geranium Essential oil. MediatInflam, 2004;13:21-4.
19. Unruly Izzati Osman et all, In vitro xanthine oxidase and albumin denaturation inhibition assay of Barringtoniaracemosa L. and total phenolic content analysis forpotential anti-inflammatory use in gouty arthritis, J intercultethnopharmocolo gy2016sep-dec; 5(4).
20. S Rajeshkumar (2016) Green synthesis of different sized antimicrobial silver nanoparticles using different parts of plants – A Review International Journal of ChemTech Research 9 (4) 197-208

Comparative Evaluation of Maximum Bite Force and Facial Morphology—A Cross Sectional Study

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ABSTRACT

Purpose: There seems to exist an interaction between craniofacial morphology and bite force. The purpose of the present study was therefore to compare the maximum bite force with various face forms and facial measurements.

Method: A total of 212 samples were included in the study. Bite force was recorded using Flexiforce Sensors. Facial measurements included facial form, height and other measurements. Student t test, ANOVA test and Post hoc turkey test was applied.

Results: The maximum bite force value showed significant increase, with increasing age. A statistically significant negative correlation was found between the maximum bite force to the ratio between lower anterior face height to total anterior face height. Maximum bite force value was recorded for the square face form and the lowest maximum for the tapering face form.

Conclusion: Maximum bite force has significantly positive relationship with transverse facial dimensions, Reduced lower anterior facial height and gonial angle was related to maximum bite force and was significantly higher than subjects with long face.

Keywords: *Bite force, facial form, facial measurements*

Introduction

Understanding masticatory muscle activity and influence of physiological factors on occlusal forces, determining bite force levels, is the emerging new face of dentistry.[1,2]

There exists an interaction between craniofacial morphology and bite force. Several researchers have studied the relation between facial morphology and the strength of the masticatory muscles and its influence on the form of the face.[5] It is concluded that bite force is higher in individuals with normal facial height than the long faced individuals.[6]

There exists to be a relation between bite force and transverse facial dimensions.[9] It is seen that square facial form have higher bite force values as compared to the other facial forms.

Although much effort has been made to analyze interdependencies between bite force and these variables, there still remains a need to more fully understand bite forces in very young children with healthy primary and permanent dentition and appreciate the dynamic interplay of these range of influencing variables.[13] The purpose of this study is therefore to compare the maximum bite force with the demographic details like age and gender and also to study the changes associated with various face forms and facial measurements.

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Material and Method

Study Design: The present study was of cross-sectional analytical type.

Sample Selection: Considering the study power of 80% and statistical significance of 5% with the pilot correlation estimate, a total of 212 samples were included in the study. 110 male and 102 female students participated in this study. The age range of the samples comprised of two groups, 5-6 years and 8-10 years. All participants and their parents received written explanation of the research purposes and were informed before the start of the study.

Inclusion Criteria

1. Parents of children who have given consent for the study.
2. Children with healthy teeth present in the maxillary/mandibular deciduous first molar or first premolar region.

Exclusion Criteria

Children with following were excluded from the study

1. Acute symptoms such as pain for any reason in the oral cavity.
2. Malocclusion.
3. Temporomandibular disorder.
4. Any kind of disability

Recording the Bite force: The device used to measure the bite force consists of adapter board, a Phidget interface kit 8/8/8 board and a Sensor (FlexiForce, Tekscan, Inc, USA). (Fig 1)

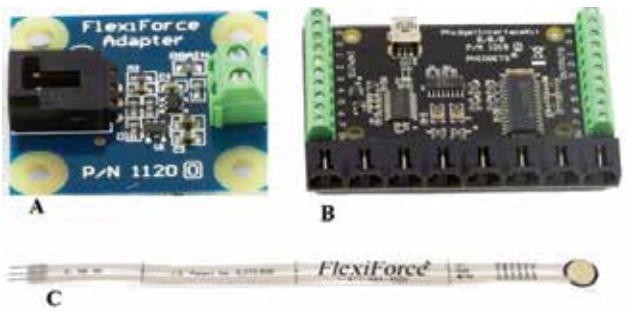


Fig 1: The device used to measure the bite force consists of A) Adapter board, B) Phidget interface kit 8/8/8 board and C) A Sensor

To measure the maximum bite force, the calibrated device was positioned across the arches, corresponding to the maxillary/mandibular first molar or premolar region (Fig 2). Each subject was then instructed to bite in centric occlusion as hard as possible, three times in succession, resting 2-5 seconds, between each bite. The largest value was selected as the maximum bite force value.



Fig. 2: Device in between the teeth

Recording the facial measurements: Standardized frontal photographs were taken. Face forms were defined as square, square-tapering, tapering and ovoid. For standardization, each subject was seated in a chair, so that the spine is erect and the head centered over the vertebral column.

For facial measurement, standardized lateral photographs were taken. Each subject was photographed in profile with the right side of the face towards the investigator. Before the photo was taken, the following landmarks were identified by palpation, and adhesive dots were placed on the subject's face. Landmarks included, Soft Tissue Nasion, Tragion, Menton, Gnathion, Soft Tissue A Point and Gonion. (Fig3)

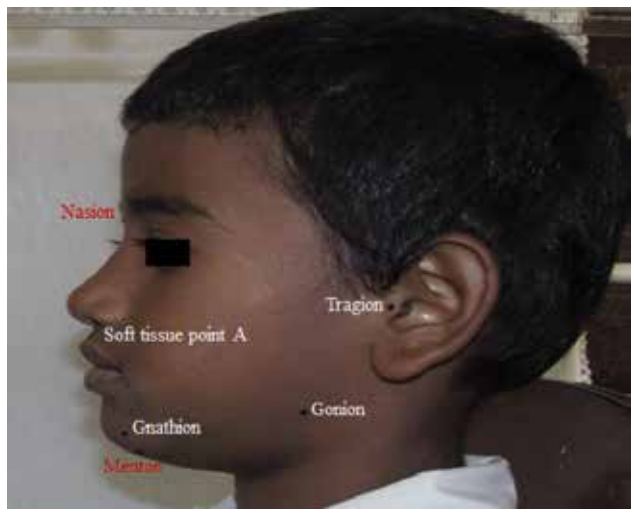


Fig. 3: Soft tissue landmarks

For photographic analysis, indigenous and tested software was used to correct the magnification differences among photographs. This software measured the distance between the two points, by taking into account, the magnification occurring between the camera and the subject.

Facial Measurements: From the photographs, the following was measured.

- Nasion-Menton, for total anterior facial height
- Soft tissue Point A-Menton, for lower anterior facial height
- Angle between lines from Tragion-Gonion and
- Gonion-Gnathion, for gonial angle.

Statistical Analysis

Data analysis was carried out using SPSS version 16.0. The level of significance was kept at $p<0.05$. The analysis of the association between maximum bite force recorded on the left and right side and the demographic details, facial measurements was done using Student t test. ANOVA test was used in analyzing the different facial morphology and their association with the maximum bite force. Post hoc turkey test was then applied to get a detailed relationship.

Results

The maximum bite force on the left side was found to be slightly more than the right side in both the age groups. Gonial angle and Ratio between the lower anterior facial height to total anterior face height was more in the 5-6 year age group. The maximum bite force was more in boys in both the groups. The Ratio between the lower anterior facial height to total anterior face height and the gonial angle was also more in boys. Student t test, ANOVA and Post hoc turkey test was applied to the data. The t' test revealed that for both males and females, the maximum bite force value showed significant increase, with increasing age. This relationship was statistically significant for both right and left side ($p < 0.05$).

Association between gender and maximum bite force in 5-6 years revealed that the maximum bite force value on the right side was significantly higher ($p < 0.05$) for males than females. However, this relationship was not significant on the left side.

The values for ratio and gonial angle were stratified according to age and gender. A statistically significant negative correlation was found between the maximum bite force to the ratio between lower anterior face height to total anterior face height. This signifies that as the ratio decreases, the bite force is seen to increases (Table 1). Thus, in subjects with lesser value of lower anterior face height, depicting a short face, the value of mean maximum bite force was significantly higher than subjects presenting with long face.

Table 1: Correlation between maximum bite force value to the facial measurements

Group	Gender	Bite force	Ratio	Gonial angle
Age group (5-6)	Male	Left maximum	-.416*	-.025
		Right maximum	-.605*	-.050
	Female	Left maximum	-.761*	-.199
		Right maximum	-.749*	-.227
Age group (8-10)	Male	Left maximum	-.724*	-.210
		Right maximum	-.725*	-.211
	Female	Left maximum	-.651*	-.163
		Right maximum	-.628*	-.112

*p value <0.005

On analyzing the face form data, it showed that the highest maximum bite force value was recorded for the square face form and the lowest maximum for the tapering face form.

ANOVA test was then applied to the data to find the association between these groups. ANOVA test showed a statistically significant relationship between the face forms and the recorded maximum bite force values, for both right and left side.(Table 2)

Table 2: ANOVA test results

		Sum of squares	Df	Mean Square	F	Sig.
Left maximum	Between Groups	218606.172	3	72868.724	6.545	.000
	Within Groups	2315888.672	208	11134.080		
	Total	2534494.844	211			
Right maximum	Between Groups	210367.864	3	70122.621	6.268	.000
	Within Groups	2327078.607	208	11187.878		
	Total	2537446.470	211			

Post Hoc Tukey test was then applied to find the detailed relationship. The results of both right and left side showed that the maximum bite force value was significantly higher for square face form followed by square-tapering, tapering but not associated with the ovoid face form. (Table 3)

Table 3: Post Hoc Tukey test

Dependent variable	Face form (I)	Face form (J)	Mean difference (I-J)	Std. Error	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Left maximum	Square	Square-tapering	62.51	2.12	.019	7.57	117.51
		Tapering	98.81	2.26	.000	40.24	157.38
		Ovoid	44.82	3.15	.487	-36.76	126.40
	Square-tapering	Tapering	36.30	1.69	.144	-7.62	80.22
		Ovoid	-17.69	2.77	.920	-89.49	54.10
	Tapering	Ovoid	-53.99	2.87	.242	-128.55	20.57
Right maximum	Square	Square-tapering	62.43	2.12	.019	7.30	117.57
		Tapering	96.92	2.26	.000	38.21	155.62
		Ovoid	44.04	3.15	.504	-37.73	125.83
	Square-tapering	Tapering	34.48	1.69	.181	-9.54	78.50
		Ovoid	-18.38	2.77	.911	-90.36	53.58
	Tapering	Ovoid	-52.87	2.88	.261	-127.61	21.87

Discussion

Age group 5-6 depicts the end of primary dentition and 8-10 mixed dentition, since by 11 years of age, most of the permanent teeth are seen to erupt in the oral cavity.

In the present study, bite force value showed significant gender variation in lower age group with values being higher in boys. However, this can be attributed as a chance finding, since studies done in the past related to gender association, give a wide range of conclusions. According to Braun et al, [12] the gender association becomes significant only during the postpubertal period. Girls are seen to be as strong as boys until puberty. The increase in muscle mass produced by androgenic steroids creates the difference in male and female physiques following puberty.

Another variable considered in the comparison includes the face form and facial measurements. In the present study, higher value of bite force was recorded in children having square face form, and those showing a lesser value of lower anterior face height, depicting a short face. It appears that, for some reason, the children with long-facial pattern stop gaining strength in the elevator muscles of the mandible, while children with normal facial proportions develop considerably more strength as they mature and this may be the reason for children with square face form and short lower anterior facial height having higher bite force.[14] Skeletal growth to a considerable extent is influenced by muscular growth and the parts of bones to which muscles are attached develop in conjunction with the muscle. Ingervall and Helkimo[15] in their study found that higher bite forces correlated with a smaller cranial base flexure, a deeper upper face, a smaller anterior and a larger posterior face height, and a less divergent, broader face. Also, Proffit et al [14] found a similar kind of relationship between bite force magnitude and vertical facial morphology, in 1983.

In the present study, no significant relationship was found between the bite force value and gonial angle measurements. Epker et al [17] has proposed that biomechanical factors can influence both direction and magnitude of growth. In his theoretical formulation, decreased occlusal forces are given an important role in the genesis of the long-face condition. The fact that the long-face condition can be recognized prior to an age at which decreased occlusal forces are present strongly suggests that the decreased forces are an effect of the condition, not a cause.

Conclusion

Based on the inferences drawn from the present study, it can be concluded that maximum bite force value in children is dependent on the age, gender, face form and the various facial measurements. The bite force value tend to increase with age and was significantly more in males than in females, for both the age groups. Facial photographs measurements were reliable in characterizing the facial morphology, in terms of both linear and angular measurements. It was also found that maximum bite force has significantly positive relationship with transverse facial dimensions, with it being maximum for square facial form and minimum for tapering. In subjects with lesser value of lower anterior face height as well as gonial angle, depicting a short face, the value of mean maximum bite force was significantly higher than subjects presenting with long face.

Ethical Clearance: Taken from Institutional Ethics Committee, Manipal College of Dental Sciences, Mangalore

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Bonjardim LR, Gaviao MB, Pereira LJ, Castelo PM. Bite force determination in adolescents with and without temporomandibular dysfunction. J Oral Rehabil 2005; 32: 577–83.
2. Shiau YY, Peng CC, Wen SC, Lin LD, Wang JS, Lou KL. The effects of masseter muscle pain on biting performance. J Oral Rehabil. 2003; 30:978–84.
3. Sonnesen L, Bakke M, Solow B. Bite force in preorthodontic children with unilateral crossbite. Eur J Orthod. 2001; 23: 741–9.
4. Yawaka Y, Hironaka S, Akiyama A, Matzuduka I, Takasaki C, Oguchi H. Changes in occlusal contact area and average bite pressure during treatment of anterior crossbite in primary dentition. J Clin Pediatr Dent 2003; 28: 75–9.
5. Singh S, Sandhu N, Kashyap R. A Study of Bite Force and Various Variables in Children Segregated by Angle's Classification. Int J Clin Pediatr Dent. 2012 May; 5(2): 118-23.
6. Proffit WR, Fields HW, Nixon WL. Occlusal forces in normal and long face adults. J Dent Res 1983; 62:566–71.
7. Fields HW, Proffit WR, Nixon WL, Phillips C, Stanek E. Facial pattern differences in long-faced children and adults. Am J Orthod. 1984; 85: 217 – 23.
8. Opdebeeck H, Bell WH. The short face syndrome. Am J Orthod. 1978; 73: 499 – 511.
9. Raadsheer MC, van Eijden TMGJ, van Ginkel FC, Prahl-Andersen B. Contribution of jaw muscle size and craniofacial morphology to human occlusal force magnitude. J Dent Res 1999; 78:31–42.
10. Bonakdarchian M, Askari N, Askari M. Effect of face form on maximal molar bite force with natural dentition. Arch Oral Biol. 2009 Mar; 54(3):201-4.
11. Hellsing E, Hagberg C. Changes in maximum bite force related to extension of the head. Eur J Orthod. 1990; 12: 148–53.
12. Braun S, Hnat WP, Freudenthaler JW, Marcotte MR, Honigle K, Johnson BE. A study of maximum bite force during growth and development. Angle Orthod. 1996; 66: 261.
13. Mountain G, Wood D, Toumba J. Bite force measurement in children with primary dentition. Int J Paediatr Dent. 2011 Mar;21(2):112-8.
14. Proffit WR, Fields HW. Occlusal forces in normal- and long-face children. J Dent Res. 1983; 62:571-4.
15. Ingervall B, Helkimo E. Masticatory muscle force and facial morphology in man. Arch Oral Biol. 1978; 23:203-6.
16. Throckmorton G, Finn R., Bell W.H. Biomechanics of Differences in Lower Face Height. Am J Orthod. 1988; 77:410-20.
17. Epker BN, Schendel SA, Washburn M. Effects of Early Surgical Superior Repositioning of the Maxilla on Subsequent Growth: III. Biomechanical Consideration. In: The Effect of Surgical Intervention on Craniofacial Growth, McNamara, J.A., Carlson, D.S., and Ribbens, K., Eds., Ann Arbor, MI: Univ. of Michigan Center for Human Growth and Development, 1982: 231-50.
18. English JD, Buschang PH, Throckmorton GS. Does malocclusion affect masticatory performance? Angle Orthodontist. 2002; 72: 21–7.

19. Wenzel A, Henriksen J, Melsen B. Nasal respiratory resistance and head posture: effect of intranasal corticosteroid (Budesonide) in children with asthma and perennial rhinitis. Am J Orthod. 1983; 84: 422–6.

20. Solow B, Skov S, Ovesen J, Norup P W, Wildschiodtz G. Airway dimensions and head posture in obstructive sleep apnoea. Eur J Orthod. 1996; 18: 571–9.

21. Solow B, Siersbaek-Nielsen S. Cervical and craniofacial posture as predictors of craniofacial growth. Am J Orthod Dentofacial Orthop. 1992; 101: 449–58.

22. Sonnesen L, Bakke M, Solow B. Temporomandibular disorders in relation to craniofacial dimensions, head posture and bite force in children selected for orthodontic treatment. Eur J Orthod. 2001; 23: 179–92.

23. Kovero O, Hurmerinta K, Zepa I, Huggare J, Nissinen M, Könönen M. Maximal bite force and its associations with spinal posture and craniofacial morphology in young adults. Acta Odontol Scand. 2002; 60: 365–9.

24. Lindauer SJ, Gay T, Rendell J. Effect of jaw opening on masticatory muscle, EMG force characteristics. J Dent Res. 1993; 72:51-5.

25. Allen D, Rebellato J, Sheats R, Ceron AM. Skeletal and dental contributions to posterior crossbites. Angle Orthod. 2003; 73(5):515-24.

26. Oueis H, Ono Y, Takagi Y. Prediction of mandibular growth in Japanese children age 4 to 9 years. Pediatr Dent. 2002; 24(3):264-8.

27. Katz CRT, Rosenblatt A, Gondim PPC. Nonnutritive sucking habits in Brazilian children: effects on deciduous dentition and relationship with facial morphology. Am J Orthod Dentofacial Orthop, 2004; 126(l):53-7.

28. Lyle KC. Airway compromise and dentofacial abnormalities. J Gen Orthod. 2000; 11(4):9-18.

29. Saitoh I, Hayasaki H, Iwase Y, Nakata M. Improvement in jaw motion following treatment of unilateral crossbite in a child with primary dentition: a case report. J Craniomandib Pract. 2002; 20(2):129-34.

30. Sonnesen L, Bakke M. Molar bite force in relation to occlusion, craniofacial dimensions, and head posture in pre-orthodontic children. Eur J Orthod. 2005 Feb; 27(1):58-63.

31. Kiliandis S, Katsaros C, Raadsheer MC, Mabbouhi PH. Bilateral masseter muscle thickness in growing individuals with unilateral crossbites. J Dent Res. 2000; 79:497.

32. Pinto AS, Buscbang PH, Throckmorton GS, Chen P. Morphological and positional asymmetries of young children with functional unilateral posterior crossbite. Am J Orthod Dentofacial Orthop. 2001 Nov; 120(5):513-20.

Comparative Evaluation of Tensile Bond Strength and Shear Bond Strength of Mineral Trioxide Aggregate with Composite Resin and Resin Modified Glass Ionomer

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ABSTRACT

Background: In a vital pulp therapy such as direct pulp capping or pulpotomy, MTA is directly placed over the pulp followed by the restoration with resin modified glass ionomer cement or composite material. An important factor determining the clinical success of such restorations is the bond between MTA and restorative material. Therefore, the aim of the present study was to evaluate and compare the bond strength of MTA with Glass Ionomer and Composite resin interface.

Material and Method: The sample size was calculated as 11 in each group. Tensile and shear bond strength was measured between MTA- Glass Ionomer and MTA- Composite material. Percentage of bond failure for each group was obtained. Average and standard deviations were calculated and the data was analyzed by independent't' test. The level of significance was set at 0.05.

Results: Out of the total 44 samples, 29 samples showed cohesive failures. Maximum numbers of failures, i.e. 17 were in tensile bond strength group which included 8 in RMGIC group and 9 in Composite resin group. Of the 12 failures in shear bond strength, 5 were in RMGIC group and 7 in composite resin group. There was no statistically significant difference between the shear bond strength of RMGIC and Composite with MTA ($p = 0.39$) at confidence interval of 95%. No statistically significant difference was observed between the tensile bond strength of RMGIC and Composite samples with MTA ($p = 0.41$) at confidence interval of 95%.

Conclusion: There was no difference in the bond strengths attained between Resin modified Glass ionomers and Resin Composites with Mineral trioxide Aggregate

Keywords: *Mineral Trioxide Aggregate, Glass Ionomer, Composite Resin, Bond strength*

Introduction

The clinical success of any vital pulp capping procedures is directly related to the control of pathogenic agent[2]. In a vital pulp therapy such as direct pulp capping or pulpotomy, MTA is directly placed over the pulp followed by the restoration with resin modified glass ionomer cement or composite material.

MTA has a multifaceted range of applicability in paediatric dentistry due to its superior biocompatibility and sealing ability and less cytotoxicity than other materials currently used for the same purpose[1]. Composite and RMGIC are the material of choice for restorations in pulp treated teeth, due to its high compressive strength, adhesion to dentine, biocompatibility, good sealing ability and handling characteristics. An important factor determining the clinical success of such restorations is

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an adhesive system that provides durable bonding of these materials to dentin and the pulp therapeutic agent. [3]

Previous studies comparing the bond strengths between MTA and GIC or composites under two different kind of loading forces have yielded varying results[4].

Therefore, the aim of the present study was to evaluate and compare the bond strength of MTA with Glass Ionomer and Composite resin interface. The null hypothesis was that there is no difference in the bond strength between both Resin modified glass ionomer and Composite resin with MTA.

Material and Method

The present study was an experimental in vitro study conducted after obtaining ethical clearance from the Institutional Ethics Committee.

Sample size: Sample size was calculated based on the formula given below

$$n = \frac{[Z\alpha + Z\beta]S}{d}$$

S, Standard deviation

d, Difference between the two standard deviations

Zβ, 95% Confidence interval CI=1.96

Zβ, 80% Power= 0.84

Hence, At 95% Confidence interval (CI) and 80% of Power, referring Standard deviation (SD) as '2' and the difference between the bond strength between the groups as 3, the sample size was calculated as 11 in each group.

Materials used for the study were Resin modified Glass Ionomer (GC Gold Label Light Cured Universal Restorative, GC Corporation, Tokyo, Japan), Composite Resin (Filtek Z350 Restorative material, 3M ESPE, dental products, St Paul, USA) and Mineral trioxide aggregate (Angelus, Angelus Industria de Productos Odontologicos, Londrina, PR, Brasil).

The samples were divided into 2 groups equally for MTA-GIC and MTA-Composite.

Group I – Shear bond strength measurement group- 22 samples

Group II- Tensile bond strength measurement group- 22 samples

Preparation of Samples

For Tensile Bond strength measurement: Circular acrylic discs of diameter 1cm and thickness of 1-2mm with a hook made of stainless steel wire inserted on one side of the disc. 44 discs were made between which the specimen for tensile strength were stabilized for testing.

For Shear Bond strength measurement: 22 Acrylic blocks (4cm x 2cm x 2cm) were made. A cavity (5mm diameter and 2mm depth) was prepared on one side of the block, 1cm from the top corner.

Cylindrical plastic molds (5mm x 10mm) were used to make specimens with bonded surface area of $5mm^2$. The MTA was first filled into the plastic mold followed by RMGIC or Composite accordingly in each group.

All the materials were manipulated as per manufacturer's instructions. The surface of the MTA was made flat by gently condensing with a flat ended instrument after filling into the mold and all the excess was removed. The material was kept to set for 24hours with a moist cotton pellet placed over its surface before placement of the other material.

Bond Strength Measurement

Tensile bond strength (TBS): The specimen consisting of a pair of circular discs with MTA-RMGIC or MTA-Composite sample were one by one separately loaded into the Universal testing machine (Instron 3366, Instron corp, Canton, MA, USA). After loaded specimen were stabilized, the machine was made to work in tensile mode at a cross head speed of 0.5mm/min until bonded area failed. The load applied at failure point and the TBS value was systematically recorded for each sample. The TBS was expressed in MPa, as derived from dividing the imposed force (N) at the time of fracture by the bond area (mm^2).

Shear bond strength (SBS): The samples were loaded into the acrylic blocks such that the RMGIC or Composite parts were embedded inside the prepared cavity in it. The MTA part of the sample projected out of the block which was subjected to the shear load. The shear bond strength was measured by shearing the bonded specimens on an Instron universal testing machine, using a cross head speed of 0.5 mm/minute. The acrylic blocks were stabilized on shearing apparatus and a wedge blade system applied a shear force on the sample. The readings at failure were recorded systematically.

The compressive load acting on the bonded area on application of shear and tensile force recorded from Instron 3366 was tabulated and the bond strength was calculated by dividing it by the area of bonded surface.

MPa = Force/Area = Newton/mm^2

Area of bonded surface, A = πr^2;

r- radius of the specimen used = 2.5mm.

A = 19.625mm^2

Statistical Analysis

All statistical analysis was carried out using SPSS 20 software. Percentage of bond failure for each group was obtained. Average and standard deviations were calculated and the data was analyzed by independent 't' test. The level of significance was set at 0.05.

Results

The bond strength values of the two groups, has been tabulated with their minimum and maximum values obtained and the mean values of the same in Table No.1.

The shear bond strength values obtained has been represented in a Box plot form, which gives the distribution of the values of the RMGIC and Composite groups. The 50th percentile of the values obtained overlap at the value 5.50MPa. (Fig No.1)

Table 1: Bond strength of RMGIC and Composite with MTA (MPa)

	Group	MIN (MPa)	MAX (MPa)	MEAN ± SD (MPa)
SHEAR BOND STRENGTH	RMGIC (n = 11)	3.65	12.68	7.24 ± 3.64
	COMPOSITE (n = 11)	2.67	10.23	6.06 ± 2.74
TENSILE BOND STRENGTH	RMGIC (n = 11)	.17	1.73	.656 ± .427
	COMPOSITE (n = 11)	.23	1.67	.806 ± .425

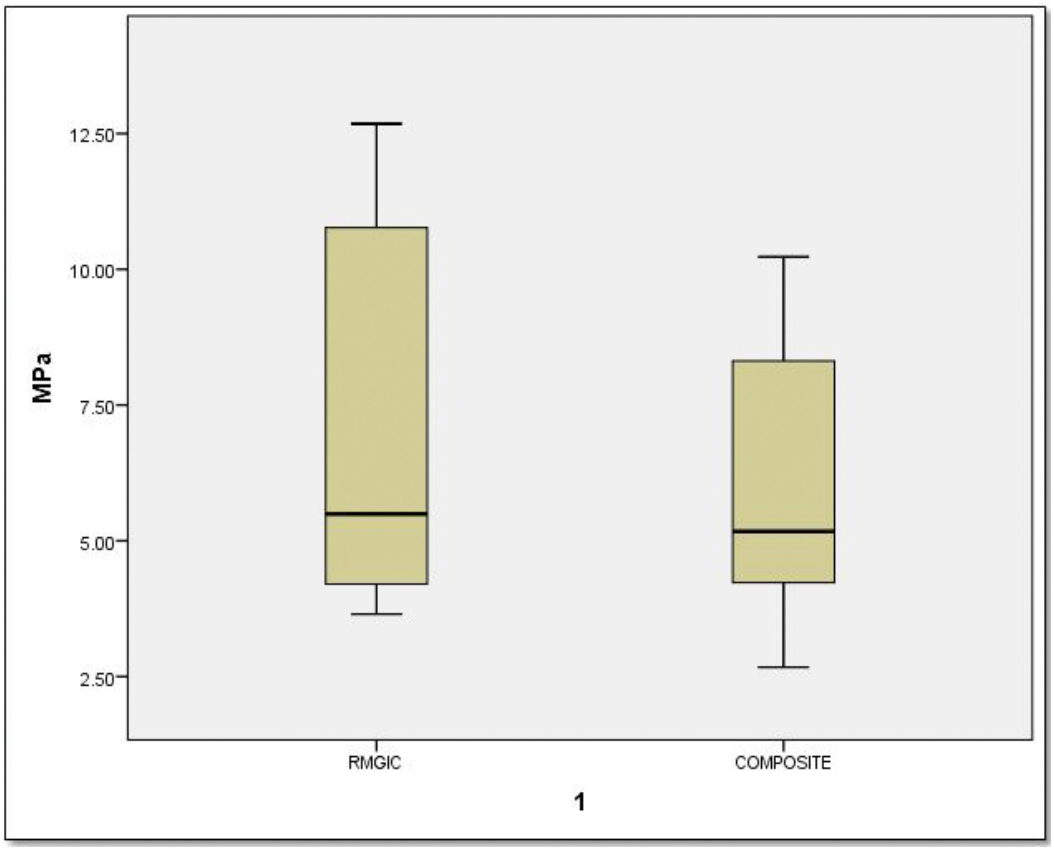


Fig. 1: Box plot form giving the distribution of Shear bond strength values between the groups

The tensile bond strength values obtained has been represented in a Box plot form, which gives the distribution of the values of the RMGIC and Composite groups. The 50th percentile values do not overlap. (Fig No.2)

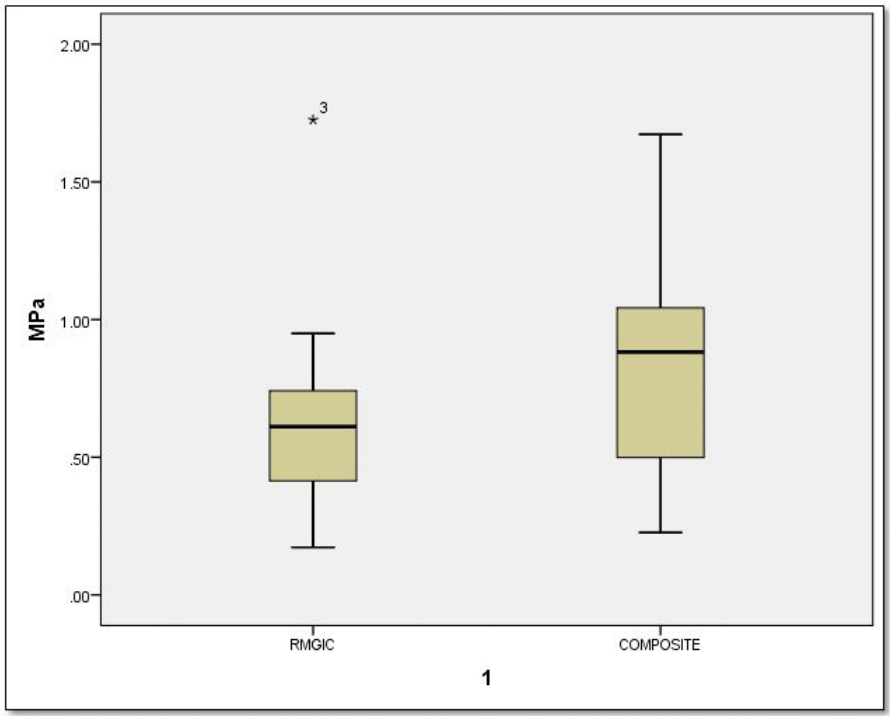


Fig. 2: Box plot form giving the distribution of Tensile bond strength values between the groups

The plot form shows distribution of shear bond strength of RMGIC subgroup towards higher values along the x axis representing the bond strength values in MPa. Whereas in the plot form for tensile bond strength shows distribution of vaues of composite subgroup was found to be higher on the x axis representing the bond strength values in MPa.

Shear Bond strength: There was no statistically significant difference between the shear bond strength of RMGIC and Composite with MTA (p = 0.39) at confidence interval of 95%. (Table 2)

Table 2: Independent Samples Test Comparing Shear Bond Strength

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
MPa	Equal variances assumed	.399	1.18272	-1.68180	4.04725
	Equal variances not assumed	.400	1.18272	-1.69596	4.06140

Tensile Bond strength: No statistically significant difference was observed between the tensile bond strength of RMGIC and Composite samples with MTA (p = 0.41) at confidence interval of 95%. (Table 3). So the Null Hypothesis was accepted as there was no statistically significant difference between the groups.

Table 3: Independent Samples Test Comparing Tensile Bond Strength

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
MPa	**Equal variances assumed**	.419	-.15013	-.52954	.22927
	Equal variances not assumed	.419	-.15013	-.52954	.22927

Type of Failures: Out of the total 44 samples, 29 samples showed cohesive failures. Maximum numbers of failures, i.e. 17 were in tensile bond strength group which included 8 in RMGIC group and 9 in Composite resin group. Of the 12 failures in shear bond strength, 5 were in RMGIC group and 7 in composite resin group. The distributions of failed samples have been tabulated in Table 4.

Table 4: Types of failures

Measurements	Material used	Cohesive Failures (Nos.)	Adhesive Failures (Nos.)
Shear bond strength group	RMGIC (11 nos.)	5	6
	Composite Resin (11 nos.)	7	4
Tensile bond strength group	RMGIC (11 nos.)	8	3
	Composite Resin (11 nos.)	9	2

Discussion

Mineral trioxide aggregate (MTA) has been a versatile revolutionary material in endodontics since its introduction in the 1990[5]. The hydrophilic nature of MTA makes it an ideal material for different endodontic applications in which contact with blood, body fluids, and moisture is inevitable, but it may complicate the bond between MTA and restorative material[6].

A strong bond between the pulp therapeutic agent and the restorative material provides an optimal hermetic coronal seal. Shear bond strength estimates the local stress and integrity of the materials that the bonding layer can withstand. Increased shear bond strength means better bonding between two interfaces and lesser microleakage[4,7].

The current literature contains few studies on bond strength of MTA with RMGIC and Composite resin. GIC was found to bond to MTA, although bond strength values of GIC – MTA was comparatively inferior to that of resin composites – MTA[8,9].

The bond strength between the materials is one of the most critical factors for quality dental filling treatment. A shear bond strength of about 17 to 20 MPa is required to sufficiently resist contraction forces and produce gap-free restoration margins [10-12].

Resin modified Glass ionomer showed better shear bond strength and Composite resin showed better tensile bond strength with MTA but both the results were statistically not significant.

In the present study none of the groups reached the optimal shear bond strength. Since the results showed no significant difference between the shear and tensile bond strength values between the MTA -Composite and MTA-RMGIC groups, the Null hypothesis was rejected. This results are contradictory to the results obtained by Ajami A et al,[13] in which the shear bond strength between MTA and composite was found to be 12.12 ± 2.31 and between MTA and RMGIC was 3.24 ± 0.58.

Acid etching using 37% phosphoric acid affects the morphology of MTA surface. Under SEM analysis, it was found that etching resulted in a selective loss of matrix from around the crystalline structure and due to loss of matrix, the sealing ability and physical properties of MTA was found to be decreased[14].

The use of 10% polyacrylic acid for smear layer removal, results in mildly demineralized dentin and then helps in chemical interaction between the carboxylic groups of RMGIC and calcium of hydroxyapatite crystals from dentin leading to mechanical bonding via hybrid layer formation.

The shear bond strength values between MTA and Composite obtained were found to be similar to the values obtained in the study by Savadi Oskoee, which had a mean value of 4.65Mpa[15].

As the difference in the shear and tensile bond strengths between MTA and the two restorative materials of choice is statistically insignificant, it can be concluded that the both the materials bond well to MTA.

The failure of the bond between two materials may not always result in interface failure but can occur in either of the material used for testing. Rigidity of the material may have a significant influence on the interpretation of bond strength[16].

In the present study failure was largely within the material rather than at the interface. In a study by Shenoy et al[7] 80% of the samples showed cohesive failures

within MTA[8]. The reason for cohesive failure with MTA may be due to its porous nature which may be a matter of concern[7].

Conclusion

The choice of restorative material following a pulp therapy gains as much importance as the pulp therapeutic agents. With advent of adhesive materials the scope of pulp therapy has improved significantly. The knowledge about the bonding mechanisms and the bond strengths of the restorative materials will help a clinician in better treatment planning.

The conclusions of the study are-

- There was no difference in the bond strengths attained between Resin modified Glass ionomers and Resin Composites with Mineral trioxide Aggregate (MTA)
- Both the materials can be used as a restoration of choice following a pulp therapy with MTA after it has reached its initial final set.
- It can be a predictable choice to use RMGIC directly over MTA followed by a composite restoration (Sandwich Restoration) or a full coverage restoration (Stainless steel crown).

Ethical Clearance: Taken from Institutional Ethics Committee, Manipal College of Dental Sciences, Mangalore

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Tziafas D, Smith AJ, Lesot H. Designing new treatment strategies in vital pulp therapy. J Dent. 2000;28(2):77-92.
2. Modena KCDS, Casas-Apayco LC, Atta MT, Costa CADS, Hebling J, Sipert CR, et al. Cytotoxicity and biocompatibility of direct and indirect pulp capping materials. J Appl Oral Sci. 2009;17(6):544–554.
3. Yaseen SM, Subba Reddy V V. Comparative evaluation of shear bond strength of two self-etching adhesives (sixth and seventh generation) on dentin of primary and permanent teeth: an in vitro study. J Indian Soc Pedod Prev Dent. 2009;27(1):33–38.
4. Wang L, Sakai VT, Kawai ES, Buzalaf MA, Atta MT. Effect of adhesive systems associated with resin-modified glass ionomer cements. J Oral Rehabil. 2006;33(2):110-116.
5. Lee SJ, Monsef M, Torabinejad M. Sealing ability of a mineral trioxide aggregate for repair of lateral root perforations. J Endod. 1993;19(11):541–544.
6. Al-Hezaimi K, Al-Shalan TA, Naghshbandi J, Oglesby S, Simon JHS, Rotstein I. Antibacterial effect of two mineral trioxide aggregate (MTA) preparations against Enterococcus faecalis and Streptococcus sanguis in vitro. J Endod. 2006;32(11):1053–1056.
7. Shenoy V, Margasahayam S, Gulati S. Comparison of shear bond strength of resin-modified glass ionomer to conditioned and unconditioned mineral trioxide aggregate surface: An in vitro study. J Conserv Dent. 2014;17(5):440-443.
8. Yesilyurt C, Yildirim T, Taşdemir T, Kusgoz A. Shear Bond Strength of Conventional Glass Ionomer Cements Bound to Mineral Trioxide Aggregate. J Endod. 2009;35(10):1381–1383.
9. Al-Sarheed MA. Evaluation of shear bond strength and SEM observation of all-in-one self-etching primer used for bonding of fissure sealants. J Contemp Dent Pract. 2006;7(2):9–16.
10. Atabek D, Sillelioğlu H, Olmez A. Bond strength of adhesive systems to mineral trioxide aggregate with different time intervals. J Endod. 2012;38(9):1288–1292.
11. Bodanezi A, Carvalho N, Silva D, Bernardineli N, Bramante CM, Garcia RB, et al. Immediate and delayed solubility of mineral trioxide aggregate and Portland cement. J Appl Oral Sci. 2015;16(2):127–131.
12. Kayahan MB, Nekoofar MH, Kazandağ M, Canpolat C, Malkondu O, Kaptan F, et al. Effect of acid-etching procedure on selected physical properties of mineral trioxide aggregate. Int Endod J. 2009;42(11):1004–1014.

13. Ajami A, Navimipour E, Oskoee S, Kahnamoui A, Lotfi M, Daneshpooy M. Comparison of shear bond strength of resin-modified glass ionomer and composite resin to three pulp capping agents. J Dent Res Dent Clin Dent Prospects. 2013;7(3):164-168.

14. Mauro S J, Sundfeld R H, Bedran-Russo A K, Fraga Briso A L J. Bond strength of resin-modified glass ionomer to dentin: the effect of dentin surface treatment. Minim Interv Dent. 2009; 2: 45-53.

15. Oskoee SS, Bahari M, Kimyai S, Motahhari P, Eghbal MJ, Asgary S. Shear Bond Strength of Calcium Enriched Mixture Cement and Mineral Trioxide Aggregate to Composite Resin with Two Different Adhesive Systems. J Dent (Tehran). 2014;11(6):665–671.

16. Oztürk B, Malkoç S, Koyutürk AE, Catalbas B, Ozer F. Influence of different tooth types on the bond strength of two orthodontic adhesive systems. Eur J Orthod. 2008;30(4):407-12.

A Study to Assess the Effectiveness of Planned Teaching Programme on Knowledge Regarding Prevention of Abuse among the Children of 11–14 Years of Age at Selected Schools of Sangli, Miraj, Kupwad Corporation Area

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ABSTRACT

Introduction: Child abuse has serious and psychosocial consequences that adversely affect on the general well being of kid. In line with World Health Organization agency "Child abuse or mistreatment represent all sort of physical and emotional maltreatment, sexual offense, neglect or negligent treatment or industrial or alternative exploration ensuing in actual or potential damage to the kid health,survival,development or dignity within the context of a relation of responsibility, trust or power.

Aims: 1) To assess the knowledge regarding prevention of abuse. 2) To evaluate the effectiveness of planned teaching programme on knowledge regarding prevention of abuse**.**

Methodology: One group pre-test post-test Pre- Experimental, study was conducted at Sangli, Miraj and Kupwad Corporation area, quantitative research approach was adopted for this study. The study comprised of 100 samples. Non-probability convenient sampling technique used for selection of samples. Data was analyzed using descriptive and inferential statistics. Theoretical framework in study was based on general systems theory as postulated by Von Bertalanffy (1998).Proposal of tool was presented in front of ethical committee for permission.

Result and Conclusion: Among the 100 children total mean of Pre-test was 12.91 and mean of post-test was 19.33 with P value of 0.000 which is significantly high. This shows that the knowledge score of pre-test was less than post-test knowledge score. Thus null hypothesis is rejected. There is significant change in knowledge in the post-test. The result of this study proved that the planned teaching programme was effective. It was concluded from the statistical test that planned teaching programme on prevention of abuse was effective among children. Analysis of the data showed that there was significant difference between pre-test and post-test knowledge score. Among the children administration of structure teaching course have a major impact on awareness score.

Keywords: *Assess, Effectiveness, Planned teaching, Knowledge, Child abuse*

Introduction

The rate of victimization of kids is 12.3 per 1,000 kids. Kids below 3 years are the foremost probably to experience abuse. They are exploited at a rate of 16.4 per 1,000.79 share. Kids are killed younger than 4 years. The statistics are taken from the administration for kids and Families of the, US Department of Health And Human services, "Kid mistreatment Report." There are nearly 3 million reports of kid abuse created annually. There have been 906,000 maltreatment convictions. The rate of child

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abuse is calculable to the 3 times larger than is reported.[1] Due to ill-treatment; most of the kids wants to get into a wrong manner. Therefore it affects the health of the new generations. So as to promote the younger generations, this insisted researcher to carry out analysis upon this. Legal issues are 2.5 million; the numbers of issues are informed annually and are increasing continuously of kid's maltreatment and ignorance. Within which 35% involves bodily maltreatment, 50% involves sex offence and 50% involves ignorance. Studies shows those 1 in 4 women and 1 in 8 boys are sexually abused before they are 18 years of age.[1]

In India Abused kids are 25% more likely to experience adolescent pregnancy. 14, 4 % of all men and 36.7 % of all girls in jail within the US are abused as kids. Sexually abused kids are a pair of 2.5 times additional probably to develop substance abuse and 3.8 times additional probably develop drug addictions. Abused teens are 3 times less probably to practices sexual activity, putting them at bigger risk for STDs.It is known that one third of abused and neglected kids can eventually put-upon their own kids, and nearly two third of the individuals in treatment for habit reportable being abused as kids.[2]

As per the annual publication of the National Crime record Bureau (NCRB), Union Ministry of Home affairs, throughout 2003,374 children within the age group of 10-18 were abducted for illicit intercourse and 57 for being forced into prostitution. And 2,949 children raped that year, a figure that registered 21 % raise in 2004. Abused children are 25 % a lot of possible to experience adolescent pregnancy.14.4 % of all men and 36 .7 % of all women in jail at intervals the United States are abused as youngsters. Youngsters who are sexually abused are a pair of 5 times extra most likely to practices sexual activity, putting them at larger risks for STDs, it had been acknowledged that one third of abused and neglected children will eventually used their own children, and nearly two third of the people in treatment for habit reportable being abused as children.[3]

Materials and Method

One group pre-test–post-test Pre-experimental design was used for the study. The study is quantitative study. The study was carried out in schools of Sangli, Miraj, and Kupwad corporation area among school children with the sample size of 100.Ethical committee approved the Research proposal. For assessing the knowledge and effect of planned teaching programme, on knowledge regarding hindrance of abuse among the children of 11-14 years of age, Quantitative research approach was adopted for this study. Non-probability convenient sampling technique used for selection of samples. Pilot study and final study were conducted after approval of the ethical committee.

The prior permission from concerned authority was taken and informed written consent from each participant parent was taken before conducting the study. Pre-test was taken by using structured questionnaire for 15 minutes. Planned teaching programme was given immediately after pre-test for 45 minutes and after the seven days, post-test was conducted. The data analyzed Based on the objectives of the study, using descriptive and inferential statistics. Frequency percentage, Mean, SD calculated to get the pre-test and post-test knowledge score. Paired 't 'test applied to check the effectiveness of Planned teaching programme between the pre-test and post-test knowledge score mean. Paired't'-test used to compare Pre and Post – test knowledge score.

Results/Findings

The Data Analyses, which was collected from 100 samples regarding prevention of abuse among children of 11- 14 years of age. Section- I, Table no. 1 shows frequency and percentage distribution of selected demographic variables,in that 50 % sample were male and 50 % were female, 53 % sample were belongs to Nuclear type of family and 47 % were belongs to joint family. As data given in the table shows 64 % of father are doing job, and 36 % were doing business. Maximum samples 56 % mothers were Housewife, and 24 % were doing business, 20 % were doing jobs. Maximum samples mothers that is 60 % were taking care at home, and 40 % others were taking care of children,91 % samples belongs to Urban area and 9 % were belongs to Rural area. Maximum that is 62 % of samples were not having any information about child abuse prevention and 38 % sample were having information about child abuse prevention. 92 % samples were given positive response for conducting workshop on the topic and 8 % were not willing to conduct the workshop.

Section–II

Table 1: Frequency and Percentage Distribution of Pre-Test and Post-Test Knowledge Score

N= 100

Knowledge Grading	PRE Test		POST Test	
	Frequency	Percentage	Frequency	Percentage
Poor 0-6	20	20.00	0	0.00
Average 7-12	31	31.00	10	10.00 %
Good 13-18	40	40.00	20	20.00 %
Excellent 19-25	9	9.00	70	70.00 %

Section –II, Table no1.frequency and percentage distribution of pre-test and post-test knowledge score, at the time of pre test, 20% of subjects had poor knowledge, 31% had average knowledge, 40% in good knowledge category and remaining 9% subjects were having excellent knowledge. At the time of post test, 10% of subjects had average knowledge, 20% in good knowledge category, 70% subjects were having excellent knowledge and no one in the poor knowledge category.

Section III

Table 2: Comparison of the Pre and Post Test Knowledge Score (Paired T Test)

N = 100

Group	Frequency	Mean	S.D.	t value	P value
PRE TEST	100	12.91	4.81	16.30	0.000
POST TEST	100	19.33	3.20		

Section III table no. 2 comparison of the pre and post test knowledge score by using paired t test. The pre test average score was 12.91 with standard deviation of 4.81. The post test average score was 19.33 with standard deviation of 3.20. The test statistics value of the paired' test was 16.30 with p value 0.000. Shows that calculated value is more than tab value there was significant difference in the average knowledge score, at significance level of 5%.

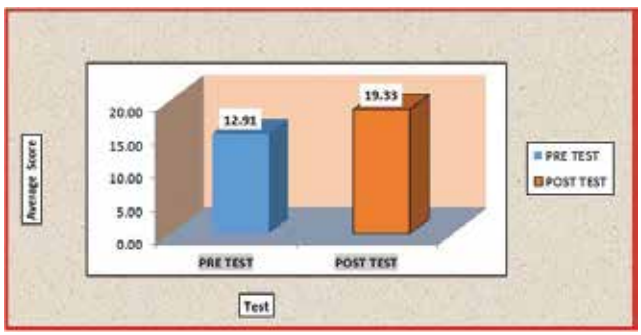


Figure 1: Comparison of the Pre and Post Test Knowledge Score (paired't' test)

Discussion

The present study found that the knowledge of the participants was not up to the mark. The results are similar to several previous studies. In contrast to our findings several studies showed that all the students were having inadequate knowledge and many misconceptions regarding prevention of abuse among children of 11 – 14 years of age were present. Most of the previous study did not provide any planned teaching program. In present study the planned teaching program was given in order to provide appropriate knowledge regarding prevention of abuse among the children and clear the misconception and encourage the student to take appropriate action for prevention of abuse activity in early stage. At the time of pre test, 20 % of subjects were having poor knowledge, 31 % were having average knowledge, 40 % in good knowledge category and remaining 9% subjects were having excellent knowledge. At the time of post test, 10 % of subjects were having average knowledge, 20 % in good knowledge category, 70 % subjects were having excellent knowledge and in the poor knowledge category there was no one. It shows that there is marked increase in post-test knowledge. 12.91 is the mean value of pre-test knowledge score and post-test knowledge score is 19.33, standard deviation score in pre-test phase was 4.81 and in the post-test phase it was 3.20. Calculated' value 16.30 that is more than tabulated 'p' value is 0.000

which is less than tabulated 'p' value (0.05). This suggest that there is statistically significant increase in post-test score so planned teaching programme on prevention of abuse among the school children of 11 to 14 years of age was effective. The findings of the present study with reference to the objectives and hypothesis have been discussed. The finding of the study shows that planned teaching programme was effective.

Similar study was conducted by Ms. Priyanka kadam, Mr. Mangesh Vilinikaran Jabade in pune city they assessed the level of knowledge regarding the awareness and prevention of child abuse among school children As per the findings of the study the mean of post-test knowledge score 15.73 (92.55%) was increased as compare with the mean pre-test knowledge score 9.63 (56.66%) . Where the mean of post-test knowledge score was 19.33 (3.20 %) which was higher than mean pre-test score 12.91 (4.81 %) in the present study.

The test statistics value of the paired't' test was 16.30 with 'p' value 0.000 shows that calculated value is more than table value, there was significant difference in the average knowledge score, At the significance level of 5%. Consequently come to the conclusion so as to structure teaching was effectual.[4]

Conclusion

This research have being carried out to estimate the efficiency of structure lessons plan concerning prevention of abuse amongst the kids about 11- 14 years of age on knowledge, at selected school of Sangli, Miraj, Kupwad corporation area. At the time of presentation of planned teaching programme the samples were found in confusion state. The misconception and unawareness about child abuse and its prevention clearly seen among the children. They require further information regarding child abuse prevention. After the planned teaching the misconceptions of parents and children were cleared, where School children and their parents and school teachers gave positive response about preventive activities and got information about provisions made in legislation by government regarding child safety. Through this they can help to reduce the number of child abuse cases. Significant difference between pre-test and post-test was visible as per the findings of the study in knowledge score of school children regarding prevention of abuse after planned teaching and null hypothesis was rejected.

Conflict of Interest: The authors declare that they have no conflict of interest.

Source of Funding: The authors declare that did not used any source of funding for conducting the research, expenses is done by self.

Ethical Clearance: All procedures performed in studies involving participants were in accordance with the ethical standards of the institutional and/or national research committee. Informed consent was obtained from all participants parents, included in study.

REFERENCES

1. Lesa Bethea. Primary prevention of child abuse, American family physician, 1995 Mar 15; vol 59/ No.6.
2. Long term Consequences of child abuse & Neglect 2005.National clearinghouse on child Abuse & Neglect information. Available from:URL:http// www.childabuse and neglect.org
3. Schools MWA, de Ruiter C, Ory FG. How the public child healthcare professionals and primary school teachers identify and handle child abuse cases? A qualitative study; BMC Public Health. 2013;13:807.
4. Ms.Priyanka Anton kadam, Mr.Mangesh Vilinkaran Jabade study to Assess the Effectiveness of educational interventions regarding the awareness and prevention of child abuse in selected schools in pune city. International journal of scientific research, volume 6(10) October 2017; 78-4.
5. Dorothy R. Marlow, Barbara A Redding. Textbook of paediatric nursing 6th edition. London (UK):W.B. Sounders Company; 2010; 841-42.
6. S. R Raghunandthan, National Organization for Child Abuse and Neglect, Chennai. 2005 Jan-16 (cited 2006 May 24); Available from: URL:http// www.pubmed.
7. Current issues of child abuse [online].2005 Sep15. Available from: URL:http//:www.thehindu. com/10hdline html.
8. Wuretes, S. (1987).School-based sexual prevention programs: A review. Child Abuse & neglect, 11, 483-95.

9. Polit DF, Hungler BP. Nursing Research, principles and methods. Philadelphia: Lippincott; 2011.

10. Derakhshanpour pour F, Shahini N, Hajebi A, Vakili MA, et.al.Demographic characteristic and risk factors of children and parents in child abuse subtype: findings from a psychosocial support department. Journal of Fundamentals of mental Health 2017 Nov Dec; 19 (6): 459-67.

11. Risk factors and child sexual abuse among secondary school student in the Northern province (South Africa) Article in Child Abuse & Neglect 24(2):259-68 March2000.(Pubmed)

12. Linda M. Williams. Research on partner violence, child physical abuse and child sexual abuse [online]. 2006 Jul: 24(6): 569-74. Available from: URL: http://www. Pubmed.com.

13. D.Finkelhor; G Hottaling;et.al.Sexual Abuse in National survey of adult Men and Women: Child Abuse and Neglect Volume:14 Issue:1 Dated:(1990) Pages:19-28.

14. Verbal Abuse by the teacher and child Adjustment from kindergarten through grade 6 Mara Brendgen, Brigitte wanner and Frank vitaro Paediatrics 2006;117;1585.

15. A Quasi experimental study to assess the effectiveness of structured teaching programme on knowledge about child abuse. 'Roa K N, Begam S, Venkataramana V, Gangadharappa N, conducted a study about nutritional neglect and physical abuse in children of alcoholic, which was higher at risk :2001;68:8435.3.

16. Scholarly article for Riggs RS, Evans DW article on child abuse prevention and implementation within the curriculum the Journal of school Health, 49,255-259.

17. Maureen Kenny, Teacher's attitude towards and knowledge of child maltreatment Child Abuse and Neglect 28(2004)1311-1119.

18. Crenshaw, W.B.Crenshaw, L.M., & Lichtenberg, J.W. (1995).When educators confront child abuse: An analysis of the decision to report. Child Abuse & Neglect, 19(9), 1095-1113.

19. Ramya P. An experimental study to assess the effectiveness of structured teaching program on sexual harassment among urban high school girls in selected schools at Mysore, Karnataka.2010.

20. Relationship between child maltreatment and Emotional Abuse: Michiko Koizumi, Haroto Tkagishi, URL: http://www. Pubmed.com

Risk Factors Associated with Overweight and Obesity among Population of Ahmedabad, India

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ABSTRACT

Background: Obesity is one of the leading disorders among developing countries. It is associated with many chronic disorders such as hypertension, dyslipidemia and vitamin D deficiency. This study aimed at determining the prevalence of overweight and obesity and its associated risk factors among 12-55 years old participants of Ahmedabad.

Method: This was a cross-sectional study carried out among 2,412 participants of 12-55 years of age of Ahmedabad, Gujarat, India. Blood pressure was measured and fasting venous plasma was drawn for determination of lipid profile, vitamin D level, insulin level and C-reactive protein level.

Results: The prevalence of overweight among 12-17, 18-35 and 36-55 years old participants was 16.23%, 18.51% and 26.22% respectively, whereas obesity prevalence among same age groups was 5.45%, 5.15% and 5.39% respectively. The risk of pre-hypertension, hypertension, hypercholesterolemia, hypertriglyceridemia, low HDL-C level, dyslipidemia, vitamin D deficiency, hyperinsulinemia and elevated C-reactive protein was noted to be significantly higher among overweight and obese respondents than healthy weight respondents.

Conclusion: The results of this study explains that public health programmes are needed to increase awareness on risks associated with overweight and obesity such as hypertension, lipid abnormalities, vitamin D deficiency and elevated C-reactive protein in order to reduce the burden of overweight and obesity as well as obesity associated chronic diseases.

Keywords: *Overweight, obesity, risk factors, lipid profile, vitamin D, C-reactive protein, insulin*

Introduction

Obesity is defined as excess body weight for height, which is also associated with excess adiposity or body fatness. It is a complex, multifactorial, and largely preventable disease [1]. Overweight and obesity has become a public health problem for all strata of the society worldwide. WHO (2016) has reported worldwide prevalence of obesity has increased thrice from 1975 to 2016. According to obesity update (2017), more than one in two adults and nearly one in six children are overweight or obese in OECD countries with the highest in the United States, Mexico, New Zealand and Hungary. If policies for prevention of this preventable disease are not made then by 2030 an estimated 38% of the world's adult population will be overweight and another 20% will be obese [2].

The prevalence of obesity was more than doubled in children and tripled in adults of India between 1980 and 2015 reported in the Global Burden of Disease Study [3]. According to Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study, the prevalence of generalized obesity was the lowest (11.8%) in Jharkhand (east India) and the highest (31.3%) in Chandigarh (north India) [4]. Overweight and obesity are the fifth leading cause of death estimated by WHO [5].

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Overweight and obesity are associated with many non-communicable, chronic diseases such as hypertension, type-2 diabetes, metabolic syndrome, dyslipidemia, coronary heart disease, stroke, several cancers, disability and increased mortality [6-8].

The aim of this study is to determine the prevalence of overweight and obesity among the subjects of 12 – 55 years of age of Ahmedabad city. The study is also aimed to identify the important factors associated with overweight and obesity.

Method

A cross sectional, multi-centric, observational study was conducted in six different regions of Ahmedabad city. The study included a total of 2,412 participants of both genders of age between 12 to 55 years old. The subjects were divided into three age groups; 12- 17, 18-35 and 36-55 years. Study excluded participants with any previously diagnosed chronic ailments, pregnant or lactating women or subjects who are under any drug therapy.

For 12-17 years old children, data was collected from schools of Ahmedabad, by conducting health camps at colleges and of six different regions of Ahmedabad. Before conducting any procedure, the participants were well informed about the purpose of the study and were ensured strict non-disclosure of information. Signed informed consent form was taken from parents/guardians (for 12-17 years) or from participants (18-55 years).

The body weight (kg) and height (m) were measured and body mass index (BMI) was calculated using standard formula: body weight (kg)/height (m^2). Participants were divided into four groups depending on their BMI defined by WHO (1999). Overweight and obesity were considered if BMI is between 25.0 to 29.9 kg/m^2 and BMI greater than or equal to 30.0 Kg/m^2, respectively. Blood pressure of participants was measured by auscultatory method using standard mercury sphygmomanometer. Participants prior to clinical examination were informed not to eat anything after 10 pm. Next day clinical examination of the subjects was carried out by taking their blood samples.

Pre-hypertension and hypertension was defined by the seventh report of the Joint National Committee on prevention, detection and treatment of high blood pressure (JNC 7) criteria. According to guideline NCEP - ATP III (National Cholesterol Education Programme), 2002 for lipid abnormalities; hypercholesterolemia is defined as total cholesterol more than 200mg/dl, hypertriglyceridemia as triglycerides more than 150mg/dl and HDL-C less than 40mg/dl in men and less than 50mg/dl in women. Dyslipidemia is considered by the presence of hypercholesterolemia and low HDL-C levels. Vitamin D deficiency is considered if vitamin D level is less than 20 ng/dL. High sensitivity C-reactive protein (hs-CRP) concentration more than 3 mg/L was considered as having elevated CRP in current study. According to Melmed et al (2011), hyperinsulinemia was defined as fasting insulin level $\geqslant 25 mIU/L$.

Results

A total of 456 school going children of age group 12-17 years old were selected for this study; 16.23% were overweight and 5.48% ware obese. Out of 1,010 participants of 18-35 years old, 5.15% were obese 18.51% were overweight. The prevalence of overweight and obesity among 946 subjects of 36-55 years old was 26.22% and 5.39%, respectively.

The prevalence of pre-hypertension was 17.56% and 24.00% among overweight and obese participants, respectively, which was found higher than healthy weight subjects of 12 – 17 years old. Similarly, 9.45% and 8.00% hypertensive subjects were overweight and obese in the same age group. Children of 12 – 17 years old noted to have no lipid abnormalities as well as high insulin level. Vitamin D deficiency was 70.27% among overweight and 80.00% among obese children, which was significantly higher compared to healthy weight subjects (56.63%). Overweight and obese children found to have elevated C-reactive protein whilst none of the healthy weight children had elevated C-reactive protein.

The current study found significantly greater prevalence of pre-hypertension among overweight (33.15%) and obese (40.38%) subjects of 18-35 years than healthy weight (26.53%) subjects, whilst hypertension prevalence was noted nearly similar among healthy weight (23.64%), overweight (23.52%) and obese (25.00%) subjects. The prevalence of hypercholesterolemia (27.27% and 36.53%, respectively vs 9.54%), hypertriglyceridemia (28.34% and 36.53%, respectively vs 12.96%), low HDL-C (47.05% and 65.38%, respectively vs 21.65%), dyslipidemia (26.73% and 36.53%, respectively vs 8.83%), vitamin

D deficiency (79.67% and 92.30%, respectively vs 63.39%), hyperinsulinemia (35.82% and 36.53%, respectively vs 11.53%) and elevated C-reactive protein (15.50% and 25.00%, respectively vs 9.11%) was noted to be significantly higher among overweight and obese than healthy weight subjects of 18-35 years old.

In present study the prevalence of pre-hypertension (32.66% and 45.09%, respectively vs 27.24%) and hypertension (39.51% and 52.94%, respectively vs 28.40%) was significantly higher among overweight and obese subjects than healthy weight subjects of 36-55 years old. Hypercholesterolemia (46.37% and 60.78% vs 21.76%), hypertriglyceridemia (59.27% and 64.70% vs 30.23%), low HDL-C (69.75% and 80.39% vs 35.21%), dyslipidemia (43.54% and 56.86% vs 19.10%), vitamin D deficiency (79.83% and 92.15% vs 69.43%), hyperinsulinemia (50.80% and 56.86% vs 22.92%) and elevated C-reactive protein (29.43% and 35.29% vs 17.94%) were noted to be higher among overweight and obese subjects than healthy weight subjects of 36 – 55 years old.

Discussion

This study reveals increasing prevalence of overweight with age. Few studies from India on adolescents reported less prevalence of overweight compared to the result of the present study whilst obesity prevalence was as consistent as the current study's findings [9, 10, 11]. Researchers from Punjab, Jaipur and Chennai found 10-15% prevalence of overweight, which is noted to be similar to the current findings whilst they found the prevalence of obesity was as high as 5-11% [12, 13, 14, 15]. In keeping with the studies of Sen et al and Gupta et al, the current study found consistent results on the prevalence of overweight whereas obesity prevalence was lower in current study on adults [16, 17]. Furthermore, the findings of few studies on the prevalence of both, overweight and obesity, documented higher prevalence when compared to the present study [18, 19, 13] whilst another study on subjects of 20-40 years old reported consistent findings [20].

Obesity plays a crucial role in the aetiology of hypertension [21]. The current study reported higher prevalence of pre-hypertension and hypertension among overweight and obese subjects which was supported by Dua et al and Yadav et al [22, 23]. Pre-hypertensive subjects had 1.77% chances of becoming overweight reported by Rahmanian et al [24]. The risk of hypertension among overweight and obese subjects was higher due to increase in mass, causing an inadequate vasodilatation in the presence of increased blood volume and cardiac output [25].

It has long been known that obesity attributes to lipid metabolism abnormalities which results in elevation of lipid stores [26]. Though the current study did not find any lipid abnormalities among children, few studies have shown an association between lipid abnormalities and obesity in children [27]. Supporting the findings of current study, Gayathri et al reported significantly higher value of various lipid parameters like total cholesterol, triglycerides and LDL-C in overweight and obese individuals [28]. Inversely, the results of Sharma et al and Chadha et al showed HDL-C has no significant association with BMI [29, 30].

Vitamin D deficiency is a significant health problem globally. It helps in the regulation of calcium and phosphorus homeostasis and hence plays an important role in the development and maintenance of good bone health [31]. Many studies have supported the current study finding by reporting higher prevalence of vitamin D deficiency among overweight and obese children [32, 33]. Inversely, Bradaran et al noted no significant association between vitamin D level and BMI [34].

In line with the finding of current study, Shrinivasan et al showed temporal relationship between obesity and hyperinsulinemia and supported the role of obesity in hyperinsulinemia in three age groups; children, adolescents and young adults [35].

The current study showed a higher prevalence as well as higher mean level of C-reactive protein among overweight and obese subjects demonstrating the role of inflammation in overweight and obesity. Many studies have supported these findings demonstrating positive association between BMI and C-reactive protein [36, 37, 38].

Conclusion

The results of this study allow us to affirm that an increasing prevalence of overweight and obesity due to unhealthy lifestyle increases the risk of metabolic syndrome and cardiovascular complications. Thus, lifestyle modification including understanding of nutritional behaviour and physical activity decreases the risk factors associated with overweight and obesity.

Acknowledgment

We are thankful to Gujarat council of Science and Technology, Gandhinagar and Research Society for the study of Diabetes in India for proving financial support in terms of minor research grant.

Ethical Clearance: Taken from Nirma University, Ahmedabad.

Conflict of Interest: Nil

REFERENCES

1. Hruby A, Hu FB. The Epidemiology of Obesity: A Big Picture. Pharmacogenomics. 2015; 33(7): 673-689.
2. Kelly T, Yang W, Chen CS, Reynolds K, He J, Global burden of obesity in 2005 and projections to 2030. Int J Obes (Lond.) 2008; 32(9): 1431-1437.
3. GBD 2015 Obesity Collaborators, Health effects of overweight and obesity in 195 countries over 25 years. The New England Journal of Medicine. 2017.
4. Pradeepa R, Anjana RM, Joshi SR, et al. ICMR-INDIAB Collaborative Study Group. Prevalence of generalized & abdominal obesity in urban & rural India the ICMR-INDIAB Study (Phase-I) [ICMR- NDIAB-3]. Indian J Med Res. 2015; 142(2): 139-50.
5. WHO, Obesity and Overweight, 2017, WHO, Geneva, Switzerland.
6. M. Marqueta de Salas, J. Martin-Ramiro, J. J. J. Soto. Sociodemographic characteristics as risk factors for obesity and overweight in Spanish adult population. Medicina Clinica. 2016; 146(11): 471-477.
7. Nguyen NT, Magno CP, Lane KT, et al. Association of hypertension, diabetes, dyslipidemia, and metabolic syndrome with obesity: findings from the National Health and Nutrition Examination Survey, 1999 to 2004. J Am Coll Surg. 2008; 207: 928–34.
8. Castillo JJ, Reagan JL, Ingham RR, et al. Obesity but not overweight increases the incidence and mortality of leukemia in adults: a meta-analysis of prospective cohort studies. Leuk Res. 2012; 36: 868–875.
9. Kotian MS, Kumar GS, Kotian SS, et al. Prevalence and determinants of overweight and obesity among adolescent school children of South Karnataka, India. Indian Journal of community medicine. 2010; 35(1): 176–178.
10. Gamit SS, Moitra M, Verma MR. Prevalence of obesity and overweight in school going adolescents of Surat city, Gujarat, India. International Journal of Medical Science and Public Health. 2015; 4: 42-47.
11. Krutarth B, Umesh O. Obesity among adolescents of Ahmedabad city, Gujarat, India- a community based cross-sectional study. International Journal of Biological and Medical Research. 2012; 3(2): 1554-1557.
12. Chattwal J, Verma M, Riar SK. Adolescents of a developing country (India). Asia Pacific Journal of Clinical Nutrition. 2004; 13(3): 231-235.
13. Sidhu S, Marwah G, Prabhjot. Prevalence of overweight and obesity among the affluent adolescent school children of Amritsar, Punjab. Collegium Antropologicum. 2005; 29(1): 53–55.
14. Bansal AK, Monohar R, Yadav R, Sharma D, Yadav N, Lohani H. Prevalence of obesity and its lifestyle risk factors in school age children in Jaipur. The Indian Journal of Research and Reports in Medical Sciences. 2013; 3(2): 16-19.
15. Thakur S, Viswanathan V. Impact of socioeconomic status on prevalence of overweight and obesity among children and adolescents in Urban India. The Open Obesity Journal. 2009; 1: 9-14.
16. Sen J, Mondal N, Dutta S. Factors affecting overweight and obesity among urban adults: a cross-sectional study. Epidemiology Biostatistics and Public Health. 2013; 1(10): e8741-1:11
17. Gupta P, Gupta S. Study on Prevalence of Overweight and Obesity Among Urban & Rural Area of Azamgarh. Indian journal of Applied Research. 2016; 2(6): 202-204.
18. Chauhan RC, Chauhan NS, Manikandan, et al. Obesity among adult population of a rural coastal area in South India. International Journal of Scientifc Reports. 2015; 1(3): 155-158.
19. Kumar AP, Faisal GD. Prevalence and determinants of overweight and obesity among affluent adolescents in Vijayawada city, Andhra

Pradesh, India. International Journal of Medical Science and Public Health. 2015; 4(3): 408-413.

20. Masoodi SR, Wani AA. Prevalence of overweight and obesity in young adults aged 20–40 years in North India (Kashmir Valley). Diabetes research and clinical practice. 2010; 87: e4 – e6.
21. Davy KP, Hall JE. Obesity and hypertension: two epidemics or one? American Journal of Physiology-Regulatory, Integrative and Comparative Physiology. 2004; 286: R803–13.
22. Dua S, Bhuker M, Sharma P, et al. Body mass index relates to blood pressure among adults. North American Journal of Medical Sciences. 2014; 6(2): 89-95.
23. Yadav S, Boddula R, Genitta G et al. Prevalence & risk factors of pre-hypertension & hypertension in an affluent north Indian population. Indian Journal of Medical research. 2008; 128: 712-720.
24. Rahmanian K, Shojaie M. The prevalence of pre-hypertension and its association to established cardiovascular risk factors in South of Iran. Biomedical Research Notes. 2012; 5: 386.
25. Doll S, Paccaud F, Bovet P, Burnier M, Wietlisbach V. Body mass index, abdominal adiposity and blood pressure: Consistency of their association across developing and developed countries. International Journal of Obesity and Related Metabolic Disorders. 2002; 26: 48–57.
26. Nicholas SB. Lipid disorders in obesity. Current Hypertension Reports. 1999; 1: 131-136.
27. Singh R, Bhansali A, Sialy R, Aggarwal A. Prevalence of metabolic syndrome in adolescents from a north Indian population. Diabetes Medicine. 2007; 24: 195–199.
28. Gayathri B, Vinodhini VM. Correlation of lipids and lipoprotein concentration with body mass index in obese, overweight and normal weight south Indian adults. International Journal of Research in Medical Sciences. 2017; 5: 4803-4807.
29. Sharma S, Sharma B et al; Lipid profile and risk of obesity among urban adults. International Journal of Current Research and Review. 2015; 7(23):30-33.
30. Chadha DS, Singh G, Kharbanda P. Anthropometric correlation of lipid profile in healthy aviators. Indian Journal of Aerospace medicine. 2006; 50(2): 32-37.
31. Institute of Medicine. Food and Nutrition Board. Dietary reference intakes for calcium and vitamin D. Washington, D.C.: National Academies Press; 2011.
32. Turer C, Lin H, Flores G. Prevalence of vitamin D deficiency among overweight and obese US children. Pediatrics. 2012; 131(1): E152-E161.
33. Al-Agha AE, Shaikhoon SM, Sultan M et al. Weight and Body Mass Index in Relation to Vitamin D Status in Healthy 4 to 13 Years Old Children in Saudi Arabia. Research & Reviews: Journal of Medical and Health Sciences. 2016; 5(5): 20-24.
34. Baradaran A, Behradmanesh S, Nasri H. Association of body mass index and serum vitamin D level in healthy Iranian adolescents. Endokrynologia Polska. 2012; 63(1): 29-33.
35. Shrinivasan SR, Myers L, Berenson GS. Temporal association between obesity and hyperinsulinemia in children, adolescents, and young adults: The Bogalusa Heart Study. Metabolism Clinical and Experimental. 1999; 48(7): 928-934.
36. Pearson TA, Mensah GA, Alexander RW, Anderson JL, Cannon RO, Criqui M, et al. Markers of inflammation and cardiovascular disease: Application to clinical and public health practice: A statement for healthcare professionals from the Centers for Disease Control and Prevention and the American Heart Association. Circulation. 2003; 107: 499–511.
37. Mattsson N, Rönnemaa T, Juonala M, Viikari JS, Raitakari OT. Childhood predictors of the metabolic syndrome in adulthood. The Cardiovascular Risk in Young Finns Study. Annals of Medicine. 2008; 40: 542–552.
38. Hiura M, Kikuchi T, Nagasaki K, Uchiyama M. Elevation of serum C-reactive protein levels is associated with obesity in boys. Hypertension Research. 2003; 26:541-546.

Fast-Food Marketing and Children's Fast-Food Consumption: A Trigger to Childhood Obesity

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ABSTRACT

Fast-food marketing to children and their parents is considered a stimulus to trigger childhood obesity. The authors explore the various factors influencing fast food consumption and impact of excessive fast food consumption. The public health distress with fast-food marketing lies in the anticipated relationship between fast-food consumption and obesity in both children and adults, along with the nutritional profile of most fast-food menus.The conceptual framework is designed to understand how does fast-food marketing influence parents' behaviors with respect to eating habits of their children in a manner that promote the development or maintenance of obesity in their children. The random sampling of selected parents of children aged 2 to 12 years from the community health centre and residential localities of children within the age group. The convenience sample included 314 parents of children aged 2 to 12 years. At the end suggested various strategies to reduce the trend of fast food consumption. Fast food intake among children can be reduced by implementation of policies to regulate the marketing of fast foods in Indian market. Label of nutrition contents of food might control the quantity of food ordered and choice of low fat menu among children of educated parents. Further imminent into marketing as an influence on parents' behavior with respect to eating habits of their children to ensure that food marketing plays a positive role in children's health and promotion of healthy eating habits.

Keywords: *Obesity, child health, meals, taste perceptions and fast food.*

Introduction

Childhood obesity has become one of the major societal concerns of the 21st century. The problem is global and is steadily affecting many low- and middle-income countries, specifically in urban settings. Over the past few years the prevalence of child obesity has increased at an alarming rate. Globally, in 2010 the number of overweight children under the age of five is estimated to be over 42 million. Almost 35 million of these are living in developing countries *(Global Strategy on Diet, Physical Activity & Health - WHO 2010)*[1].

Earlier in India, childhood obesity was rarely observed but since past few years as malnutrition has attracted the focus of health workers, childhood obesity is increasingly being observed with the changing lifestyle of families with more and more purchasing power, increasing hours of inactivity due to addiction to television, video games and computer, which have replaced outdoor games and other social activities.

As per the various research studies nearly 16% of children in India are overweight and 31% are in risk of falling in this category[2]. The increased rates of obesity have become a public health concern as obesity is associated with chronic disease and adverse health outcomes[3]. The root cause for such epidemic culture is an emerging trend of fast food culture among the younger generation.

Fast food Marketing: Fast food marketing has been criticized for targeting children through television advertisements and for using promotional characters or favorite cartoon characters and sweepstakes based on frequent purchase[4&5]. Beside parents are a major influence on children's access to food, and parents are also exposed to such marketing[6]. Therefore, the concern is to find the ways that marketing adversely influences children's weight by means of its effects on parents, such as by influencing the types of foods parents buy for their children or allow their children to buy? What strategies are needed and appropriate to address such influences? These questions, related to marketing directed at children, have been a focus of this paper.

Factors Influencing Fast food Consumption: Fast food restaurants are targeted to maximize the speed, efficiency, conformity and sales. The menu is kept limited and standardized so as to reduce the waiting time so that the customers eat quickly and leave. This strategy reveals the emerging fast food culture in India and its impact on children[7].

The fast food chains are further gaining popularity through nuclear families as working parents have less time for meal preparation at home. The great numbers of working parents with school going children are tired with exhausting commutes, other household activities and stress. The children spend most of their time away from home by attending tuition classes after their school hours or engaged in recreational activity. Proximity of fast food chains to households could also influence to increased consumption.

Children usually skipping breakfast at home, find fast food handy in school which results in increased fast food consumption and body mass index. It is observed that children from high socio-economic status have more preference for fast foods over traditional foods irrespective of their better nutritional knowledge[8]. This indicates socio economic status is an important factor related to fast food consumption among children.

Indian Fast Foods: India is known for its rich heritage of foods and recipes. Most common north Indian fast foods include *chole kulchae, chaat*, *pakora*, *chole bhature*, *pav bhaji*, *dhokla*, *samosa, pani puri aloo tikki* and *bhel puri*. The cooking method of this Indian fast food decides its calorie and fat content[9]. Generally most of Indian fast foods are prepared by deep frying in fats specifically transfat and saturated fats. Foods that are baked, roasted or cooked in *tandoor* have lower fat content. *Hydrogenated oil* used in Indian cooking is rich in transfats and have been replaced in many restaurants by refined vegetable oil. Transfat content in Indian fast food are far higher than western foods[10]. Transfat content in *bhatura, parantha* and *puris* is 9.5%, 7.8% and 7.6%, respectively as compared to 4.2% in regular French fries. South Indian foods like *idli* and *uthappam* are better as they are good source of carbohydrates and proteins rather than fat.

Conceptual Framework and Hypotheses: Favourable attitudes or the belief that behaviour is normative in a community may send a subtle message that the behaviour is supported and facilitate the likelihood of the behaviour. Thus, we hypothesize that fast-food marketing not only affects consumption levels in the community of interest (children) but also influences parents' attitudes toward fast food and their beliefs about social norms surrounding fast food consumption. This result in more positive fast-food attitudes and the degree to which parents perceive fast-food consumption as socially normative are associated with children's greater fast-food consumption. Further, parents' attitudes and beliefs about fast food strengthen the relationship between parents' easy approachability to fast-food marketing and their children's fast-food consumption. Thus the two hypotheses identified are

H1: Parents' easy approachability to fast-food restaurants and exposure to fast-food promotion are associated with their children's greater frequency of fast-food consumption.

H2: Parents' (a) beliefs about social norms surrounding fast food and (b attitudes towards fast food strengthen the relationship between parents' easy approachability to fast-food restaurants and exposure to fast-food promotion.

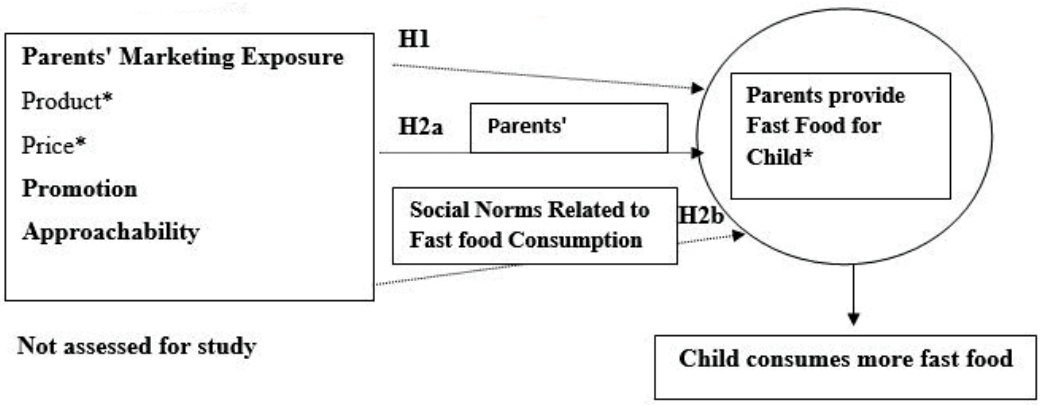


Figure 1: Conceptual Framework for Hypotheses

Method and Measures

For the sampling strategy, we randomly selected parents of children aged 2 to 12 years from the community health centre and residential localities using a centralized file of chart numbers of children within the age group. The convenience sample included 314 parents of children aged 2 to 12 years. The parents' education and income with standard demographic questions were also assessed. (Table 1)

Table 1: Summary of Sample Characteristics

	N	Percentage
Total sample	314	100
Female	163	52
Younger than age 7	184	59
Household Income		
Less than Rs 3,00,000 p.a.	48	15.3
Rs. 3,00,000 to Rs. 5,00,000 p.a.	192	61.1
Rs.5,00,000 to Rs. 8,00,000 or more p.a.	74	23.5
Parents' Education		
12th or less	81	25.8
Graduate	142	45.2
Post Graduate	91	29.0
Urban Residence	204	65
Overweight	158	50.3
At risk of overweight	48	15.2

Discussions

Tests of Hypotheses: To test the hypothesis that parents' higher reported exposure to fast-food promotions is associated with their children's more frequent fast-food consumption (H1; refer Figure1), the multiple regression analysis for ordinal outcomes with the three-category measure of children's fast-food consumption as the dependent variable. Further it was determined whether social norms strengthen the association between fast-food promotion and children's fast-food consumption (H2a). To establish the first path of H2a, a multiple linear regression was performed to test whether parents' reports of higher exposure to fast-food promotion are associated with more positive social norms surrounding fast food, after this study controlled parameters, the child's age, weight status and for the parent's education and income. The analysis supported the relationship ($t = 2.66$, $p = .009$). To demonstrate whether a parent's perceptions of social norms regarding fast food strengthen or account for the relationship between reports of fast-food promotion and fast-food consumption, a second ordinal regression analysis was performed. The model included the independent variable—fast-food promotions, the putative mediator—social norms and the covariates included in the original model. Parents' perceived social norms regarding fast food were directly associated with consumption ($\chi 2 = 8.63$, $p = .003$). However, in this model, parents' perceived exposure to marketing promotions was no longer related to frequency of fast-food consumption ($\chi 2 = 2.39$, $p = .12$), which suggests a mediation effect.

Exclusively, the results suggest that fast-food promotions affect the frequency of children's fast-food consumption through influences on parents' perceptions about social norms, which provides support for H2a.

The test of the H2b by modelling parents' attitudes toward fast food as a function of reported exposure to fast-food promotions, after we controlled for the covariates discussed in the previous models. We found no association ($t = –.86$, $p = .39$), though attitudes did have a direct effect on consumption ($\chi 2 = 10.02$, $p = .002$). Thus, parents' attitudes do not appear to be an intervening variable that explains the relationship between parents' reports of fast food promotions and their children's fast-food consumption. Thus, there is no support for H2b.

Impact of Excessive Fast Food Consumption: The major concerns with fast food consumption in developing countries as India include poor hygiene during preparation storage and handling leading to microbiological contamination. Consumption of diet high in sugar, saturated fat, salt and calorie content in children can lead to early development of obesity, hypertension, impaired glucose tolerance and various other diseases. Fast foods not only have high level of fat and sugars that unhealthy but have addictive creates a vicious cycle making it hard for children to select healthy food. High content of trans fat in commercially available fast foods predispose children to risk of future heart diseases. Energy density of fast food is more than twice the recommended daily allowance for children. Fast food intake leads to higher proportion of calories being derived from total and saturated fat[11]. Moreover, the

micronutrient content (carotene, vitamin A, and vitamin C), calcium and magnesium of the fast food is also low. Such diet can contribute to osteoporosis. Diets rich in free sugars can lead to increased risk of dental problems.

Strategies to Reduce the Trend of Fast Food: The enhanced pattern of fast food consumption and childhood dietary habits forces to think some strategies to curtail it. Strategies could be designed for healthy food intake by availability of healthy standard foods, information campaigns and surveillance of diets and disease burden. Health education and school based intervention programs can improve the dietary pattern of children. Few schools in India have banned the sale of junk foods in the school cafeteria. An NGO in India has introduced school mid-day meal programs[12] in government aided schools, where healthy Indian foods are offered to children.

Another strategy to enhance the purchase of healthy foods among children and teens is price reduction on healthy snacks as fresh fruits and salad. Nutritional labeling of low fat label[13] too indicates significant increase in their consumption among teens population. In a study it was observed that a 10% increase in the cost of fast food meal led to 3% increases in consumption of fruits and vegetables.

Further televisions, newspapers and effective school education campaigns should focus its presentation on healthy lifestyle and eating among children and adolescents. Marketing strategy should be to encourage children to consume foods with high nutritious value like food grains, pulses, legumes, fruits and vegetables. In developing country as India where poverty still prevails in major part of country, government has taken measure to liberalize the international trade to reduce the cost of food grains. However, trade liberalization[14] has led to massive infiltration of Indian market with fast food joints. Policy reforms and imposing heavy tax on imported and manufactured readymade food items might control this intrusion.

Following measure could be adopted by parents to promote healthy food intake among children:

- Aerated beverages should be replaced by fresh lime juice, coconut water and fresh fruit juices.
- Child should be tempted with a plate filled with plenty of brightly colored vegetables, fruits and sprouts.
- Chocolates, candies ice-creams and other heavy desserts can be replaced by low fat fresh yogurt.
- Substitute meat or poultry with baked or boiled items, fried with grilled fresh sandwiches.
- Dough used for preparing *poori*/*pakoras* should be thick and avoid using ghee or oil for making the dough as this might increase oil absorption.
- Avoid ordering combo meal or mega meal offer to limit the quantity of the food ordered.
- In Indian menu go for *tandoori roti* as low fat option breads rather than *bathure, puri or naan.*
- While dining away from home avoid opting for dishes with rich creamy layers and lots of spices.
- Dishes can be shallow fried rather than deep fry to have lesser the fat content.
- Avoid motivating children for their good achievements and academics through chocolate bars.
- Last if too fond of such eating give your children only a single day in a month for this.

Conclusions

Parents' perceptions of more favorable social norms toward fast food mediate the association between exposure to fast food promotion and children's more frequent consumption of fast food. This has made fast foods an important part of dietary menu for most children, adolescents and even adults. Children are lured by convincing marketing strategies and peer pressure. Consumption of diet high in sugar, saturated fat, salt and calorie content in childhood can lead to early development of obesity and cardiovascular risks. Fast food intake among children can be reduced by implementation of policies to regulate the marketing of fast foods in Indian market. Nutritional labeling of food might restrict the quantity of food ordered and choice of low fat menu among children of educated parents. Additional insight into marketing as an influence on parents' behavior with respect to feeding their children to ensure that food marketing plays a positive role in children's health and promotion of healthy eating habits.

Overall, the results of this study show that fast-food marketing influences parents' behaviour with respect to feeding their children. Thus, for a more comprehensive understanding of approaches to reduce childhood obesity

and related cardiovascular risk factors, research that assesses the influence of marketing on children's eating behaviours and policy debates about food marketing to children should consider parents' marketing exposure. Additional insight into marketing as an influence on parents' behaviour with respect to feeding their children will assist researchers, policy makers, and marketers in developing mediate to ensure that food marketing plays a positive role in children's health.

Ethical Clearance: Taken from nil committee

Source of Funding: Self

Conflict of Interest: NIL

REFERENCES

1. Hawkes C. Marketing activities of global soft drink and fast food companies in emerging markets: a review. *In:* Globalization, Diet and Non communicable Diseases. World Health Organization 2002. Available from: whqlibdoc. who.int/publications/9241590416.pdf. Accessed July 14, 2010.
2. Our UNESDA commitments to act responsibly. Available from www.unesda.org/our-unesda commitments-act-responsibly. Accessed July 14, 2010.
3. Fast foods: Wikipedia the Free Encyclopedia. Available from: www.en.wikipedia.org/wiki/ Fast_food. Accessed March 1, 2010.
4. Kelly B, Hattersley L, King L, Flood V. Persuasive food marketing to children: use of cartoons and competitions in Australian commercial television advertisements. Health Promote Int. 2008;23:337-44.
5. Batada A, Seitz MD, Wootan MG, Story M. Nine out of 10 food advertisements shown during Saturday morning children's television programming are for foods high in fat, sodium, or added sugars, or low in nutrients. J Am Diet Assoc. 2008;108:673-8.
6. Sonya A. Grier, et.al. Fast-Food Marketing and Children's Fast-Food Consumption: Exploring Parents' Influences in an Ethnically Diverse Sample, American Marketing Association2007, Vol. 26 (2) pg 221-235.
7. Vijayapushpam T, Menon KK, Rao R D, Maria Antony G. A qualitative assessment of nutrition knowledge levels and dietary intake of school children in Hyderabad. Public Health Nutr. 2003;6:683-8.
8. Niemeier HM, Raynor HA, Lloyd-Richardson EE, Rogers ML, Wing RR. Fast food consumption and breakfast skipping: Predictors of weight gain from adolescence to adulthood in a nationally representative sample J Adolesc Health. 2006;39:842-9.
9. Calorie, nutrition of Indian food and cooking. Available from: www.fatfreekitchen.com/nutrition/ indian-foods. html. Accessed July 14, 2010.
10. Indian food worse than western junk. Available from: timesofindia.indiatimes.com/article show/1755418.cms. Accessed July 14, 2010.
11. World Health Organization. Life Course Perspective on Coronary Heart Disease, Stroke, Diabetes. Available from: whqlibdoc.who.int/ hq/2001/WHO_NMH_ NPH_01.4.pdf. Accessed July 14, 2010.
12. Mid-day meal programme. Available from: URL: www.akshaypatra.org.Accessed August 24, 2010.
13. Tandon PS, Wright J, Zhou C, Rogers CB, Christakis DA. Nutrition menu labeling may lead to lower-calorie restaurant meal choices for children. Pediatrics. 2010;125: 244-8.
14. CIAA annual report 2009. Available from:www. ciaa.be/asp/documents/brochure_form.asp?doc_ id=75. Accessed July 14, 2010.

Retina Identification System Using Machine Learning and Multiple Regression Model

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ABSTRACT

In recent year, Macular Degeneration is the leading cause of vision loss. Macular Degeneration is caused by the deterioration of the central portion of the retina, the inside back layer of the eye that records the images we see and sends them via the optic nerve from the eye to the brain. The retina's central portion, known as the macula, is responsible for focusing central vision in the eye, and it controls our ability to read, drive a car, recognize faces or colors, and see objects. The aim of our proposed paper is to detect macular degeneration by using machine learning and regression analysis. This involves segmentation, plotting of histogram, edge detection and singular value decomposition. The results derived from edge detection are used in regression analysis.

Keywords: *segmentation, edge detection, singular value decomposition, multilinear regression, multicollinearity*

Introduction

Eye health assistance of people is an issue of great relevance. In the recent years in Indian societies, it is observed that so many people are facing more challenges to protect their eye. Developing countries like India, face more age related diseases among elderly groups. The most common disease in eye is aged macular degeneration. The primary reasons for this disease are aging and genetic disorder. To overcome these issues, health assistance and monitoring system for early detection of aged maculer degeneration through machine learning prediction algorithm is proposed. This helps in remote interaction with society.

Reason for degeneration is eventually demise of cells in retina. Other cause of degeneration is blockage in vein and diabetic. The degeneration causes blindness, starting with tunnel vision, peripheral sight loss. The main cause of these types of degeneration is genetic disorder and ageing. It is necessary for new approaches involving machine learning to diagnose and detect these effects in time for better health adjunct system. It helps the society. Damage of macula and a little blemish approximately close to the midpoint of eye in the retina leads to retina degeneration and subsequently vision loss. The retina degeneration progress is quick and might lead to vision loss in one eye or both eyes. The general symptom of retina degeneration is blurred region close to the mid of vision.

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Method Details

This paper presents a method for detection of macular degeneration using machine learning and multiple regression analysis. Reason for degeneration is eventually demise of cells in retina. Other cause of degeneration is blockage in vein and diabetic. The degeneration causes blindness, starting with tunnel vision, peripheral sight loss. The main cause of these types of degeneration is genetic disorder and ageing. It is necessary for new approaches involving machine learning to diagnose and detect these effects in time for better health adjunct system. It helps the society. Damage of macula and a little blemish approximately close to the midpoint of eye in the retina leads to retina degeneration and subsequently

vision loss. The retina degeneration progress is quick and might lead to vision loss in one eye or both eyes. The general symptom of retina degeneration is blurred region close to the mid of vision.

Machine vision should be a direct method for getting information of surroundings. the human eyes location problem has attracted significant interests in the last decades [1,2,3]. Many efforts have been addressed to seek for eyes. A pupil generally is darker than surround eyeball, therefore algorithms can be designed to search for gray character[4]. For more effective, gray balance or contrast enhancement can be employed. Based on it, precedential knowledge on the facial feature arrangement will be helpful to detect several candidates of eyes [5,6,7]. But, the color of pupil must sharply affect the work of algorithms, as well as lighting condition. For solving these problems, an artificial template could be involved. So, in [8], the correlation coefficient between the template and the eye image can be calculated to decide which eye pair is. In addition, in the interest of reducing disturbance of color, Hough Transform is proposed to find the circle shape of the eye irises and eyelids[9]. As we know, the Hough Transform should lead to heavy load of calculation. Furthermore, NN can be counted on to solve problem well. Bianchini and Sarti [10] refer to the eyes possess strong horizontal and vertical edges, the exploitation of gradient features is particularly suited to repre sent the image content. Therefore, a neural autoassociators can be trained to detect eye region by gradient features. In order to extract gradient features, Sobel filter is utilized. More recently, Gabor wavelets techniques [11], where Gabor wavelet-based linear filters are used for eye corner detection, and non-linear (Gaussian) filters are used for eye location. Moreover, the fractal model provides an excellent representation of the ruggedness of natural surfaces and has served as an image analysis tool for a variety of applications.

A review of the image, machine learning techniques, detection, classification to filter the medical image and to perform disease area segmentation[12,13]. The application of various image processing techniques for automatic detection of glaucoma is presented in [14]. An approach for automatic classification of fundus images using image and data pre-processing techniques to improve the performance of machine learning classifiers [15,16]. In [17], application of singular value decomposition is discussed. Machine learning techniques, detection, classification to filter the medical image[18,19].

Data Base: Retina gallery full sized retina image in fig 1 normal image and diseased retina.



Fig. 1: Normal retina,diseased retina

Methodology

The methodology involves, machine learning, singular value decomposition and multiple linear regression analysis. The images are selected from the database and processed using MATLAB-R2015a. Singular value decomposition is used for comparison of normal iris and degenerated iris. The results of SVD are validated through linear multiple regression analysis. For performing multiple regression analysis, SPSS tool is used. Many methods exist to validate the results, but application of linear multiple regression analysis is a novel approach to validate the results.

The RGB image is converted to grey scale image.

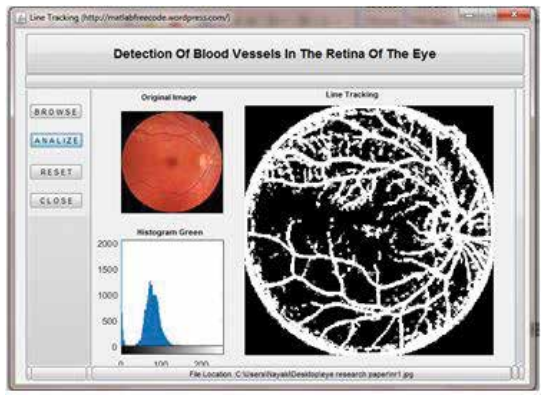


Fig. 2: Detection of blood vessels in the normal retina of the eye

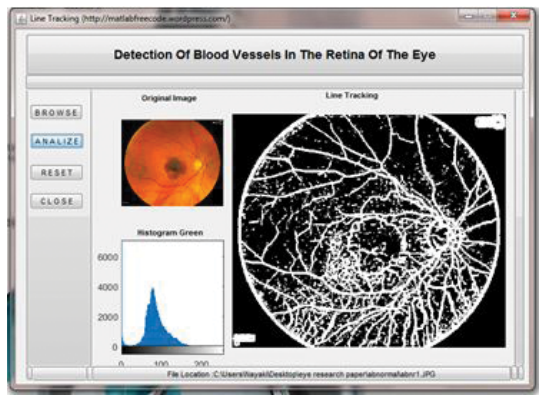


Fig. 3: Detection of blood vessels in the upnormal retina of the eye

Histogram plot of the image is in Fig.2 and 3. The histogram plot reveals the intensity of light distribution and peak of macular degeneration black spot. The histogram of normal eye, Fig.2a is not skewed and the shape of the cur ve is leptokurtic, it shows there is no drusen in the background of the eye. The histogram of diseased eye, Fig.3 is positive skewed, and leptokurtic. It shows small amount of drusen is distributed in the background of the eye. Almost symmetric histograms, we observe high concentration of pixel around the mean value. From diseased eye, Fig.3 is leptokurtic and the distribution allow the existence of small drusen as outlayers and that do not alter the general uniformity of the intensity.

The original image is converted from RGB to Green Channel. Complement structuring Element Morphological operation is done by Median Filter. Removal of background and image adjustment using intensity of the image is performed. Fig. 4, show the segmentation of the retina blood vessels through morphological operation of normal and diseased eye respectively. These allow the ophthalmologist to analyze the blood supply to the retina through cluster centres.

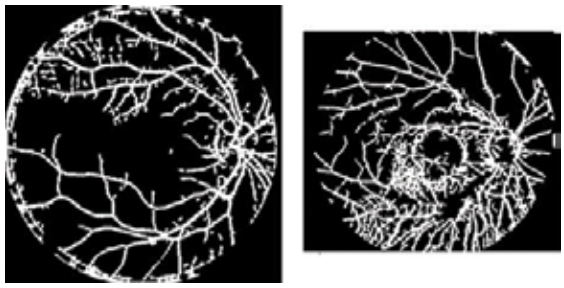


Fig. 4: Segmentation of blood vessels

The singular value decomposition is closely associated to the companion theory of diagonalisation of symmetric matrices. If A is a real symmetric n x n matrix there is an orthogonal matrices U and V and a diagonal matrix S such that.

Here the columns of V are latent vectors for A and diagonal entries of are eigen values of A. Here U is m x m and V is n x n, so that S is rectangular with the same dimensions as A. The matrix S can be formatted to be non-negative and in order of decreasing order. The columns of U and V are called left and right singular vectors of . Any non-square matrix is converted as a square matrix through singular value decomposition in order to calculate the correlation coefficient. Detection is mainly based on the comparison of correlation coefficient normal iris and degenerated iris.

Diagnostic test indicates the presence of disease when the result of the diagnostic test is true positive. The test suggests the disease is absent as well, when the outcome is true negative (TN). In the condition of no information about the disease, the test result is false positive (FP). Similarly, if the result of the diagnosis test reveals that the disease is absent for a patient for sure, the test result is false negative (FN).

In order to correctly identify as normal iris image and to correctly identify diseased iris, true positive is used. While, comparison of the images using SVD and correlation coefficient, a threshold of 80% is set to classify as True positive and True negative. The values of TP and TN are taken as independent variables of multiple linear regression analysis. The dependent variable is formed through AND logic gate.

Multiple regression is a statistical technique that allows us to predict dependent variable or criterion variable on the basis of several independent variables or predictor variables. The general multiple regression is in the form of, where denote the measure of how strongly to each predictor variable influences the criterion variable.

Here, the resulting multiple regression equation is Y= -0.069+0.7245 x1+0.2875 x2. As x1 increases by 72%, the output Y increases and x2 increases by 28%, the output increases. Table 1 reveals that the adjusted value is 0.75, thus our model is fit for dependent independent variable. The reports on ANOVA, which assess the overall significance of our model from p-value is less than 0.05, so our model is significant for analyzing dependent and independent variable in table 1 and table 2. Output from the multiple regression model show that If the variable x1 is increase then the dependent variable is increase. Variable x2 increase then the dependent is also increase. Further analysis the multiple collinearity to check for all variable. Because from multiple collinearity we can analysis the nature of the variable. dependent and independent variable in table 1 and table 2.

Table 1: Model summary and ANOVA

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.864[a]	.747	.72	.23821	.747	1 43.238	2	97	.000	1.302

Table 2: Collinearity Diagnostics[a]

Dimension	Eigenvalue	Condition Index	Constant	Var 1	Var 2
1	2.1	1	0.08	0.08	0.09
2	.54	2	.08	.17	.89
3	.29	2.7	.84	0.75	.02

Method Validation: Measure the amount of multicollinearity in a set of multiple regression variables. The presence of multicollinearity within the set of independent variables can cause a number of problems in the understanding the significance of individual independent variables in the regression model. Using variance inflation factors helps to identify multicollinearity issues so that the model can be adjusted.

VIF quantifies how much the variation is inflated. Multicollinearity is calculated using

$$R_L = \frac{\sum_{i=1}^{n} VIF_n}{n} \text{ and } VIF = \frac{1}{1-R^2}$$

VIF is 1 means that there is no correlation among the variable. VIF is exceeding 4 warrant further investigations. VIF is exceeding 10 are sign of serious multicollinearity problems.

Here, VIF = 0.27. This indicates, that the model is not seriously affected by multicollinearity .

Conclusion

From the above results are shows that 72 percentage fit for detection of disease. The characteristic of the edge of nerves is perfect for identification of macular. Remaining portion of the 28 percentage is due to the problem with some nerve diseases at the time of checking.

Notes

Compliance with ethical Standards

Conflict of Interest: The authors declare that they have no conflict of interest.

Ethical Clearance: The article does not contain any studies with human participants or animal performed by any of the authors.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

REFERENCES

1. Bianchini M. Sarti L. An eye detection system based on neural auto associators,artificial neural networks in pattern recognition in: Second IAPR Workshop, ANNPR 2006 Proceedings, 2006,244–252.
2. Dobes M, Martineka J, Skoupila D, Dobesovab Z, Posps J. Human eye localization using the modified Hough transform, Optik 117,2006, 468–473.
3. Lin K H, Lan K.M, Siu.W.C. Locating the eye in human face images using fractal dimensions, IEE Proc. Vis. Image Signal Process, (December (6)), 2001,148, 413–421.
4. Rizon M, Kawaguchi T. Automatic eye detection using intensity and edge information, Proc. IEEE TENCON,2000, 2, 415–420.
5. Zhang L, Lenders P. Knowledge-based eye detection for human face recognition, in: Proceedings of the 4th Int. Conf. on Knowledge-based Intelligent Electronic System, KES, 2000.,1, 117–120.
6. Kim H, Lee H J, Kee, Seok S C. A fast eye localization method for face recognition, 13th IEEE International Workshop on Robot and Human Interactive Communication, 2004.,241–245.
7. Du.G. Eye location method based on symmetry analysis and high-order fractal feature, IEE Proc. Vis. Image Signal Process, 2006,153 (1), 11–16.
8. Koh E J, Rhee P K. Image context-driven eye location using the hybrid network of k-means and RBF, Lecture Notes in Computer Science, v 4222 LNCS-II, in: Advances in Natural Computation—Second International Conference, ICNC 2006, Proceedings, 2006,540–549.
9. Mandelbrot B B. Fractal analysis and synthesis of fracture surface roughness and related forms of complexity and disorder, International Journal of Fracture, 2006,138 (1-4), 13–17.

10. Yan S C H, He X F, Hu Y X, Zhang H J. Bayesian shape localization for face recognition using global and local textures, IEEE Transactions on Circuits Systems. Video Technology, 2004,14(1), 102–113.

11. Machala L, Pospısil J. Proposal and verification of two methods for evaluation of the human iris video-camera images, Optik, 2001,112(8), 335–340.

12. Parul, Sharma N. A study on retinal disease classification and filteration approaches, International Journal of Computer Science and Mobile Computing,2015, 4(5), 158-165.

13. Mangai A, Nayak J, Kumar S V. A novel approach for classifying medical images using data mining techniques, International Journal of Computer Science and Electronics Engineering (IJCSEE), 2013,1(2), 188-192.

14. Inbarathi R, Karthikeyan R. Detection of retinal hemorrhage in fundus images by classifying the splat features using SVM, International Journal of Innovative Research in Science, Engineering and Technology, 2014, 3(3), 1979-1985.

15. Preeti, Pruthi J. Review of image processing technique for glaucoma detection, International Journal of Computer Science and Mobile Computing,2013, 2(11), 99-105.

16. Sellapan N., Nagarajan D., Palanikumar Evaluation of Risk Priority Number (RPN) in Design Failure Mode and Effects Analysis (DFMEA) using Factor Analysis, International Journal of Applied Engineering Research, 2015,Volume 10, Number 14 (2015) pp 34194-34198.

17. Ramesh.S, karunamoorthy.L, Nagarajan.D, Analysis of titanium alloy machining parameters using singular value decomposition. International conference on Advances in modeling, Optimization and Computing, IIT Roorkee -,2011,166-174.

18. Nagarajan D, Sujatha R, Kavimumar J, Changpang, Lathamaheswari M. Retinal Degeneration Using Iris Image through Machine Learning, Indian Journal of Publich Health Research and Development, 2018,10(2), 144-148.

19. Nagarajan D. Image denoiseing using LU decomposition and Features extraction using GLCM, International Journal of Advanced Research in Computer Science, 2017,8(7), 675-677.

Breast Cancer Prediction Using Ensemble Techniques

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ABSTRACT

One of the most dangerous types of cancer affecting women across the world happens to be breast cancer. As per clinical experts, detecting this cancer in its first stage is crucial in saving lives. The variables like sample code number, clump thickness, uniformity of cell size, uniformity of cell shape etc., are some of the important risk factors providing information, allowing identification of the recurrence of breast cancer and cure it in the earliest stages.

The factors responsible are obtained as an output from the data mining models. Existing studies and their results have produced good accuracies with minimal error rates in prediction. The medical diagnostic models which are based on data mining techniques can capture delicate designs and dependencies providing promising results. Promising results can be obtained from medically focussed diagnostic models which are based on data mining techniques, which have the capability to interpret ethereal structure and relationships. Single data mining technique may not suffice in providing results which are constant and competent.

Ensemble learning involves the blending of combination rules with input as several selected and generated intermediate risk factors to finally obtain simple selection results as output. The aim of this paper is to analyse the existing standard methodologies and to develop a new ensemble model comprising of classification techniques which will result in higher precision.

Keywords: *Breast Cancer, Prediction, Voting, Stacking, Boosting.*

Introduction

According to government statistics, breast cancer is one of the leading cancers affecting Indian women with a rate as high as 25.8 per 100,000 women and mortality of 12.7 per 100,000 women. [1, 2]The average 5-year survival rate for women with invasive breast cancer is 90%. The average 10-year survival rate is 83%.

The information obtained from this data is analysed from a large existing data, which makes it possible to make the right decision following the important information collected. Due to the rigid, complex nature of data processing, it can still be divided into simple steps. [3] These steps include data classification, data sorting and rearrangement, data summary/aggregation, data calculation, data selection.

Ensemble learning by its name involves the inclusion of more than one entity such as models. It is primarily used to meliorate the performance of a model (classification, prediction, an approximation of a function, etc.), reduce the probability of a poor pick or both. [4, 5] A good model of machine learning on unseen data should be able to perform well. The ordinary methods of machine learning, however, learn from the training data only one hypothesis. Various methods give rise to different hypotheses, but cannot justify completely on its own. Therefore, many hypothesises are learned and combined to form a good hypothesis in order to achieve better results on unseen data. Instead of just one model training and using the combined hypothesis of all the individual hypotheses, many models are trained on the data in ensemble learning, as your final hypothesis. The models which are combined are called base learners. [6,7] Ensemble principally includes Bagging, Boosting, Stacking and voting techniques.

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In bagging, various training data subsets are drawn from the entire training dataset in a random manner with replacement. Ensemble decision for any given instance is the predominant chosen class, which is from the combination if respective classifiers by mean of majority vote. Measures such as the usage of a subset of training data to train each classifier or using relatively weak classifiers (such as decision stumps) can be used to enhance diversity. The need for additional measures is due to significant overlapping of training data sets.

Boosting creates a classifier ensemble by resampling the data, later combined by majority vote. Classifiers with the most informative training data are created via resampling, resulting in the three weak classifiers. The ordinal classifier involves training with a randomly chosen subset from the available training data. The most elucidative subset where only half of the training data are properly classified and the other half are misclassified is fed as the training data subset for the second classifier. The third classifier is trained and disagrees with instances. The three classifiers are combined by a majority vote of three ways.

Stacking is to explore the same problem with a space of different models. The idea is that you can attack a learning problem with different types of models which are capable to learn some part of the problem, but not the whole space of the problem. So you can build multiple different learners and you use them to build an intermediate prediction, one prediction for each learned model. Then you add a new model which learns from the intermediate predictions the same target. It is said that this final model is stacked on top of the others. So you could improve your overall performance, and you often end up with a model that's better than any intermediate individual model.

Voting is a technique of aggregation used to combine multiple classifier decisions. Every single classifier contributes a single vote in its simplest form, based on a plurality or majority vote. Summarizing all votes and selecting the highest aggregate class ensues the final prediction.

Proposed System: We used the method of selection of features and assembly techniques in our proposed system. Feature selection process helps in reducing inputs for processing and analysis, improving the quality of the model and also making the modelling process more efficient. On omitting the feature selection method, quality degradation can be observed due to unessential columns resulting in:

1. Noisy or redundant data makes it more difficult to discover meaningful patterns
2. Larger training data set is required by the majority of data mining algorithms, where the data set is defined in higher dimensions.

The objective of our proposed work is to construct an ensemble with K nearest neighbour and Naïve Bayes algorithms. Here we have given Wisconsin dataset as an input to the K nearest neighbour algorithm and the output obtained from this algorithm is given to Naïve Bayes algorithm. Then ensemble methods like Bagging, Boosting, Stacking and Voting are applied to these algorithms. As mentioned in Table 1 we have done this process with a different number of features.

Results and Discussion

For experimental purpose, we have used Wisconsin dataset. It has 683 instances and 9 attributes namely sample code number, clump Thickness, Uniformity of cell shape, Uniformity of cell size, Marginal adhesion, Singe epithelial cell size, Bare nuclei, Bland chromatin, normal nucleoli, Mitosis. From the Table 1, it can be inferred that voting ensemble method results in higher accuracy.

Table 1: Accuracy with different Features

Sl. No.	Techniques	Accuracy				
		All Features	8 Features	7 Features	6 Features	5 Features
1.	KNN	95.07	95.08	94.79	94.64	94.64
2.	Naive Bayes	94.16	94.34	94.19	93.75	94.19
3.	Ada Boosting	95.47	95.46	95.76	95.76	96.05
4.	Grad Boosting	96.35	96.49	96.20	96.50	96.49
5.	Stacking	96.52	96.66	96.52	96.08	96.37
6.	Voting	97.07	97.08	96.49	96.93	96.64

Conclusion

The proposed scheme can provide promising results in the prediction of breast cancer. Our approach intromits multiple independent variables and provides a practical and useful tool for outcome prediction of breast cancer. Here we have used feature selection method and also some ensemble techniques with Naïve Bayes and K nearest neighbour algorithms which help in the best prediction of breast cancer by improving the accuracy. We can infer from the output that voting is the best technique. Our future research endeavours include the practice of medical diagnosis scheme involving proposed machine serving as a foundation for critical dealing with medical problems.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Chih-Jen Tsenga, Chi-JieLub, Chi-Chang Changc, Gin-Den Chena, ChalongCheewakriangkrai. Integration of data mining classification techniques and ensemble learning to identify risk factors and diagnose ovarian cancer recurrence. Artif Intell Med. 2017; 78: 47–4.
2. Landrum LM, Java J, Mathews CA, Lanneau Jr GS, Copeland LJ, Armstrong DK, et al. Prognostic factors for stage III epithelial ovarian cancer treated with intraperitoneal chemotherapy: a Gynecologic Oncology Group study. GynecolOncol. 2013; 130(1):12–8.
3. Mangone L, Mandato VD, Gandolfi R, Tromellini C, Abrate M. The impact of epithelial ovarian cancer diagnosis on women's life: a qualitative study. Eur J GynaecolOncol. 2014; 35(1):32–8.
4. Nolen BM, Lokshin AE. Screening for ovarian cancer: old tools, new lessons.Cancer Biomark. 2010; 8(4–5):177–86.
5. Delen D, Walker G, Kadam A. Predicting breast cancer survivability: a comparison of three data mining methods. Artif Intell Med. 2005; 34(2):113–27.
6. Utomo CP, Kardiana A, Yuliwulandari R. Breast cancer diagnosis using artificial neural networks with extreme learning techniques. Int J Adv Res ArtifIntell. 2014; 3(7):10–4.
7. Previs RA, Bevis KS, Huh W, Tillmanns T, Perry L, Moore K, et al. A prognostic nomogram to predict overall survival in women with recurrent ovarian cancer treated with bevacizumab and chemotherapy. GynecolOncol. 2014; 132(3):531–6.

Effects of Pesticides on Lung Function Test in Farmers of Satara District, Maharashtra, India

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ABSTRACT

Introduction: Indiscriminate use of pesticides like organophosphate, organochlorine, carbamate and pyrethroid poses various health hazards to human nervous, respiratory, endocrine, reproductive and immune systems.

Objectives: To access extent of derangement in respiratory function of farmers who are exposed to pesticide in the Satara District.

Method: 40 pesticide sprayers having age group 25-35 were selected as subjects. 40 age matched healthy farmers who were not involved in spraying activity were taken as control. Lung function was measured in morning by using computerized "HELIOS 701" instrument which includes FVC (Forced Vital Capacity), FEV1 (Forced Expiratory Volume in First second of FVC), FEV1% (FEV1as % of FVC), PEFR (Peak Expiratory Flow Rate in liters/sec), FEF25-75% (Forced Expiratory Flow Rate during 25to75 % of expiration), FEF 0.2-1.2 (Forced Expiratory Flow between 0.2-1.2 liters of expiration) and MVV (Maximum Voluntary Ventilation). After computing mean and SD of both groups comparison was done by using Unpaired t test to find out level of significance.

Results: Impairment of lung function (Predominantly restrictive type) was found in study groups as compared to controls.

Conclusions: Exposure to pesticides causes lung function derangement in pesticide sprayers.

Keywords: *lung function, pesticide sprayers.*

Introduction

Pesticides are profusely used to increase agricultural productivity and to eradicate many vector-borne diseases.[1]Indiscriminate use of pesticides like organophosphate, organochloride,carbamate and pyrethroid poses various health hazards to human nervous, respiratory,endocrine,reproductive and immune systems[2]. In modern agricultural practices use of more pesticides to gain higher cultivation has become major public health problem.[3]Indian agriculture industry is not as mechanized and advanced like other countries and its more labour intensive. There is no use of personal protective equipments (PPE) during spraying, poor housekeeping and storage, improper handling of pesticides leading to increased health hazards. [4] Hence farmers are exposed directly to pesticides.

Farmers are exposed to pesticide mainly by three ways. Firstly, through skin or eyes, secondly through mouth and thirdly through lungs (inhalation).Lung is target organ of inhaled toxicants and affected subsequent pesticide exposure by inhalation.[5]Long term exposure to cholinesterase-inhibiting pesticides those producing vapours, air droplets may cause irritant effects in respiratory tracks, lungs and lead

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to narrowing of airways, damage to the alveolar capillary membrane and gas diffusion impairments.[6]There are more deaths due to pesticide poisoning than infectious diseases in the developing world. Pesticide poisoning among farmers and occupational workers is alarming.[7]World Health Organization (WHO) estimated that approximately 20,000 workers die from exposure of pesticide every year, majority in the developing countries.[8]Recently on Wednesday, August 15, 2018, The Times Of India, New Delhi Indian newspaper reported some pesticides were banned by Indian Government as their usage is cause for cancer.

Farmers in developing countries are under impression that pesticides are substitutes for fertilizers and there is need to create awareness at grass root level among the farmers.[9]The researchers till date in some parts of India have studied effects of pesticide spraying on lung functioning of farmers. But they have studied only few parameters of pulmonary function test (PFT). Very less work has been done on PFT of farmers in the Satara District. Therefore aim of present study is to access extent of derangement in respiratory function of farmers who are exposed to pesticide in Satara District.

Materials & Method

In this study, 40 pesticide sprayers having age group 25-35 were selected as subjects. 40 age matched healthy farmers who were not involved in spraying activity were taken as control group. Both groups were having same socioeconomic status. The study was conducted in Satara District during the period from November 2017 to Feb 2018. Approval from Institutional Ethical Committee (IEC) was taken prior of starting research. Sprayers were having pesticide exposure for an average of 7-8 years. A detail history of both groups was taken by use of questions regarding duration of work, smoking habits, diet and present respiratory symptoms. Prevalence of respiratory symptoms was recorded by using questionnaire which is based on British medical research council.[10]The questions were formulated in such a way to get maximum information about respiratory symptoms of pesticide sprayers over the period of last one year. It includes prevalence of upper respiratory symptoms such as sinusitis, rhinitis, sore throat, common cold and fever. Prevalence of lower respiratory symptoms such as dry cough, wet cough, wheeze, heaviness in chest and dyspnoea. Dyspnoea was assessed by using dyspnoea scale of Medical Research Council.[11] It comes under six headings as following.

Category	Symptoms	Dyspnoea grade
0	No any abnormality	No
1	Shortness of breath while walking up slight hill or hurrying on the level.	Slight
2	Walk slower than people of same age on the level due to breathlessness.	Moderate
3	To stop while walking at own pace on the level due to breathlessness.	Moderately severe
4	Stops for breath after walking about 100 yards or after a few minutes on the level.	Severe
5	Too breathless	Very severe

The sprayers having smoking habits, past history of respiratory or cardiac disease were excluded from the study. Institutional Ethical Committee (IAC) approval was taken. Informed written consent from all the subjects and controls was taken. Anthropometric measurements like height and weight were recorded for each participant. Their lung function tests were done preferably in the morning.Lung function was measured by using a computerized "HELIOS 701" (RMS Chandigarh, India) instrument.Spirometry was carried out as per guidelines of American Thoracic Society.[12] Before recording lung functions, subjects were shown a demonstration of the test. Consequently minimum three readings of each test were taken for every subject and the best of three was selected for having reproducibility and validity of the recorded parameters.

Statistical Methods: SPSS version-20 was used for statistical analysis. Mean and standard deviation (SD) of each variable was calculated. Unpaired t test was used to find out level of significance. The difference was said to be significant if $P< 0.001$***, $P< 0.01$**, $P< 0.05$* when compared to control.

Results

Table I: Mean and standard deviation of anthropometric measurements of control and sprayer groups

Group	Control group Mean ± SD (n = 40)	Pesticide sprayer group Mean ± SD (n = 40)	p value
Age in years	30.35 ± 3.06	31.40 ± 2.78	0.11
Height in cms	167.54	165.98	0.22
Weight in kgs	64.22 ± 3.56	62.52 ± 3.76	0.04*

Table II: Prevalence of respiratory symptoms in control group and study group

Respiratory symptoms	Pesticide Sprayers (n = 40)	Control Group (n = 40)
sinusitis	22%	7%
rhinitis	11%	3%
sore throat	12%	5%
common cold and fever	6%	2%
dry cough	38%	11%
wet cough	14%	7%
wheeze	28%	2%
heaviness in chest and	11%	3%
dyspnoea	42%	5%

Compared to control in Pesticide Sprayers higher prevalence of respiratory symptoms observed.

Table III: Mean and standard deviation of PFT findings in control and pesticide sprayers

Haematological Parameters	Control (N = 40)	Pesticide Sprayers (N = 40)	t value	P value
FVC (L)	3.43 ± 0.17 2.91 – 3.79	2.74 ± 0.19 2.37-3.08	16.49	< 0.001***
FEV1 (L)	3.04 ± 0.09 2.88 -3.19	2.42 ± 0.19 2.05 -2.76	17.84	< 0.001***
FEV1/FVC %	84.78 ± 2.68 80.07 – 94.87	90.33 ± 2.88 85.41 -96.93	8.91	< 0.001***
PEFR (L/S)	7.33 ± 0.15 6.87 – 7.54	5.92 ± 0.12 5.52 -6.12	44.05	< 0.001***
FEF 25-75 (L/S)	3.33 ± 0.07 3.12 – 3.43	3.17 ± 0.03 3.09 - 3.22	12.53	< 0.001***
FEF 0.2-1.2 (L/S)	6.01 ± 0.13 5.83 – 6.42	4.98 ± 0.06 4.88 – 5.10	43.27	< 0.001***
MVV (L/Min)	101.76 ± 6.83 89.23 – 115.16	82.29 ± 12.67 55.47 -107.33	8.54	< 0.001***

There was significant decrease observed in FVC,FEV1,PEFR,FEF25-75,FEF 0.2-1.2 and MVV while significant increase in FEV1/FVC in pesticide sprayers as compared to control.

Discussion

From table I it was observed that there was no statistical difference in age and height of control group and pesticide sprayer group (P>0.05).

In present study Table II shows prevalence of upper and lower respiratory symptoms were more in pesticide sprayers as compared to control. Organophosphorus (OP) pesticides are neurotoxic in nature and they inhibit acetylcholine esterase enzyme (AChE) by binding with its serine residue resulting in excess accumulation of acetylcholine (ACh) which over stimulate postsynaptic cholinergic nerves.[13] Action takes place on ACh Muscarinic receptors, either M3 or M2 to affect lung function. M3 receptors are stimulatory which are

present on pulmonary nerves and smooth muscles. Over stimulation of M3 receptors by ACh causes contraction of airway smooth muscles.[14]While M2 receptors are located on the pulmonary prejunctional nerves and smooth muscles which can normally inhibit further release of ACh from prejunctional nerves. It was observed in animal studies on guinea pigs that OP pesticides do not inhibit AChE but have potential to disrupt the autoinhibitory mechanism M2 receptors. [15]So there was uncontrolled release of ACh from prejunctional parasympathetic nerves which cause excessive bronchoconstriction. In present study these reasons might have induced respiratory symptoms in pesticide sprayers. Such respiratory symptoms were found by Chitra GA[16]and Khane RS[17] in pesticide exposed group. Health and hazard surveillance project among Iowa farmers found clear-cut association of respiratory symptoms with pesticides.[18]Absorption of pesticide is more through lungs than skin, stomach and intestine. So lung function impairment in farmers indicates that exposure of pesticides is mainly through inhalation.[19]

Table III shows pulmonary function tests findings in control and Pesticide Sprayers group in which there was highly significant decrease in FVC, FEV1,PEFR,FEF25-75,FEF.2-1.2 and MVV in sprayers compared to controls($p < 0.001$). FEV1/FVC ratio was significantly increased in sprayers compared to controls ($p<0.001$). Out of 40 sprayers 12(30%) had purely restrictive,24(60%) had mixed type and 4(10%) had purely obstructive type of lung dysfunction. These findings suggest that there was restrictive and obstructive lung function impairment among sprayers but restrictive type was more predominant. When FEV1/FVC ratio is normal or higher than normal but both values (FEV1 & FVC) are reduced then it indicate that there was restrictive deficit.[20]In our study similar pattern was observed in pesticide sprayers when compared with control.So in pesticide sprayers there was development of restrictive type of respiratory impairment.Chakraborty S also found restrictive deficit was more predominant in pesticide exposed group when compared with controls.[19] Restrictive deficit mainly occurs in parenchymal lung diseases when expansion of lung is reduced due to pneumonia,ILD,sarcoidosis and in chest wall abnormalities. On the contrary Fareed M et al found decrease FEV1/FVC ratio indicating obstructive deficit.[21]Previous studies also correlate with our findings that there was significant decrease in FVC,[22] FEV1[23,24]FEF25–75%[25]and in MVV.[26,19]Changes in FEV1 and FEV1/FVC ratio are related to large airways disease while changes in FEF25–75% is related to small airways disease.[27]Animal studies revealed that pesticide induces epithelial hyperplasia, thickening of capillary membranes in alveoli which leads to alveolar derangement and neuromuscular changes in respiratory muscles.[28]Some of these findings were also observed in earlier studies in India as well as in abroad.[29,17]

The cause of lung function impairment in present study might be due to various adverse effects of pesticides on lung structure as discussed above. During spraying of pesticides farmers do not use protective devices so there is direct inhalation leading to various respiratory defects. They have lack of knowledge about safety handling of pesticides which is mainly responsible for poisoning. Most of them were consuming food and water in the field during their work. These habits may increase the exposure and contamination risk.[30,31]

This derangement in PFT parameters in pesticide sprayers may also be due to more and longer duration of work practices (7-8yrs) as well as in unsafe manner. In general farmers having low educational level, lack of orientation and technical knowledge about using chemicals and low family income might be responsible for development of adverse effects on health. This scenario strongly points out our social vulnerability to make them aware from careless use of pesticide and higher pesticide exposure. [32,33]

In India about 70% of population is depend on agriculture for survival so use of pesticides is huge. [34]Every year thousands of deaths occur because of pesticides poisoning worldwide.[35]This is more common in developing countries including India. To avoid such mortality it is necessary to educate people and make them aware about pesticide poisoning. For this purpose more and more such type of work is necessarily required.

Conclusions

In present study respiratory status of pesticide sprayers was explored. They were from low socioeconomic status. They were not using PPE during spraying. They had poor knowledge of hazards of unsafe handling and use of pesticides. Majority of them were exposed to pesticides for an average 7-8 years. The chronic exposure without using safety measures has

caused some derangement of their lung function as accessed by spirometry. This scenario strongly point out our social vulnerability to make them aware from careless use of pesticide and higher pesticide exposure. Periodical assessment of lung function by spirometry may be advised for early detection of functional derangement of lungs.

Conflicts of Interest: None

Source of Funding: KIMS Karad

Ethical Clearance: Institutional Ethical committee(IEC) approval taken priorly.

REFERENCES

1. Polyxeni Nicolopoulou-Stamati, Sotirios Maipas,et al. Chemical Pesticides and Human Health: The Urgent Need for a New Concept in Agriculture. Front Public Health 2016;4: 148.
2. Xavier R, K. Rekha & K.L. Health Perspective of Pesticide Exposure and Dietary Management. Mal J Nutr 2004;10(1): 39-51.
3. Wesseling C, VanWendel de Joode B et al. Paraquat in developing countries. Int.JOccup Environ Health 2001;7:275-286.
4. Chandrasekharan NK, Rastogi SK et al. Health Status Among Pesticide Applicators at a Mango Plantation in India. Journal of Pesticide Safety Education 2006; 8: 1-9.
5. Dowling KC, Seiber JN,et al. Importance of respiratory exposure to pesticides among agricultural productions. Int J Toxicol 2002;21:371-81.
6. Chakraborty S, Mukherjee S, et al. Chronic exposures to cholinesterase-inhibiting pesticides adversely affect respiratory health of agricultural workers in India. J Occup Health 2009;51(6):488-97.
7. Jeyaratnam J. Acute pesticide poisoning: a major global health problem. World Health Stat Q 1990;43:139-144.
8. Kishi M, Hirschhorn N, et al. Relationship of pesticide spraying to sign and symptoms in Indonesian farmers. Scand J Work Enviiron Health 1995;21:124-33.
9. Sanzidur Rahman, et al. Farm-level pesticide use in Bangladesh: determinants and awareness. Agriculture, Ecosystem & Environmentb2003; 95:241-252.
10. Cotes JE. Medical Research Council questionnaire on respiratory symptoms. Lancet.1987;2:1028.
11. Eltayara L, Becklake MR, et al. Relationship between chronic dyspnoea and expiratory flow limitation in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1996;154:1726-34.
12. Ferris BG. Epidemiology standardization project. Am Rev Respir Dis 1978;118(6 Pt 2):1-120.
13. Androutsopoulos VP, Hernandez AF, et al. A mechanistic overview of health associated effects of low levels of organochlorine and organophosphorous pesticides. Toxicology 2013;307:89–94.
14. Fryer AD, Jacoby DB, e.t al. Muscarinic receptors and control of airway smooth muscle. Am J Respir Crit Care Med 1998;158(5 pt 3):S154–S160.
15. Costello RW, Jacoby DB, et al. Pulmonary neuronal M2 muscarinic receptor function in asthma and animal models of hyperactivity. Thorax 1998;53:613–616.
16. Chitra GA et al. Use of pesticides and its impact on health of farmers in South India. International journal of occupational and environmental health 2006;12(3):228-33.
17. Khane RS, Bharti Arora, et al. A Study on Effects of Inhaled Pesticides on Pulmonary Function Tests in Farmers. International Journal of Science and Research 2015;4(6):2159-62.
18. Sprince NL, Lewis MQ, et al. Respiratory symptoms: associations with pesticides, silos and animal confinement in the Iowa Farm Family Health and Hazard Surveillance Project. Am J Ind Med 2000;38(4): 455–462.
19. Chakraborty S, Mukherjee S, et al. Chronic exposures to cholinesterase-inhibiting pesticides adversely affect respiratory health of agricultural workers in India. J Occup Health 2009;51(6):488-97.

20. Nicholas JT, Simon OC. Clinical examination: A systematic guide to physical diagnosis. Elsevier Australia 2014; 7th Edition: page no.163.

21. Fareed M, Pathak M.K, et al. Adverse respiratory health and haematological alterations among agricultural workers occupationally exposed to organophosphate pesticides: a cross-sectional study in North India. PLOS ONE 2013;8(7):e69755.

22. Zuskin et al. Respiratory function in pesticide workers. J Occup. Environ. Med 2008;50:1299–1305.

23. Hernández A.F et al. Low level of exposure to pesticides leads to lung dysfunction in occupationally exposed subjects. Inhal. Toxicol. 2008, 20, 839–849.

24. Shama F.A. et al. Cross-shift changes in lung function among Palestinian farmers during high- and low-exposure periods to pesticides: A longitudinal study. Arch. Environ. Occup. Health 2015;70: 218–224.

25. Salameh P, et al Spirometric changes following the use of pesticides.East. Mediterr. Health J 2005; 11:126–136.

26. Mekonnen Y et al. Lung function and respiratory symptoms of pesticide sprayers in state farms of Ethiopia. Ethiop Med J 2004; 42(4):261-6.

27. De Jong, K Boezen, et al. Occupational Exposure to Vapors, Gases, Dusts, and Fumes Is Associated with Small Airways Obstruction. Am. J. Respir. Crit. Care Med 2014; 189:487–490.

28. Kamanyire R, Karalliedde L, et al Organophosphate toxicity and occupational exposure. Occup Med(Lond) 2004;54:69-75.

29. Priyadharshini UK, Latha R, et al . Effects of Organophosphorus Pesticides on Cardiorespiratory Parameters among the Farmers. J Clin Diagn Res. 2017;11(9):CC01-CC04.

30. Nerilo S.B, Martins F.A, et al. Pesticide use and cholinesterase inhibition in small-scale agricultural workers in southern Brazil. Braz. J. Pharm. Sci.2014; 50: 783–791.

31. Pasiani, J.O,Torres P, et al. Knowledge, attitudes, practices and bio monitoring of farmers and residents exposed to pesticides in Brazil. Int. J. Environ. Res. Public Health 2012;9: 3051–3068.

32. Faria, N.M.X, Facchini L.A, et al. Pesticides and respiratory symptoms among farmers. Rev. Saúde Pública 2005;39: 973–981.

33. Pedlowski M.A, Canela M.C, et al. Modes of pesticides utilization by Brazilian smallholders and their implications for human health and the environment. Crop Proection 2012; 31:113–118.

34. Kumari B, Kumar R, et al. Magnitude of pesticidal contamination in winter vegetables from Hisar, Haryana. Enviorn Monitor Assess 2002;87:311-18.

35. Abhilash PC, Singh N, et al. Pesticide use and application: an Indian scenario. J Hazard Mater 2009;165:1-12.

A Study to Assess the Effectiveness of Planned Teaching Program on Knowledge Regarding the Care of Permanent Pacemaker at Home among Patients at Selected OPDs of Sangli and Kolhapur City

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ABSTRACT

Background: A pacemaker is a small electronic device placed just under your skin, above the layer of muscle. it helps pace your heart in order to keep a healthy heart rate. it senses if the heart is beating too slowly or pausing too long between heart beats. if it senses a slow rate or a pause that is too long, it will send electrical pulses to keep your heart rate steady

Methodology: Pre-experimental one group pre test post test was conducted to assess the knowledge of patients having permanent pacemaker in the selected opds of Sangli and Kolhapur city. The reliability coefficient 'r 'of the questionnaire was 0.85, hence it was found reliable. Total 50 samples were selected by Purposive sampling method. A Structured questionnaire of 18 items was administered to collect data. Pre test was given on the 1st day followed by planned teaching and Post-test was administering done 7th day. The conceptual framework based on the general system model theory, developed by Ludwig von bertalanffy (1968).

Result: Before giving planned teaching patient with permanent pacemaker were unaware of the knowledge regarding care of pacemaker. It was found maximum patients had good knowledge regarding care of pacemaker i.e. 10%. The post-test showed that 46% people have good knowledge score. This suggests that there is marked increase in post-test knowledge score, and planned teaching was effective**.**

Conclusion: Thus it was conclude that, of the study clearly indicated that there are changes in pre-test and post-test knowledge score.

Keywords: *Knowledge, Planned teaching, pacemaker*

Introduction

The cardiovascular crisis in India has quadrupled inside a conclusive forty years and WHO assesses that by 2020 close 60% of heart patients worldwide will be Indian. There are unique conditions in which the coronary heart may be incapable to regulate the price causing a slow heart beat or may display blocks within the pathways through which the cutting-edge flows (coronary heart blocks). Sudden loss of life is one of the maximum not unusual motives of death worldwide which can be avoided by using placing a pacemaker[1]. Studies have proved that 60 percent of all unexpected cardiac deaths arise because of arrhythmia. Each year 1-2 million individual's global die because of lack of get admission to pacemakers[2]. The most often used implantable gadgets are cardiac pacemakers. A pacemaker is a small electronic device positioned just below your skin, above the layer of muscle. It helps temporary control your heart to be able to hold a healthful heart rate[3]. It senses if the heart is beating too slowly or pausing too lengthy among heart beats. If it senses a sluggish charge or a pause that is too lengthy, it'll ship electrical pulses to hold your heart

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charge steady[4]. This tool can be temporary or everlasting, depending at the patient's condition. Teaching patients the critical points regarding to pacemaker control, can save you the complications. Patients' schooling has grown to be a critical part of the therapeutic technique to help cardiac patients with pacemakers. Home fitness care is a particular vicinity of nursing exercise with its roots strongly located in network fitness nursing. Home fitness care is that constituent of comprehensive health care whereby fitness services are supplied to sufferers and households of their houses to promote, preserve, or repair fitness[5].

Materials and Method

A present study was conducted by using a quantitative experimental research approach with A Pre-experimental, one group pre-test and pos-test design. The conceptual framework was based on general system model with input, process, output and feedback developed by Ludwig von bertalanffy (1968). The reliability was done by using split half method 'r' was calculated by using Karl Pearson's formula coefficient 'r' of the questionnaire was 0.85, which is more than 0.70. Validity was done from 28 experts. Proposal with tool presented in front of ethical committee for permission. Total 50 samples were selected by non probability Purposive sampling method. Pilot study was conducted with 5 samples and the study was found feasible. Final study conducted with same data collection tool. Data collection tool had the questionnaires on care of permanent pacemaker at home.

Results

In the present study of patients Before giving planned teaching patient with permanent pacemaker were unaware of the knowledge regarding care of pacemaker. It was found maximum patients had good knowledge regarding care of pacemaker i.e. 10%. The post-test showed that 46% people have good knowledge score. This suggests that there is marked increase in post-test knowledge score, and planned teaching was effective. The chi square computed between pre-test knowledge and showed that knowledge was dependent on education. But it was not dependent on age, gender, occupation and previous information regarding pacemaker.

Findings

Maximum patients 64% belong to the age group of 51 and above years. 38% of patients had primary education, 56% of patients were male. Maximum patients 42% belong to other occupation, 100% of patient had previous knowledge regarding pacemaker, 44% of the patients were diagnosed with CHB.

Section I: Deals with analysis of data related to assessment of the knowledge regarding care of permanent pacemaker among patients at selected OPDs of Sangli and Kolhapur city in terms of frequency and percentage.

Table 1: Frequency and percentage distribution Pre- test knowledge score

	Groups	Scores	Frequency	Percentage
Knowledge - PRE Test	Poor	0-6	13	26.00
	Average	7-12.	32	64.00
	Good	13-18	5	10.00

The above table shows that in knowledge scores, at the time of pre test, 26% of subjects were having poor knowledge, 64% were having average knowledge and remaining 10% subjects were having good knowledge. Average score at the time of pre test was 8.14.

Table 2: Frequency and percentage distribution Post-test knowledge score

	Groups	Scores	Frequency	Percentage
Knowledge - POST Test	Poor	0-6	0	0.00
	Average	7-12.	27	54.00
	Good	13-18	23	46.00

The above table shows that in knowledge scores, at the time of post test, 54% were having average knowledge and 46% subjects were having good knowledge and no one in the poor knowledge group. Average score at the time of pre test was 12.74.

Discussion

1. The comparative examination was directed in Specialized Medical Hospital in Mansoura University, Trivandrum healing facility. Sample measure was 35.The outcomes discovered that about patients has normal dimension of information in regards to the homecare the board after permanent pacemaker implantation. The examination reasoned that there is no factual connection between information of homecare the executives of permanent pacemaker implantation patients and related factors like age instructive capabilities and year of pacemaker implantation[19].
2. The comparative examination was led in Mansoura University. the investigation uncovered that there was a factually critical contrast in patient's information and practice. Sample estimate was 50.More patients had lacking (learning and work on) with respect to pacemaker pre actualizing instruction program. After Educational program had factually noteworthy beneficial outcome on patient's execution (information and practice) with lasting Pacemaker

Conclusion

The present study concludes with the purpose of finding the effectiveness of planned teaching program on knowledge regarding the care of permanent pacemaker at home among patients at selected opds of sangli and Kolhapur city Findings of the study clearly indicated that there are changes in pre-test and post-test knowledge score.

The design used for the study was A Pre-experimental, one group pre-test and pos-test design was used. The study was conducted at selected opds of sangli and Kolhapur city. The Sample size of the study was 50 patients of permanent pacemaker

The reliability of the tool was determined Split Half Method of Reliability, the tool was administered to 5 samples. Reliability of the knowledge tool was found to be 0.85.

The pilot study was conducted, to assess the feasibility of the study and to decide the statistical analysis and practicability of research. It was found feasible.

Conflict of Interest: Column is Nil.

Source of Funding: Self.

Ethical Clearance: Proposal of research with the data collection tool was presented in the front of research committee for approval prior permission from hospital, were taken. Informed written consent from each participant was taken. Which included name, number, organization, time duration of participation, termination of participation,purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance is done with the committee members Dr.Sripriya and Dr.NilimaBhore mam.

REFERENCES

1. Mrs. Sreelekshmi. V, A STUDY TO ASSESS THE KNOWLEDGE OF HOMECARE MANAGEMENT OF PERMANENT mPACEMAKER IMPLANTED PATIENTS. project report, November 2011.
2. Suleyman Ercana,n, Gokhan Altunbasb, Fethi Yavuza, Vuslat Bosnakc, Vedat Davutoglua, Permanent pacemaker lead endocarditis due to Staphylococcus hominis and review of the literature, coretvasa 54 (2012) e336–e338.
3. Dan Malm, Anna Sandgren1. Regaining Normalcy in Relatives of Patients with a Pacemaker. Open Journal of Nursing, 2014, 4: 139-149
4. Hanaa, A, A. Yossif 1 & Ebtisam, M. Abd El-aal. Home Care for Patients with Permanent Pacemaker Insertion. *IOSR Journal of Nursing and Health Science 2017july-aug.6(4): 49-57 www.iosrjournals.org.*
5. Jason J. Roedig, DMD[1] Jignesh Shah, MD[2] Claude Samy Elayi, Interference of cardiac pacemaker andimplantable cardioverter-defibrillator activity during electronic dental device use.the journal of the American Dental Association.2010,141:512-526
6. Trigano A, Blandeau O, Dale C, Wong MF, Wiart J.reliability of electromagnetic filters of cardiac pacemakers tested by cellular telephone ringing pubmed heart rhythem 2005 aug.2(8):837-841 www.ncbi.nlm.nih.gov/pubmed/16051120

A Study to Assess the Effectiveness of Planned Teaching Programme on Knowledge Regarding Selected Pediatric Emergencies among Mothers of Under Five Children at Selected Anganwadi's of Sangli, Miraj and Kupwad Corporation Area

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ABSTRACT

A quantitative study was conducted by Mrs. Jesica P. Malap. out with the purpose of increasing awareness of Pediatric emergencies in public thereby reduces the morbidity and mortality in children.

Objectives:

1. To assess the knowledge of mothers regarding selected pediatric emergencies.
2. To assess the effectiveness of planned teaching programme regarding pediatric emergencies
3. To find out the association of pre-test knowledge score with selected demographic variables.

Materials and Method: A quantitative pre-experimental one group pre-testpost-test design was used to assess the knowledge of mothers having under five children in the selected anganwadi's of Sangli, Miraj and Kupwad corporation area. The conceptual framework based on the Goal attainment theory, developed by Modified Imogene king's (1960), with perception, action, interaction and transaction or goal attainment. The reliability was done by using test-retest method 'r' was calculated by using Karl Pearson's formula coefficient's of the questionnaire was 0.9, hence it was found reliable. Validity was done from 25 experts. Total 80 samples were selected by Probability simple random sampling method. A Structured questionnaire of 24 items was administered to collect data. Pre-test was given on the 1st day followed by planned teaching and Post-test was administered on seventh day.

Results and Conclusion: Data were analysed by using frequency and percentage for demographic variables. Compute frequency, percentage, mean, standard deviation used to calculate pre-test and post-test knowledge score. Paired 't' test was used to compare the pre and post-test knowledge score. Chi square test was used to find association between demographic and pre-teat knowledge score. It was found maximum mothers 63.75% were having average knowledge score. The post-test showed that, 82.50% have good knowledge score. This suggests that there is marked increase in post-test knowledge score, and planned teaching was effective. The chi square computed between pre-test knowledge and showed that knowledge was dependent on age and education of mothers. But it was not dependent on monthly income, type of family.

Keywords: *Knowledge, Planned teaching, Paediatric emergencies.*

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Introduction

Children are not like adults. Physiologic, Cognitive and Psychosocial differences affects a child's perception, reaction to illness or injury, communication patterns and coping abilities. To determine a child's health status and individual needs, knowledge of normal growth

and development, careful observation of behaviour and physiologic cues and listening to the primary care givers are important. To facilitate positive outcomes, health care provider need to understand the unique characteristic of children[2].

Children are a high risk group to encounter accidents and injuries. They are achieving more skills and they want to explore many things as they grow. Most of the time under five children are unaware about the consequence of their activities. A proper first aid management in the right time will save the valuable life of our future generation. Every year huge number of deaths are happening around the globe. A paediatric emergency is a serious condition that threatens the life of an infant, child, teen, or young adult thus require immediate medical attention[3].Pediatric emergencies can be caused by a particular illness, an injury or by ingesting a foreign object or poison. Paediatric emergencies like burn injury, poisoning, foreign body aspiration and epistaxis are few examples where the child needs to be managed immediately and promptly. Each year, among those 0 to 5 years of age, more than 12,000 people die from unintentional injuries and more than 9.2 million are treated in emergency departments for nonfatal injuries. It is widely recognized that children have unique needs, particularly when they require immediate medical attention. The first person to notice that the child requires emergency medical assistance, should administer first aid procedures while waiting for emergency medical personnel to respond. Therefore, adults with children in their homes should be aware of basic first aid procedures and be familiar with the characteristics of an emergency. Managing these emergencies is an important area where the family members should be involved in caring for a child, thereby reducing the mortality rates and lifelong disabilities[4].

Materials and Method

A quantitative pre-experimental one group pre-test post-test design was used to assess the knowledge of mothers having under five children in the selected anganwadi's of Sangli, Miraj and Kupwad corporation area. The conceptual framework based on the Goal attainment theory, developed by Modified Imogene king's (1960), with perception, action, interaction and transaction or goal attainment. The reliability was done by using test-retest method 'r' was calculated by using Karl Pearson's formula coefficient's' of the questionnaire was 0.9, hence it was found reliable. Validity was done from 25 experts. Total 80 samples were selected by Probability simple random sampling method. A Structured questionnaire of 24 items was administered to collect data. Pre-test was given on the 1st day followed by planned teaching and Post-test was administered on seventh day.

Results

Section II: Frequency and Percentage Distribution Pre test Knowledge Score

Table 1: Pre- test knowledge score

n = 80

Grading	Frequency	Percentage
Poor (0-8)	27	33.75
Average (9-16)	51	63.75
Good (17-24)	2	2.50

Table no.1 shows that 33.75% mothers have poor knowledge score, 63.75% and 2.50% mothers were having good knowledge score. Minimum score is 2 and maximum is 18. Average score at the time of pre- test was 9.97. It is evident that more efforts are necessary to improve the knowledge regarding pediatric emergencies among mothers of under five children.

Section III: Frequency and Percentage Distribution of Post test Knowledge Score

Table 2: Post-test knowledge score

n = 80

Grading	Frequency	Percentage (%)
Average (9-16.)	14	17.50
Good (17-24)	66	82.50

Table no.2 shows that mother at the time of post-test 17.50% were having average knowledge, 82.50% subjects were having good knowledge and none of the mothers have poor knowledge score. Minimum score is 10 and maximum score is 23.Average score at the time of pre-test was 17.90. This suggests that there is marked increase in post-test knowledge score.

Section III: Comparision between Pre-test and Post-test Knowledge Score

Table 3

n = 80

	Mean	S.D.	S.E.	t value	P value
Pre Test	9.97	3.69	0.41	22.01	0.000
Post Test	17.9	2.61	0.29		

Table no. 3 demonstrates that, mean estimation of pre-test information score is 9.97with standard deviation of 3.69 and post-test information is 17.9 with standard deviation of 2.61. The test insights estimation of the matched t test was 22.01 with p esteem 0.00. This recommends there is factually critical increment in post test score so arranged showing program (PTP) on information with respect to pediatric crises among mothers of under five children was powerful.

Section V: Association between Demographic Varibles with Pre-test Knowledge Score

Table 4: Association with demographic variables and pre -test

n = 80

Sr. No.	Demographic Variable	Chi Square	d.f	p-value	Remark
1.	Age of mothers	19.59	6	0.003	Significant association.
2.	Education	25.36	8	0.001	Significant association.
3.	Monthly income	4.35	6	0.629	No Significant association.
4.	Type of Family	2.27	2	0.321	No Significant association.

Table no. 4 indicates that there is significant association between age of mother and education with the pre-test knowledge score as calculated 'p'value is less than tabulated (0.05) value. There is no significant association between monthly family income, type of family with pre-test knowledge score as calculated 'p' value is more than tabulated (0.05) value.

Discussion

A study was conducted to assess the effectiveness of planned teaching programme on knowledge regarding selected pediatric emergencies among mothers of under five children at selected anganwadi's of Sangli, Miraj and Kupwad corporation area. The findings of the study have been discussed based on the objectives and hypothesis of the study.

It was found that, 36.25% of mothers belonged to the age group of 25-31 years, 30% of mothers belonged to the age group of 33-38 years of age, 22.2% of mothers belonged to the age group of 18-24 years and 11.25% belonged to the age group more than 39 and above. Maximum mothers 38.75% have secondary education, 23.75% mothers were graduates, 22.50% were having primary education, 8.75% were post graduates and only 6.25% mothers had not taken any formal education. As per monthly income most 28.75% was in the income group 15001-20000, 25% were having income of 20001 and above, 23.75% were in 10001-15000 and 22.50% were in the 5000-10000 income group. In type of family most of the mothers,58.75% belongs to nuclear family and rest mothers 41.25% were from joint family[3].

It was the found that maximum children 38.75% were in the age group of 2-3 years of age, 35% of children belongs to the age group of 3-4 years, 20 % children belongs to age group of 5 years and remaining 6.25% were in the age group below one year of age. In the gender of child the maximum, 58.75% were having female children and 41.25% mothers have male children. As per birth order most of the children 45% were second child, 35% were first child and 20% were the third child to their parents.[5]

In the present investigation, the pre-test information score with respect to pediatric crises in children was gathered by organized survey was utilized to gather the information. The overall score was 24 and was separated 0-8 (poor), 9-16 (normal), 17-24 (great). It was discovered that, 63.75% mother were having normal learning score, 33.75% of mother were having poor knowledge score and 2.505 of mothers have good knowledge score. Minimum score is 2 and most maximum score is 18. Normal score at the season of pre-test was 9.97. Around the same time arranged educating was taught to mothers [6].

The equivalent organized poll was utilized to gather the information after arranged instruction with the interim of 7 days post-test were directed. It was discovered that 82.50% of mothers were having great learning score, 17.50% were having normal information score and none of the mothers have poor learning score. Most maximum score was 23 and least score was 10 Normal score at the season of post-test was 17.90. This recommends there is checked increment in post-test information score.

The mean value of pre-test knowledge score is 3.69 and post knowledge score is 17.9, standard deviation score in the pre-test phase was 3.69 and in the post test was 2.61. Calculated 't' value is 22.01 which is more than the tabulated 't' value and calculated value is 0.000 which is less than tabulated ' p' value (0.05). This suggests that there isstatistically significant increase in post test score so planned teaching programme on selected pediatric emergencies in children among mothers of under five children was effective.

The chi-square test was used to find out the association between demographic variables with pre-test knowledge score. In age of mother 'x^2' value is 19.59 and 'p' value is 0.03 which is less than 0.05 so there is significant association between age of mothers with 5825pre-test knowledge score.In education 'x^2' value is 25.36 and 'p' value is 0.001which is lessthan 0.005 so there significant association between education and pre-test knowledge score. This shows that there is increase in level of knowledge respectively with age and level of education.

The demographic variables, like age of mothers, education and age of child was found that there was significant association between demographic variables with pre-test knowledge score at <0.05level.

In Other statistic factors such as month to month pay, kind of family, gender of child and birth order of the child it was discovered that there was no significant association between statistic factors like demographic variables with pre-test information score at >0.05 level. The findings of the present investigation have been discussed about with reference to the objectives and hypothesis. Findings of the investigation demonstrates that planned teaching programme regarding knowledge of pediatric emergencies among mothers of children under five years was useful.

Conclusion

The present study concludes with the purpose of finding the effectiveness of planned teaching programme on knowledge regarding selected pediatric emergencies among mothers of under five children at selected anganwadi's. Findings of the study clearly indicated that there are changes in pre-test and post-test knowledge score.

Conflict of Interest: Nil.

Source of Funding: Self.

Ethical Clearance: Proposal of research with the data collection tool was presented in the front of research committee for approval prior permission from hospital and child development officer, were taken. Informed written consent from each participant was taken. Which included name, number, organization, time duration of participation, termination of participation, purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance is done with the committee members Dr. Sripriya and Dr. Nilima Bhore mam.

REFERENCE

1. Jayalakshmi LS, "Mother"s awareness about accidents among children". The Nursing Journal of India 2004 Dec; 25(12): Page no: 276-278. [http://www.ncbi.n/m.h/m.nih.gov.pubmed/15881450]
2. Subbiah N, "Knowledge of mothers on prevention of childhood accidents", The Nursing Journal of India. 2006 Oct; 27(12): Page no: 229-31. [https://www.ncbi.n/m.nih.gov/pubmed/18232186]
3. Manoj Yadav. "Child health Nursing". S. Vikas and company (Medical Publishers. India; 2014: Page no:185-89.
4. Mackenzine R, Sutculiffe R." The injured child. The journal of royal army" 2002; 148(3): Page no: 276-87.[http://www.ramcjournal.com/2002/mar02/pdf]
5. James Canticle, "First aid to injured; Introduction to first aids". John's Ambulance association book Publications, 1st edition, Page No5-6.

6. James Canticle, "First aid to injured, Introduction to first aid", St John's Ambulance association book Publications, 1st edition, Page No9-10.

7. Houghton Mifflin Harcourt. Collins Dictionary [Internet] Collins English Dictionary [Cited 2019]. Available from : https://www.collinsdictionary.com

8. Facts about injuries: burns Genova, world health organization and international society for burn injuries, 2017. [http://www.who.int/entity/voilenceinjuryprvention/burnsfactsheet,pdf. accessed17apirl2017]

9. Chung ECW, "Burn injuries India: A one year survey at the united Christian hospital", Hong Kong practice, 1996, 18; Page no: 631-636. [http://www.ncbi.n/m.nib.gov/books/NBK310640]

10. Chirag A Bhansali, Giriraj Gandhi, Parag Sahastrabudhe, Nikhil Panse, Epidemiological study of burn injuries and its mortality risk factors in a tertiary care hospital [Internet]. Indian Journal of Burns.2017 [Cited 13 December 2017], Available form : http://www.ijburns.com

11. Teresa. E. Soud, Janice Stenes Rogers, "Manual of Pediatrics emergency nursing", Mosby Elsevier publications, 1998. Page no:99-98.

12. Margie peden, Kayede, Ogegbite, Joan Ozanne, Smith adnanAhydes(et al), "World report on child injury prevention", World health organization 2008, Page no: 79-93. [http//whqliboc.who.int/publications/2008]

13. Susan Rowe, James Jean, WeilerAshwill, et al, "Nursing care of children, Principles and practices,"1st edition, Elsevier-health sciences division. 2010. Page no:289-294.

14. ELIZABETH PATON. Medical_Specialty [Internet] Freelance medical illustrators. 2012. [Citated 2012]. Avaliable from: http://freelancemedicalillustrators.com

15. Karraebed. Child Development. [Internet]. Wikipedia. 2019 [Citated 12 March 2019]. Available from: https://en.wikipedia.org/wiki/Child_development

Comparative Evaluation of the Effect of Radiation Therapy on Surface Micro Hardness of Three Restorative Materials— An in Vitro Study

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ABSTRACT

Context: Dental restorations in Patients undergoing radiotherapy for the treatment of Malignancies may undergo changes in their physical properties due to the irradiation.

Aims: To investigate the effect of Gamma irradiation applied during cancer radiation therapy on the surface microhardness of Cention N, Zirconomer and 3M Filtek Bulkfil Posterior Packable Composite.

Settings and Design: In-vitro study conducted in a Dental school.

Method and Material: Twenty specimens of each material were prepared within acrylic moulds and these were divided into six groups with 10 of each restorative material per group. Groups 1, 2, and 3 were not subjected to any intervention whereas Groups 4, 5 and 6 were subjected to the radiotherapy protocol which is used on patients with malignancies.

Statistical Analysis Used: Two-way repeated ANOVA and Tukey's test.

Results: After irradiation the comparative changes in the surface microhardness in all the groups were statistically significant. The values of surface hardness of the Filtek group remained the highest followed by the Cention and Zirconomer groups.

Conclusions: The conclusion than can be drawn from this study are that the exposure to Gamma radiation does affect the surface hardness of the materials tested.

Keywords: *Surface micro hardness, Therapeutic ionising radiation, Vickers hardness test.*

Introduction

The physical properties of the restorative materials are of perpetual interest to the restorative dentist. Research in dental materials aims to continuously push the limits and increase the durability of the materials that are in clinical use. The surface Hardness of a dental restorative material is an important property while selecting replacement options for the lost tooth structures such as the enamel as the mechanical role of enamel is crushing food. [(1)]Surface hardness is a factor often used to assess the surface resistance of a material to plastic deformation by penetration. Amalgam has been the gold standard in restorative dentistry and has over the years vindicated its tag as the most durable of restorative materials, but due to its grey color and safety concerns it is being gradually replaced now by newer tooth colored restorative materials. Three recent alternatives to amalgam that claim to have high strength for their use in posterior stress bearing areas are Cention N, Zirconomer and Bulk fill composites.

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Direct dental restorations are routinely indicated for restoring teeth with caries prior to head and neck radiotherapy. Radiotherapy of head and neck region can cause changes in the oral environment such as drop in pH, xerostomia and structural changes of organic and inorganic portion of mineralized tissues; degenerative and inflammation processes are also observed.[2][3] The durability of dental materials is influenced by its intrinsic properties and by the environment to which they are exposed to. Studies done by Aoba et al has proved the occurrence of physical and chemical changes that modify the mechanical properties of restorative materials in irradiated teeth.[4] Ideally the material to be used in patients undergoing radiation should bond to tooth structure, check secondary caries, repel dehydration and acid erosion.[5]

The aim of this study is to assess how the impact of gamma radiation affects the micro hardness of three different restorative materials: Cention N, Zirconomer and 3M Filtek Bulk Fill Posterior Packable Composite. The null hypothesis tested was that exposure to the irradiation process will not bring about any variation in the surface microhardness of the three restorative materials being examined.

Materials and Method

Specimen Preparation: Ten specimens of each restorative material were made within acrylic molds in the dental laboratory. The dimensions of each specimen was 6mm in diameter and 3mm in thickness. A polyethylene sheet and a glass slide was positioned over the filled mold after which light pressure was applied. This method provided an even surface on every specimen.

The Specimens were allocated into six groups

Group 1: Cention N without irradiation for 7 weeks (n=10)

Group 2: Zirconomer without irradiation for 7 weeks (n=10)

Group 3: 3M Filtek Bulk Fill Posterior Packable Composite without irradiation for 7weeks (n=10)

Group 4: Cention N with irradiation for 7 weeks (n=10)

Group 5: Zirconomer with irradiation for 7 weeks (n=10)

Group 6: 3M Filtek Bulk Fill Posterior Packable Composite with irradiation for 7 weeks (n=10)

Radiation Protocol: Ten samples of groups 4, 5, 6 were irradiated with 70 Gy of 6 megavoltage radiation using ELEKTA COMPACT linear accelerator, 2 Gy daily, 5 days per week for a total of 7 weeks (35 fractions) at the Department of Radiotherapy and Oncology.The samples were immersed in a water phantom during irradiation. This protocol is the same as the one used in patients under oncogenic treatment for head and neck tumors.

Microhardness Testing: The Vickers hardness test method involves the indenting of the test material with a diamond indenter, in the form of a right pyramid with a square base and an angle of 136 degrees between opposite faces subjected to a load of 1 to 100 Kg. The load is normally applied for 10 to 15 seconds. After the removal of the load the two diagonals of the indentations created on the surface of the materials are measured using a microscope and their average is calculated. The area of the sloping surface of the indentation is then calculated.

Data Management and Statistical Analysis: The mean values of various materials at different immersing times were compared by one-way analysis of variance (ANOVA), and multiple comparisons of mean were performed using Tukey's test and the level of $p < 0.001$ was regarded as significant.

Ethical Considerations: Ethical clearance to conduct the study was obtained from the Institutional Ethics Committee of the dental college.

Results

In this experimental and comparative in vitro study, all data showed normal distribution. The mean values of Vickers hardness before radiation exposure are summarized in Table 1. Prior to irradiation Group 3 exhibit the highest VHN (Harder) followed by Group 1 and Group 2. The comparative changes in the surface micro hardness of Group 1, Group 2 and Group 3 following the exposure to radiation were statistically significant (p=.011) (Table 2).After irradiation the values of surface hardness of the Filtek group remained the highest followed by the Cention and Zirconomer groups. When the results of the pre and post radiation values were compared against each other, there was a comparative reduction in the Vickers hardness values after radiation in the Cention and Filtek groups, whereas the Zirconomer group showed an increase in the microhardness values following irradiation (Graph 1).

Table 1: The mean and standard deviation values of Vickers hardness before radiation exposure are tabulated

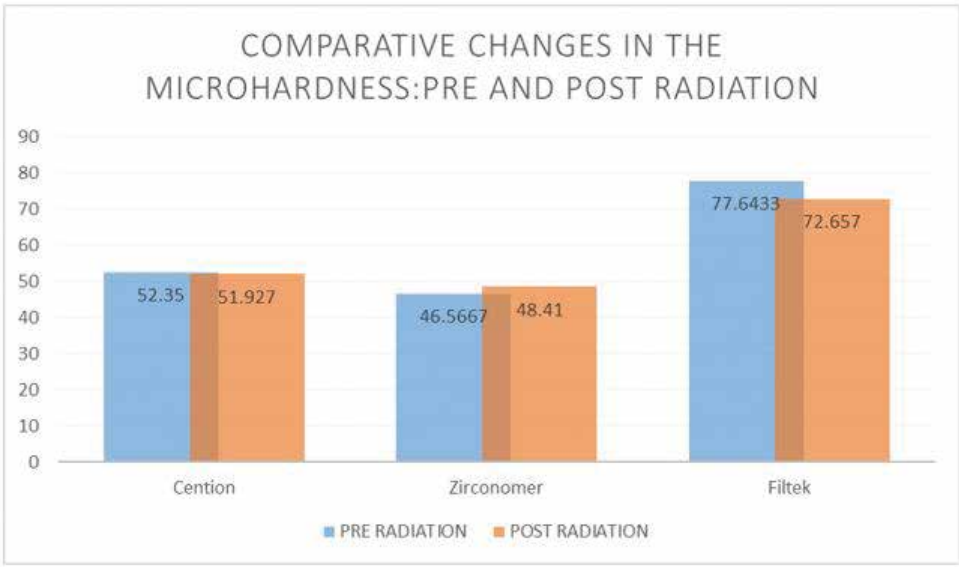
MICROHARDNESS PRE RADIATION

	N	Mean	Std. Deviation	Minimum	Maximum
Cention	10	52.3500	2.85113	47.17	56.13
Zirconomer	10	46.5667	2.91395	43.07	51.40
Filtek	10	77.6433	5.86848	69.27	86.17

Table 2: The mean and standard deviation values of Vickers hardness after radiation exposure are tabulated

MICROHARDNESS POST RADIATION

	N	Mean	Std. Deviation	Minimum	Maximum
Cention	10	51.927	4.302	44.73	58.47
Zirconomer	10	48.410	4.399	42.17	55.53
Filtek	10	72.657	7.164	62.70	83.07



Graph 1: The comparative changes in Vickers hardness value before radiation and after radiation are depicted

Discussion

Therapeutic ionising radiation is used for radiotherapy in the treatment of head and neck cancers. The risk of developing caries is substantially increased for their lifetime in patients of radiation therapy. This is as radiation causes a direct alteration in the enamel and dentin ultrastructure, Chemical alterations in the tissues, Morphological alterations of enamel and dentine structures and decrease in dentinal microhardness[6][7][8][9][10][11][12]. Since radiation produces such structural changes and alterations in the mechanical properties of enamel and dentin, we can also expect some changes to occur in the restorative materials too. The effects of exposure to different sources of electromagnetic fields (EMFs) on animal models and humans have been studied extensively over the years.[13][14][15][16][17][18][19][20] But we did not come across any studies on the effect of Gamma radiation on dental restorative materials in our literature search. In the current study the dosage of radiation which the restorative materials were subjected to was planned to replicate the clinical scenario.

In the present study Filtek exhibited the highest values for surface microhardness in the pre testing before irradiation, followed by Cention and Zirconomer. After irradiation the values of surface hardness of the Filtek group remained the highest followed by the Cention and Zirconomer groups. The comparative changes in the surface microhardness of the groups were statistically

significant. The results showed a comparative reduction in the Vickers hardness value after radiation in the Cention and Filtek groups. But the Zirconomer group showed an increase in the microhardness values following irradiation.

Conclusion

The conclusion than can be drawn from this study are that Filtek bulkfil composite will be the material of choice if strength is desired from the restoration as it continued to be the hardest material even after irradiation. But Zirconomer can be considered as a viable alternative as it showed no regressive changes following irradiation rather an increase in the hardness values of the material was noted.

Conflict of Interest: The authors have no conflict of interest to disclose.

Source of Funding: Self.

REFERENCES

1. Chun, Keyoung Jin, and Jong Yeop Lee. "Comparative study of mechanical properties of dental restorative materials and dental hard tissues in compressive loads." *Journal of dental biomechanics* 5 (2014).
2. Wanebo, Harold J., et al. "T-cell deficiency in patients with squamous cell cancer of the head and neck." *The American Journal of Surgery* 130.4 (1975): 445-451.
3. Martin, M. V. "The role of oral microorganisms in cancer therapy." *Current opinion in dentistry* 2 (1992): 81-84.
4. Aoba, Takaaki, et al. "High-voltage electron microscopy of radiation damages in octacalcium phosphate." Journal of dental research 60.5 (1981): 954-959.
5. Hu, J-Y, et al. "Restoration of teeth with more-viscous glass ionomer cements following radiation-induced caries." *International dental journal* 52.6 (2002): 445-448.
6. Jervøe, Peter. "X-Ray Diffraction Investigation on the Effect of Experimental and in Situ Radiation on Mature Human Teeth a Preliminary Report." *Acta Odontologica Scandinavica* 28.5 (1970): 623-631.
7. Jansma, J., J. M. P. M. Borggreven, and F. C. M. Driessens. "Effect of X-ray irradiation on the permeability of bovine dental enamel." *Caries research* 24.3 (1990): 164-168.
8. Soares, C. J., et al. "Scanning electric microscopy used to analyze the effect of gamma irradiation on enamel and dentin." *Microscopy: science, technology, application and education. A Mendez–Vilas and J Diaz* (2010): 372-8.
9. Gonçalves, Ligia Maria Napolitano, et al. "Radiation therapy alters microhardness and microstructure of enamel and dentin of permanent human teeth." *Journal of dentistry* 42.8 (2014): 986-992.
10. de Siqueira Mellara, Talitha, et al. "The effect of radiation therapy on the mechanical and morphological properties of the enamel and dentin of deciduous teeth—an in vitro study." *Radiation Oncology* 9.1 (2014): 30.
11. Gonçalves, Ligia Maria Napolitano, et al. "Radiation therapy alters microhardness and microstructure of enamel and dentin of permanent human teeth." *Journal of dentistry* 42.8 (2014): 986-992.
12. Kielbassa, Andrej M., et al. "Irradiation effects on microhardness of fluoridated and non-fluoridated bovine dentin." *European journal of oral sciences* 105.5P1 (1997): 444-447.
13. Mortazavi, S. M. J., et al. "Non-linear adaptive phenomena which decrease the risk of infection after pre-exposure to radiofrequency radiation." *Dose-Response* 12.2 (2014): dose-response.
14. Mortazavi, S. M. J., et al. "Non-linear adaptive phenomena which decrease the risk of infection after pre-exposure to radiofrequency radiation." *Dose-Response* 12.2 (2014): dose-response.
15. Mortazavi, S. M. J., et al. "Human short-term exposure to electromagnetic fields emitted by mobile phones decreases computer-assisted visual reaction time." *Acta neurologica belgica* 112.2 (2012): 171-175.
16. Mortazavi, S. M. J., et al. "Increased radioresistance to lethal doses of gamma rays in mice and rats after exposure to microwave radiation emitted by a GSM mobile phone simulator." *Dose-response* 11.2 (2013): dose-response.

17. Mortazavi, S. M. J., et al. "A comparative study on the increased radio resistance to lethal doses of gamma rays after exposure to microwave radiation and oral intake of flaxseed oil." *International Journal of Radiation Research* 9.1 (2011): 9.

18. Mortavazi, Seyed, et al. "Alterations in TSH and thyroid hormones following mobile phone use." *Oman medical journal*24.4 (2009): 274.

19. Mortazavi, S. M. J., J. Ahmadi, and M. Shariati. "Prevalence of subjective poor health symptoms associated with exposure to electromagnetic fields among university students." *Bioelectromagnetics: Journal of the Bioelectromagnetics Society, The Society for Physical Regulation in Biology and Medicine, The European Bioelectromagnetics Association*28.4 (2007): 326-330.

20. Mortazavi, Seyed Mohammad Javad. "Does the ringtone or radiofrequency radiation of a mobile phone affect reaction time of its owner?" *International journal of occupational medicine and environmental health* 27.1 (2014): 149-150.

Evaluate the Association between Acrochordons and Systemic Diseases

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ABSTRACT

Acrochordons are associated with conditions like pregnancy, intestinal polyps, growth disorders, metabolic syndromes, atherosclerosis and various other syndromes including polycystic ovarian syndrome, Birt–Hogg–Dubé syndrome, and Cowden syndrome. This study was carried out as a cross sectional study in a Teaching hospital. This study was undertaken in the outpatient Department of Dermatology in our Teaching hospital. This study was carried out for a period of seven months between October 2017 and April 2018. Our study demonstrated the association of skin tags with certain systemic conditions. Our study demonstrated statistically significant results with uncontrolled diabetes mellitus. Studies have demonstrated that multiple skin tags are often associated with insulin resistance and obesity. Our study demonstrates the significant relationship between history of cardiovascular diseases, hypercholesterolemia, and the presence of skin tags, which has been substantiated by several other studies. While diabetes mellitus, hypertension and cardiovascular diseases were definitive risk factors, our study could not demonstrate significant association between obesity and acrochordons.

Our study may be taken as the basis for using acrochordons as an effective screening tool for several non-communicable diseases like diabetes mellitus, hypertension, cardiovascular diseases and uncontrolled diabetes.

Keywords: *Acrochordons, Diabetes Mellitus, insulin resistance, Metabolic Syndrome, Obesity.*

Introduction

There are several systemic infectious diseases and syndromes associated with skin tags. Skin tags are associated with conditions like pregnancy, intestinal polyps, growth disorders, metabolic syndromes, atherosclerosis and various other syndromes including polycystic ovarian syndrome, Birt–Hogg–Dubé syndrome, and Cowden syndrome. Some of the infections which correlate with skin tags include human papilloma virus, which is said to occur in 88% of the acrochordons. Certain variations in the estrogen levels and hormones such as IGF-1, Insulin and Transforming Growth Factor (TGF) and Epidermal Growth Factor (EGF)are also implicated in the incidence of skin tags. [1]

Birt–Hogg - Dube- syndrome is characterized by multiple fibrofolliculomas and trichodiscomas. They are similar to acrochordons. Birt – Hogg - Dube- syndrome is caused by mutation of FLCN gene that produces folliculin which is a tumor suppressor protein. There has been significant association between Birt – Hogg - Dube- syndrome and Pneumothorax and renal cell carcinoma. In addition to this, one of the variants of basal cell carcinoma also present with clinical similarities of acrochordons. The fibroepithelioma of Pinkus is a sub type of basal cell carcinoma which often presents as pink acrochordons and form an important differential diagnosis. An increased irritation of the skin due to skin stretching in obese individuals may result in polypoid formations for which several factors are often involved. Some of the factors suggested include hormonal imbalance, since the genetic material from the viral pathogens has been identified in many samples of skin tags.[2]

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Acrochordons have been linked to the appearance of malignancies with other organs like kidney and gastrointestinal tract because of abnormal activity of Epidermal Growth Factor (EGF) & Tissue Growth Factor (TGF) which are released by these tumors. The other important biological condition which is associated with Acrochordons is Type 2 diabetes mellitus. This is due to the presence of insulin resistance. Acrochordons in acanthosis nigricans which is a common feature of insulin resistance and type 2 diabetes mellitus.

Metabolic syndrome is a clustering of various pathologies of metabolic origin and are accompanying by increasing risk of cardiovascular diseases and type 2 diabetes mellitus. Metabolic syndrome is commonly presented as obesity, atherogenic dyslipidaemia, elevated blood pressure and raised plasma glucose [3]. The other essential component of metabolic syndrome which affects the skin diseases are oxidative stress. Oxidative stress, is a condition where the relative imbalance between reactive oxygen species and antioxidants. This is believed to play a major role in the pathogenesis of metabolic syndrome. The other factor associated with metabolic syndrome is endocrine abnormality. Intra abdominal fat in endocrine organs capable of secreting proteins such as adiponectin and Leptin promote inflammation, altered glucose metabolism and vascular endothelial biology. Obesity may be defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size or an increase in the fat cell number or a combination of both. [4] Obesity is also found with mixed color skin tags and has been hypothesized to occur due to interaction of mast cells and melanocytes for post inflammatory pigmentation [5]. Insulin is the hormone that promotes tissue growth and stimulates glucose uptake in tissues at an intensity that varies from individuals. Adult patients with acrochordons should be alerted in risk of development of insulin resistance, hypertriglyceridemia, diabetes mellitus in the light of obesity and overweight. They are at increased risk of developing cardiovascular complication like myocardial infarction, cerebrovascular disease, Peripheral arterial disease, erectile dysfunction, Cognitive decline, fatty liver and reno-vascular diseases. [6]

Overall skin tags occur as a result of impaired carbohydrate or lipid metabolism or liver enzyme abnormalities or hypertension. Studies have proven that skin tags are associated with various components of metabolic syndrome either individually or in combination [7].Metabolic syndrome and several other non-communicable diseases are silent killers with a long latent period and dreadful, morbid complications affecting various systems like heart, brain, kidneys, etc.

There are very few predictors for non-communicable diseases, which help clinically detect the ongoing risk of a non-communicable disease. Studies have implicated that skin tags or acrochordons are potential predictors of the risk of these non-communicable diseases. Acrochordons are easily identified by clinical examination and individuals can be educated to use this as a potent screening tool for detecting systemic diseases. This study is expected to implicate the magnitude of clinical risk of these diseases in the presence of acrochordons. The aim of this study is to clinically evaluate associated factors of acrochordons along with the prevalence of systemic diseases.

Material and Method

This study was carried out as a cross sectional study in a Teaching hospital. This study was undertaken in the outpatient Department of Dermatology in our Teaching hospital. This study was carried out for a period of seven months between October 2017 and April 2018. The study population consisted of all the patients who visited the outpatient department during the study period. Obtained Ethical Clearance from Institutional Ethics Committee, prior to the commencement of the study. Each participant was explained in detail about the study and informed consent was obtained prior to the data collection. The participants were selected using purposive sampling amongst the patients who visited the outpatient clinic of our Dermatology Department.

Inclusion Criteria: Adults above 18 years of age. Both Sexes.

Exclusion Criteria: Children and Patients presenting with generalized skin disease like psoriasis, Erythroderma, Immunobullous disorder, etc.

Statistical Analysis

Data was entered and analyzed using SPSS version 15 software. Percentages and Chi – square were used to describe the prevalence of skin tags and systemic diseases. A p value less than 0.05 was considered to be statistically significant.

Results

This cross-sectional study was carried out among 150 participants visiting the outpatient clinic of our department. The consent form was given to the patients prior to the interview. A structured interview schedule was used to elicit history regarding the medical conditions. Each participant was clinically examined for skin tags. Random blood sugar was estimated to assess the status of diabetic control. Majority of the participants belonged to the age group of >40 years (75.3%). Males were about 104 (69.33%) while females were 46 (30.67%). The body mass index of the participants showed that majority of the participants were overweight (23.7%). (Figure 1).

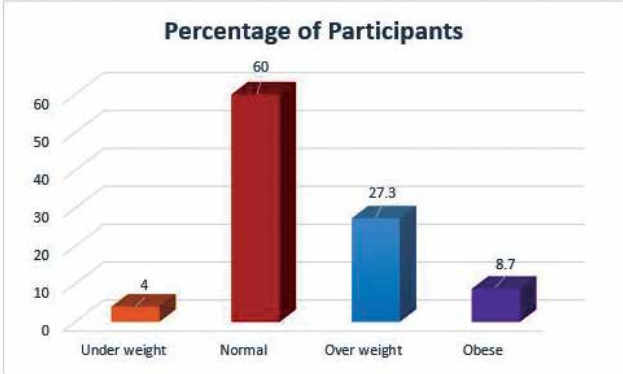


Figure 1: Distribution of the body mass index of the study participants

The association between background risk factors and acrochordons show that males are at increased risk for acrochordons (16.3%). However, the observed difference was statistically not significant. Participants with overweight and obesity were at an increased risk for acrochordons (16.7% and 14.4% respectively) compared to participants with normal BMI. However, the observed difference was statistically not significant. Our study also showed that uncontrolled diabetes mellitus (RBS>200 mg/dl) was not significantly associated with acrochordons (p<0.520). (Table 1)

Table 1: Association between skin tag and systemic diseases

S. No.	Parameters	Acrochordons		N (150)	Chi sq	P value
		Present n (%)	Absent n(%)			
1.	**Age**					
	<40	3 (8.1)	34 (91.9)	37	1.4	0.234
	>40	18 (15.9)	95 (84.1)	113		
2.	**Sex**					
	Male	17 (16.34)	87 (83.65)	104	1.55	0.158
	Female	4 (8.69)	42(91.30)	46		
3.	**Body Mass Index**					
	>30	1 (16.7)	5 (83.3)	6	4.6	0.203
	24-29.9	13 (14.4)	77 (85.6)	90		
	18.5-24	3 (7.3)	38 (92.7)	41		
	<18.5	4 (30.8)	9 (69.2)	13		
4.	**Random Blood Sugar**					
	>200	20 (13.7)	126 (86.3)	146	0.4	0.520
	<200	1 (25.0)	3 (75.0)	4		

The association between history of medical conditions and presence of acrochordons shows that known history of cardiovascular diseases was a significant risk factor (75.0%) for acrochordons compared to participants without history of cardiovascular diseases (12.4%). The observed difference was found to be statistically significant (p<0.05). Moreover, history of hypertension was a significant factor for acrochordons. It was observed that participants with known history of hypertension were significantly associated with acrochordons (29.6%) compared to those with no history of hypertension (10.6%). The observed difference was found to be statistically significant (p<0.05). (Table 2)

Table 2: Association between medical history and Acrochordons

S. No.	Parameters	Acrochordons		N (150)	Chi sq	P value
		Present n (%)	Absent n(%)			
1.	**History of cardiovascular diseases**					
	Present	3 (75.0)	1 (25.0)	4	12.7	0.001*
	Absent	18 (12.3)	128 (87.7)	146		
2.	**History of hypertension**					
	Present	8 (29.6)	19 (70.4)	27	6.6	0.010*
	Absent	13 (10.6)	110 (89.4)	123		
3.	**History of diabetes mellitus**					
	Present	5 (19.2)	21 (80.8)	26	0.7	0.398
	Absent	16 (12.9)	108 (87.1)	124		
4.	**History of endocrine disorders**					
	Present	0(0.0)	2 (100.0)	2	0.3	0.566
	Absent	21 (14.2)	127 (85.8)	148		

*statistically significant

Discussion

In our study one of the objectives was to evaluate the association of acrochordons and the risk factors. The association between demographic risk factors and the skin tags was carried out and it was observed that male participants were at an increase the risk of having skin tags compared to female participants. However, the association was statistically non-significant. We also analyzed the evaluated the risk of Body Mass Index as a risk factor for acrochordon. It was observed that participants with overweight and obesity were at increased risk for developing skin tags compared to participant with normal Body Mass Index. However, the observed association was statistically non-significant. It was observed that fasting blood sugar levels > 200mg/dl was a significant risk factor for the development of skin tags the association was not statistically significant (P > 0.005) we also evaluated the association between skin tags and the presences of known history of diabetes mellitus or hypertension or cardiovascular diseases. It was observed that known history of cardiovascular diseases was a risk factor and it increased with prevalence of skin tags (75.0%) compared to patients without history of cardiovascular diseases (12.3%). The observed difference was statistically significant (p< 0.001). Known history of hypertension was significantly associated with the occurrence of skin tags. Participants with known history of hypertension had increased the prevalence of skin tags (29.6%) compared to participants with no history of hypertension (10.6%) The association was found to be statistically significant (p< 0.001)

Our study findings were similar to other studies [8-9] done by Maluki et al BMI, Blood Pressure, and Metabolic Syndrome correlated significantly in the presence of skin tags (p<0.005) and El Safouri et al BMI was found to be a significant risk factor for skin tags (p< 0.05) [10],other study done by El Zawahry et al diabetic status was significant risk factor for appearance of skin tags (p< 0.001), similar to the findings of our study.[11]

Our study demonstrated the prevalence and association of skin tags with certain systemic conditions. Studies have demonstrated that multiple skin tags are often associated with insulin resistance and obesity. [12,13]. Therefore obesity is a significant risk factor for development of skin tags. However, our study could not demonstrate any significant association between obesity and skin tags. The reason for this difference could be because of the innate characteristic differences in the participants who visited the outpatient department. However, our study demonstrates the significant relationship between history of cardiovascular diseases, hypercholesterolemia, and the presence of skin tags, which has been substantiated by several other studies.

Conclusion

Our study demonstrated statistically significant results with uncontrolled diabetes mellitus. Our

study elucidated the clinical pattern of presentation of acrochordons and their association with potential risk factors. While diabetes mellitus, hypertension and cardiovascular diseases were definitive risk factors, our study could not demonstrate significant association between obesity and acrochordons. This could be because of the innate differences in the sampling characteristics present among the study participants. Our study may be taken as the basis for using acrochordons as an effective screening tool for several non-communicable diseases like diabetes mellitus, hypertension, cardiovascular diseases and uncontrolled diabetes.

Ethical Clearance: Obtained from Institutional Ethical committee.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Usatine RP, Smith MA, Chumley HS, Mayeaux Jr. EJ. Color Atlas of Family Medicine, Access Medicine, Skin tag. 2nd edition. The McGraw-Hill Companies; 2013.
2. Lipoff JB, Chatterjee K. Acrochordon. In: Stat Pearls. Treasure Island (FL): Stat Pearls Publishing; 2019
3. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Circulation. 2002; 17; 106(25):3143-421
4. Narahari P, Rao PNS, Sharma N, Navukkarasu S, Navaneeth A, Om Prakash M. Predictors of overweight and obesity among medical students. International Journal of Scientific and Research Publications 2014;4(12):1-5.
5. Phiske MM. An approach to acanthosis nigricans. Indian Dermatol Online J 2014;5(3):239-249.
6. Thappa DM. Skin tags as markers of diabetes mellitus: an epidemiological study in India. J Dermatol 1995; 22: 729-731.
7. Urschitz J, Urban Z, Granda C, Souza KA, Lupp C, Csiszar K et al. A serial analysis of gene expression in sun damaged human skin. Journal of Investigative Dermatology 2002;119(1):3-13.
8. Shrestha P, Poudyal Y, Rajbhandari SL. Acrochordons and diabetes mellitus: a case control study.NJDVL 2015;13(1):32-37
9. Maluki AH, Abdullah AA. Metabolic association of skin tags. Int J Dermatol Clin Res 2016;2(1):3-11.
10. ElSafoury O, Fawzi M, Abdel Hay RM, Hassan AS, El Maadawi Z, Rashed L. Increased tissue leptin hormone level and mast cell count in skin tags: a possible role of adipoimmune in the growth of benign skin growths. Indian J Dermatol VenereolLeprol. 2010; 76(5):538-42
11. El Zawahry, Abdallah MAR, Elmahdy HE. Study of possible relationship between skin tags and obesity in Egypt. The Egyptian Journal of Dermatology and Venereology 2013;33(1):18-21
12. Mustafa NAO, Ramadan ARMA, Alfarouk KO, Aljarbou A, Elhassan GO, Muddathir AK et al. Skin tags and atherogenic lipid profile in diabetes mellitus type 2 in Jabir Abu Eliz Diabetic Center. American Journal of Dermatology and Venereology 2017; 6(3):41-50.
13. Austin MA, King MC, Vranizan KM, Krauss RM. Atherogenic lipoprotein phenotype. A proposed genetic marker for coronary heart disease risk. Circulation. 1990; 82: 495-506.

The Logical Investigation of the Digitalization andits Capacities, Particularly those Influencing Conduct in Human Brain Research on Based on the Psychological Distress

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ABSTRACT

Digitalization is a part of portable banking and an administration, giving other financial associations that empowers its customer to lead an extent of budgetary trades remotely using for instance, a phone or Tablet using programming usually called "Applications" gave by a cash related establishment to the reason. Portable Banking is generally accessible for 24x7 and 366 days onwards. Some money related foundations have limitations on which records might be blamed through versatile saving money, and in addition a farthest point of sum that can be executed. In one educational model compact keeping cash described by flexible dealing with a record implies course of action and budgetary organizations with the help of convenience of media transmission contraptions. The degree of offered organizations may join workplaces to lead banks, securities trade and pay charge on the web, etc.

Keywords: *Versatile Accounting, Versatile Brokerage, Portable Financial Information Services, Versatile saving money applications, Plastic money transaction, Psychological distress*

Jel Classification: *B25, C81, F23, F44.*

Introduction

The earliest flexible keeping cash organizations used Short Message Service. The administration known as short message service dealing with a record with the showing of cutting edge cells with wireless application convention, reinforce engaging the use of the compact web in the year of 1999, the essential banks in Europe started to offer m-banking of their customers. The time of 2010 or before was as often as possible performed by short message service on the all-inclusive audit of business inquire about papers from world business association like Australia[6]. The key supportive precedents conceivable in universe of m-banking are following, with the incident to improvement and expanding utilization of front line phones and tablet based contraptions, the utilization of adaptable putting aside additional money esteem would empower client accomplice crosswise over whole client life circle much broadly than in advance. Minimal Banking associations relate with

1. Record Information:

- Mini proclamations and knowing of record history.
- Notifications on record development.
- Observing of Term store.
- Accessibility of credit explanations.
- Accessibility of card explanations.
- Correlative reserves and value explanations.
- Insurance Policy Managements.

2. Trade:

- Funds, trades exchange between client's connection accounts.
- Paying outsiders including charge installments of duties, web based shopping, book lodgings, tickets and so on.
- Outsider store exchange. Bank Check remote stores.
- Cancelling an administration ask.
- Checking the status of administration ask.
- Changing passwords.

3. Ventures:

- Mutual funds, Shares statements.
- Wealth Management Services.
- Notification alarms and warnings on security.

4. Support:

- Status of demand for credit, debit cards including contract endorsement and protection scope with security.
- Check status of cheque-book and requesting for PIN change, activation, chip-based cards etc.
- Exchange of information message and email including objection accommodation and following of banking online requirement.
- Searching of ATM Locations.

5. Content Services:

- Common data, for example, weather notification, news and so forth.
- Earn loyalty related offers through online transactions.
- Search Location of bank branches and ATM's.

According to the US Federal Reserve report discovered sixty eight percent of cell phone proprietors had utilized versatile managing an account over the most recent a year, in light of the study directed by Forrester, portable saving money will be alluring for the most part to the more youthful more "well informed" client fragment.

Platforms of Cashless Banking: The essential use of cashless banking was arranged in Finland. On 1992 as on schedule, customers of European banks could make charge portions and records status, alter using a cell phone. Significantly all the more beginning late flexible money related applications have depended upon the improvement of some key gauges for remote electronic associations and extended to in general markets. With everything considered, the stages utilized have been the Wireless Application Protocol and Short Message Service.

I. **WAP BANKING (Wireless Application Protocol):** Wireless Application Protocol is a typical dimension for taking online substance and impelled regard added organizations to remote contraptions, for instance, phones and Personal Digital Assistance (PDA's). Wireless Application Protocol goals are encouraged on web servers and use an unclear transmission tradition from destinations that is Hypertext Transport Protocol (http). The most basic complexity among web and website is the application condition.

II. **SMS BANKING (Short Message Service):** SMS permits instant messages normally up to one hundred and sixty characters to be sent to and from portable cordless cell phone by means of spared and forward framework. Around five hundred billions SMS were sent in 2001. Despite the fact that ninety five percent of this depends on individual to individual correspondence and phone message, different administrations, for example, e-keeping money are developing in prevalence.

- Verifying the status and changes of their record.
- Verifying the status of the check mobile numbers.
- Resettle the subsidize starting with one record then onto the next.
- View the last trade made.
- Request trade articulation.
- Pay service charges.
- Changes secret personal index numbers.

III. **Other Platforms:** Different stages are accessible or have been proposed for online banking experience. These incorporate the internet mode stage in Japan, which had amazing around ninety four percent supporters in 2015. Commission on membership gives docomo, internet mode's patent organization with yearly incomes of more than $13400 million every year[2]. Aside from remote m-banking various thoughts exist for Point of Sale applications, for instance utilizing short range remote innovation or network facilities in telephones and networks, for example, Bluetooth, clients can't pay charges by associating with the shipper's point of sale terminal by a thing from the candy machine pay a stopping meter and numerous different applications[4].

Part of Mobile-Banking in Customer's as well as Service Provider's Point of View: Portable saving money from the client's perspective, the client needs to get to data, merchandise and enterprises in whenever on his or her cell phone. Individuals can utilize their cell phone to buy tickets for occasions or open transports, pay for stopping, downloading substance and even cash exchange through portable included[8]. These are:

- Mobile ticket
- Mobile cash exchange
- Bill installments
- Online any sort of records opening
- Balance checks
- Tax installments
- Recharge and so forth.

Portable managing an account from the specialist organization's perspective, in PDA versatile biometrics has acquired another measurement to putting money on the go. The PDA has changed the market for biometrics in the portable saving money. The times of booth - based, secret word empowered exchanges will before long be a relic of times gone by. The in-assemble advanced cell cameras, fingerprints sensors, receivers currently let clients utilize their own equipment to catch their facial, unique mark and voice qualities, making ready for what we call "multi-factor" biometrics[1]. Biometric is keeping money as expression paint with enhancements in innovation on a regular schedule, making it a to a great degree convincing alternative for the two banks and their customers[3].

Portable Banking: Advantage and Disadvantage: Favorable circumstances of Mobile Banking:

i. Anytime Banking.

ii. Mobile Banking is Free.

iii. Various saving money administrations gave incorporate
   - Information about account balancing,
   - Credit/Debit card notifications,
   - Payment of bills, recharge notifications.
   - Transactions details.
   - Fund Transfer Facility (FTF),
   - Minimum balance notifications and so on can be gotten to from your convenient.

iv. Fund transactions in a split second to another record in a similar bank utilizing portable managing an account.

v. Secure Banking.

vi. Mobile application innovation accompanies propelled encryption advancements making it protected and secure as Internet Banking.

Demerits of Cashless Banking:

- Making most extreme advantage of versatile keeping money one ought to have advanced mobile phone. A few banks have particular programming for particular portable, for example, I-telephone and Blackberry individuals ought to download distinctive applications in view of the advanced cell they possess[5].
- Many specialists trust that versatile managing an account is all the more anchoring then web saving money as not very many infection or Trojans can exist in telephone. In any case, that does not imply that they are safe to any sort of dangers[7].
- There are likewise exceptionally constrained hostile to - infection programming alternatives for cell phones. Individuals are less watchful with their portable contrasted with PC. You should likewise refresh your hostile to infection on the portable in the event that you are an incessant client of versatile saving money.

Worldwide Scenario of Cashless Banking in Recent Trends: Data on e-exchange of cash are uncommon and differentiates in definitions make cross-country tests troublesome, an essential examination by Nsouli and Schechter (2002) from universal financial store exhibits that online exchange of cash is particularly in all cases in Austria, Korea, the Scandinavian countries like Singapore, Spain, and Switzerland, where in excess of seventy five for each penny of all banks offer such organizations.

Indian Scenario of Mobile Banking in Recent Trends: According to Hawkins (2002), in India, there is a danger of the rise of a 'computerized isolate' as the poor are avoided from the utilization of the web thus from the budgetary framework. Observational proof demonstrates that more extravagant nations have higher convergences of web clients (higher than pay focus) in examination with poorer nations.

Difficulties in Cashless Banking for Developing Countries: UNCTAD, 2002 data has stated couple of problems that makes country, when all is said in done, are relied upon to defeat to fulfill the favorable circumstances that electronic-money activities can achieve the capacity to embrace worldwide innovation to neighborhood necessities and the volume to fortify open help for e-back.

Conclusion

The outcomes introduced in this paper, speak to the network of research which has been the principle enthusiasm of creators as of late and which is coordinated towards finding ideal conditions for utilizing the capability of the versatile communication or portable saving money universally and the specialized security identified with the advancements, yet in addition with the client trust, protection and security as far as social experience. Current individuals even in dream likewise they thing about innovation, consider present day keeping money that is called "Portable Banking".

Conflict of Interest: Exceptionally in India, people are progressively beneficial to use liquid cash and there is no obligation to advance check in future for seeming complete national yield**.**

Ethical Clearence: Nil

Source of Funding: Self from related review articles, reports.

REFFERENCE

1. ACFE, Fraud Examiners Manual, Association of Certified Fraud Examiners, Austin, TX, 2007.
2. Ahmed ZU, Ismail I, Sadiq Sohail M, Tabsh I, Alias H, Malaysian consumers' credit card behavior, Asia Pacific Journal of Marketing and Logistics, 2001, 22(4), pp 528-544.
3. Barker KJ, D'Amato J, Sheridon P, Credit card fraud: awareness and prevention, Journal of financial crime, 2002, 15(4), 398-410.
4. Hasan SA, Subhani MI, Osman M, Plastic Money/ Credit Cards Charisma for Now and Then (A Thin Line between Easy Money and Risky Money), European Journal of Scientific Research, 2011, 62(1), 123-127.
5. Mary LS, Wisconsin Community Banking News, Going Mobile- Assessing the Pros/Cons of Mobile Banking, 2011.
6. Patil S, Impact of plastic money on banking trends in India, International Journal of Management Research and Business Strategy, 2014, 3(1).
7. Dr. Uppal RK, Transformation in banks in a highly competitive E-Age through E-services – An Empirical study, Indian journal of Management, 2014, Vol-4, 17-30.
8. Sumi FR, Safiullah AB, Problems and Prospects of Plastic Money in Bangladesh, IOSR Journal of Business and Management, 2014, 16(12), 31-38.

To Study Behavioral and Socio Economic Factors of Non Communicable Diseases in Northeast India Using NFHS-4

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ABSTRACT

Introduction: This paper investigates the incidence of non-communicable diseases(NCDs) in North-Eastern states of India using NFHS-4 data and correlates with the different proximate and the secondary risk factors.

Method: Descriptive statistics were initially undertaken to understand the incidence of non-communicable diseases with the different proximate and the secondary risk factors. To finally draw statistically inference, logistic regression model was applied to determine the significance and nature of relationship between the predictor and the covariates.

Results: The result reveals that 'age' is a significant factor for both women and men under study in determining the prevalence of non-communicable diseases under study. The findings also shows that among the surveyed population, rural women and men are having high chances of NCDs compare to urban counterparts.

Conclusion: In Northeast, much research is needed to be undertaken for planning on time effective NCD surveillance, to identify the major risk factors and the cost.

Keywords. *Non Communicable Diseases, North east India, Logistic regression, Nutritional Index, Wealth Index.*

JEL classification codes: *I100, I120*

Introduction

Many studies have identified Non-Communicable Diseases (NCD) as increasingly predominant diseases in many regions.

Multi-centre studies have been initiated by the ICMR to find out the genetic factors, in addition to common environmental exposures, tobacco smoking, alcohol consumption etc, which could possibly explain the high prevalence of certain Non-Communicable Diseases (NCD) in Northeast India.

Not many literatures have focused about the Non-communicable diseases especially in the North-East. Therefore, this study will try to address these lacunae in providing information on the various socio economic and demographic risk factors associated with some non-communicable diseases by the used of the recently available data and information from National family health survey 4.

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Review of Literature

Current Health Scenario in Rural India**,** as reveals by Patil[(1)], that the country is passing through a phase of double health burden of high incidences of communicable diseases and an increasing trend of NCDs.

Saxena, *et al* [(2)] emphasize that identifying risk factors of non-communicable diseases in rural settings occupies a central place in the surveillance system because of the importance of the lag time between exposure and disease.

The need of surveillance and procurement of details regarding NCD risk factors is essential for

health programs/policy planning and implementation, particularly in a country like India with a rapidly increasing burden of NCDs[3].

Multi-morbidity among older adults in India as reveals by Mini and Thankappan[4] found that more than 30% had multi-morbidity. Older age, women, those in higher socioeconomic status, tobacco users and alcohol users were more likely to have multi-morbidity compared to those with no NCD.

Research Objective

The objective of the present study focuses on investigating the determinants on some Non-Communicable diseases through various behavioral and socio economic and demographic risk factors in states of Northeast India using NFHS - 4.

Sources of Data

The National Family Health Survey 2015-16 (NFHS-4)[5], the fourth in the NFHS series, provides information on population, health and nutrition for India and each State/Union territory. NFHS-4, for the first time, provides district-level estimates for many important indicators. The Ministry of Health and Family Welfare, Government of India designated International Institute for Population Sciences, Mumbai as the nodal agency to conduct NFHS-4. Four Survey Schedules - Household, Woman's, Man's and Biomarker - were canvassed in local language using Computer Assisted Personal Interviewing (CAPI). NFHS-4 fieldwork for India was conducted from January 2015 to December 2016 and gathered information from 601,509 households, 699,686 women, and 112,122 men.

As our study will be concentrated in states of Northeast, India by the use of NFHS-4 in connection with the topic of this research. Hence, the following tables provide an overview of the sample size collected during the survey for the 8 different states.

The data provide information on various non-communicable diseases like D**iabetes, Asthma, Thyroid, Heart Diseases and Cancer** which will be used in the present study. Information's on the various socio-economic risk factors on the above mention NCD's is obtained from the data.

Methodology for Analysis

The study used both MS Excel as well as Statistical Package for Social Sciences (SPSS) for data analysis. SPSS was used for cross tabulation to present relationships between different variables. Logistic regression which is used to predict the risk of developing a given diseases (e.g. diabetes, asthma, thyroid and hearth diseases) based on the observed characteristics of the respondent (i.e. **age, residence, wealth status, occupation** and **educational attainment**).

We have also considered some *behavioral or proximate* risk factors of the selected non-communicable diseases which are collected during NFHS-4; two of these factors are **smoking and drinking**. We also constructed the third proximate factor called the **Nutritional Index**. This index is to determine the nutritional status of the surveyed population and was constructed using the Principal Component Analysis (PCA) in SPSS, base on the following variables: (1) intakes milk or curd (2) intakes pulses or beans (3) intakes dark green leafy vegetables (4) intakes fruits (5) intakes eggs (6) intakes fish (7) intakes chicken or meat (8) intakes fried food (9) intakes aerated drinks. We have divided this index into the three ranges they are: Low Range, Medium Range and High Range where low range implies low status of nutrition.

Data Interpretation: Among the various non-communicable diseases, data only on the Diabetes, Asthma, Thyroid, Heart Diseases and Cancer are available in NFHS-4.

Table 1: Number of women and men interviewed in NFHS 4 by states of Northeast India

States	Number Women interviewed	Number Men interviewed
Arunachal Pradesh	14294	2140
Assam	28447	4191
Manipur	13593	1886
Meghalaya	9202	1236
Mizoram	12279	1749
Nagaland	10790	1596
Sikkim	5293	879
Tripura	4804	878
Total	98702	14555

Source: NFHS 4

Interpretation of Data based on secondary risk factors: Some of the secondary risk factors considered in the present study are Sex, Residences, Educational Attainment, Occupation and Wealth Index. These are considered as secondary for the fact that these factors may indirectly led to incidences of NCDs viz., diabetes, asthma, thyroid, cancer and heart diseases.

The frequency distribution of the above mentioned NCDs by the secondary risk factors reveals that among people who suffer from the stated NCDs, a greater proportion of them are Christian from Arunachal Pradesh, Meghalaya, Mizoram and Nagaland whereas in the state of Assam, Manipur, Sikkim and Tripura, incidences of NCDs is higher among Hindus.

Many literatures reveal that risk factors may be affected by lifestyle choices that are often influenced by economic development and urban living. The data also depicted that among people who suffer from the stated NCDs, there are more proportion of rural people having the diseases compared to their urban counterparts in almost all the states.

The data in the present study reveals that incidences of diabetes is more for people with the middle and richer wealth index groups except for the state of Tripura where the chances of having the diseases is more with people of the poorer wealth index level.

In the case of Asthma incidences is highest for 'middle wealth index' groups in the states of Arunachal Pradesh, Meghalaya and Sikkim whereas the incidences of the disease is high with the 'poorer wealth index' people in the states of Assam, Nagaland and Tripura.

In connection with occupation, the data reveals that from among people who have NCDs viz., diabetes, asthma, thyroid, heart diseases and cancer incidences a significant proportion of them belong to those groups of people who work in agricultural sector.

Thyroid can be seen is high with women of urban residence in the state of Mizoram, Nagaland, Sikkim and Tripura. Heart diseases are found out to be high with the people of rural residence in almost all the states of North East. However, in the some states we have found that people of urban residence are also suffering the most.

Interpretation of Data based on proximate(behavioral) risk factors: Some of the proximate risk factors that are considered in the present study are age, alcohol consumption, smoking and Nutritional Index. These are considered as proximate for the fact that these factors may directly led to incidences of NCDs viz., diabetes, asthma, thyroid, cancer and heart diseases.

Diabetes by the proximate risk factor depicts that in all states and among those who have the disease, highest proportion belong to medium range of the nutritional index both for the men and women, age group of 40+ for both men and women.

In general it is observed that, with increase in age the occurrence of the disease seems more prominent especially in the states of Assam, Mizoram and Tripura.

Among samples having Heart Diseases these, highest proportion of them belongs to medium range of the nutritional index both for the men and women. With age, the incidence of the disease seems to increases and this trend become more pronounce from the age 30+ in all states except in the state of Meghalaya, were the disease is prominent even among younger age group of women.

Interpretation Binary Logistic regression for women: All the risk factors are categorize into various classes, the cross tabulation shows the distribution of NCDs by Age Group, Residences, Wealth, Educational status and Occupational status and also by some of the proximate risk factors as Nutrition, Smoking and Drinking Alcohol.

In order to statistically verify the nature and strength of the associations between the above mentioned NCDs with the risk factors, a **binary logistic regression model** is applied, whereby the risk factors constitute the independent variables and the corresponding NCDs on the depending variable. The model when applied by state does not yield significant result which may be due to the small number of samples of the incidences of the Diseases. Hence the model is on the combine data of North east and the outcome of the model is discussed below.A logistic regression on women with the above mentioned explanatory variables and each of the corresponding NCDs.

The model with **Diabetes** as the dependent variable which is categories as yes or no, reveals that age is one factor that can have significantly determine the risk of incidence and the Table 2 reveals that at less than 0.01 level of significance, the increase in age of the respondent is associated with increased odds of the diabetes diseases.

Table 2: Binary Logistic regression of NCDs with the corresponding risk factors for women

Women	Diabetes	Asthma	Thyroid	Heart Diseases	Cancer
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
Age	1.097*	1.027*	1.039*	1.046*	1.055*
Religion					
Buddhist/Neo-Buddhist[R]					
Hindu	1.412**	1.434**	2.395**	1.448*	2.118
Muslim	2.493*	1.535**	2.845**	1.755*	4.701**
Christian	1.125	1.856*	1.932**	2.362*	5.087**
Residence					
Rural[R]					
Urban	1.121	.944	1.083	.969	.826
Wealth Index					
Richest[R]					
Richer	.831**	.877	.803*	1.028	1.076
Middle	.590*	.928	.672*	1.090	.803
Poorer	.341*	.935	.656*	1.006	.888
Poorest	.243*	.640*	.496*	.785**	.542
Educational Attainment					
No Education[R]					
Incomplete Primary	.957	1.240	.643*	1.034	1.614
Complete Primary	1.163	1.231	.588*	1.179	1.203
Incomplete Secondary	1.351	1.245	.745**	1.342**	.781
Complete Secondary	1.232	1.265**	.851**	1.325*	1.878
Higher	1.158	1.345**	.925	1.277**	2.170
Drink Alcohol					
No[R]					
Yes	.982	.751*	1.456*	1.035	.488*
Smokes Cigarette					
No[R]					
Yes	.887	.721**	.822	.619*	.401**
Nutrition status					
High Range[R]					
Medium Range	.897	.879**	.856*	.866*	.570*
Low Range	1.473**	.650**	.530*	.968	.685
Constant	.001	.008	.004	.004	.000

Source: Authors own calculation. *p < 0.01, ** p < 0.05

In connection to nutritional status, the model depicts that among those who have the diabetes, the odd of the disease is 1.5 times to people who belongs to the low range compare to the people who belongs to the high range group.

As in the case of Diabetes, the Table 2 of the logistic model shows that increase in age is associated with increased odds of the **Asthma diseases**.

The outcome of the regression model as depicted in the table shows that age is again a highly significant (i.e. p<.000) factor with women who is currently having the **thyroid** diseases.. Wealth is another significant factor (p <0.01) in this case in determining the odds of incidences, whereby the odds of women who belongs the poorest, poorer, middle and richer wealth index are less comparing to the people with the richest wealth index.

The regression model further depicts that women who have attended school have less odds of having the thyroid diseases, although internal variation(between educational status) of the incidences of the diseases prevail. Among the proximate risk factors, the table shows that the odds of having the disease among drinking women are 1.5 higher than those who does not drink.

As in the other previously mentioned NCDs, age is a significant factor in the case of **heart diseases** also as depicted in the table 2, showing that an increase in age is associated with increased risk of the disease.

The table 2 shows that drinking alcohol increases the chances of the disease. Further women in the highest nutritional group have higher odds of having the disease compare to middle nutritional group and low nutritional group.

Age is an important factor determining the incidences of **cancer** among women in the reproductive age group. Further women in the highest nutritional group have higher odds of having the disease compare to middle nutritional group and low nutritional group.

Logistic regression on **men** with the above mentioned explanatory variables and each of the corresponding NCDs is depicted in Table 3.

Table 3: Binary Logistic regression of NCDs with the corresponding risk factors for men

Men	Diabetes	Asthma	Thyroid	Heart Diseases
	Odds ratio	Odds ratio	Odds ratio	Odds ratio
Age	1.080*	1.030*	1.057*	1.070*
Religion				
Buddhist/Neo-Buddhist[R]				
Hindu	1.407	.611	2.237	1.495
Muslim	1.283	1.345	3.672	1.090
Christian	1.936	1.022	5.342	1.642
Residence				
Rural[R]				
Urban	.569*	1.536	1.009	.979
Wealth Index				
Richest[R]				
Richer	.736	.593	1.764	.705
Middle	.614**	.732	2.604	.692
Poorer	.491*	.523	2.691	1.117
Poorest	.378*	.452	2.375	.985
Educational Attainment				
No Education[R]				
Incomplete Primary	.483**	2.706	.475	.739
Complete Primary	.465**	2.964**	.257**	.619
Incomplete Secondary	.215*	2.628	.259	.858
Complete Secondary	.502*	2.302	.526	.822
Higher	.781	1.246	.355**	.908
Drink Alcohol				
No[R]				
Yes	1.396**	1.173	.977	.962
Smokes Cigarette				
No[R]				
Yes	1.075	1.714**	1.119	.687**

Conted…

Occupation				
Not Working/No Occupation[R]				
Professional/technical/managerial	1.517	1.051	2.295	.989
Clerical	1.219	1.057	1.420	1.064
Sales	1.575	.913	1.498	.715
Agricultural	1.908**	.997	1.203	1.311
Services	.966	.995	1.065	.829
Skilled& Unskilled manual	2.431*	.289**	1.494	.720
Nutrition status				
High Range[R]				
Medium Range	.477*	1.079	.384*	.620**
Low Range	.657	.479	.441	1.535
Constant	.002	.001	.000	.002

Source. Authors own calculation. *p < 0.01, ** p < 0.05

Limitation of the Study: The first limitation is that the study was conducted with a limited sample size for men comparing to women and hence many of the risk factors for men were found not to be statistically significant and hence would act as a limitation.

The second limitation of the study is the problem of identifying the various risk factors. If the more data could be collected on biomedical report of those respondents who is currently suffering from the following diseases i.e. diabetes, asthma, hearth diseases, thyroid and cancer than the various risk factors for causing the diseases would be more clearer.

Scope of the further study: Since this study has been compiled at all the state level of Northeast. Therefore, further we can extend this work to the district level also for all the states of the Northeast.

This study can further be complimented with primary data collected from the various sources like hospitals, dispensaries, than the major risk factors which causes the NCDs could identified appropriately.

Policy Recommendations: The study was conducted by taking the data from the NFHS-4 for finding out the issues of adult health which are cause by the different modifiable risk factors due to the common non-communicable diseases in Northeastern states of India. A few suggestions towards policy recommendations of the study are as follows

Since in our study we mostly found that people of rural residence are suffering from the diseases, therefore better diagnostic facilities should be provided in Rural areas.

In the present study we found that people with incomplete secondary education have higher chances of having NCDs. This suggests that higher educational level reduces the risk of NCDs. Thus, in this connection government and policy makers should ensure higher education for the masses.

As we have seen in this study that people who work in agricultural sectors have more chances of having NCDs compare to people from other occupation. Thus, government should take the initiative of ensuring that more awareness of health lifestyle be provided to people who work in agricultural sectors.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Not applicable

REFERENCES

1. Patil AV, Somasundaram KV, Goyal RC. Current Health Scenario in Rural India, Australian Journal of Rural Health. 2002, **10**(2):129-135.
2. Saxena A, Kandpal SD, Goel D, Bansal S. Prevalence of risk-factors of non-communicable diseases in rural population, Indian Journal of Community Health, 2011 **23**(2):65-68.
3. Nethan S, Sinha D and Mehrotra R. Non Communicable Disease Risk Factors and their Trends in India. Asian Pac J Cancer Prev, 2017 **18**(7): 2005-2010.
4. Mini GK and Thankappan KR. Pattern, correlates and implications of Non-communicable disease multimorbidity among older adults in selected Indian states: a cross-sectional study, BMJ Open, **2017 7**:1-6.
5. International Institute for Population Sciences. National Family Health Survey 2015-16, Mumbai: 2017.

A Study to Assess the Knowledge and Self Reported Practices Regarding Care of Arterio Venous Fistula among Patients at Selected Haemodialysis Units of Sangli City

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ABSRACT

"A study to assess the knowledge and self reported practices regarding care of arteriovenous fistula among patients at selected haemodialysis units of sangli city". Background: A.V.Fistula is referred as gold standard method to carry out the dialysis of client, so the care and appropriate knowledge is most important factor for smooth access. Objectives: 1. To assses the existing knowledge regarding A.V.Fistula care among haemodialysis patients. 2. To assess the self reported practices regarding care of A.V.Fistula among haemodialysis patients. Methodology: A present study was conducted by using quantitative approach with non-experimental descriptive research design. Nola j penders health promotion model was used which is revised in 1996for conceptual framework. Proposal with tool presented in front of ethical committee for permission. Total 100 samples were selected by Probability simple random sampling method. Data collection tool had knowledge questions to assess knowledge and practice were assessed by using likhert scale. Result and conclusion: knowledge scores, 84.00% subjects were having average knowledge, 16% were having poor knowledge and no one in the good knowledge category. In the present study of patients of A. V. fistula, in Practice scores, 37% of subjects identified with inadequate practice score 63% identified with appropriate practice score.Implementation of knowledge regarding A.V. Fistula care and its practices would be beneficial to the patients who are going under haemodialysis treatment for increasing the patency and reducing the complications of A.V.Fistula for reducing the life threatening conditions.

Keywords: *A.V.Fistula, knowledge, self reported practices*

Introduction

National vascular access initiative conducted the physical examination of Arteriovenous fistula in 4 weeks to identify the failure and other complications and recommend it to diagnostic evaluation. For proper identification of the problems related to A.V.Fistula standard protocols were obtained as monitoring, timely check up, education to all care givers as well as patiens to improve the vascular patency(e.g., application of adequate pressure on vascular site, brouchers)[1.] Self management throughout the levels of chronic kidney disease and reeferd vascular access problems, which includes failure to mature of A.V. Fistula and placement. Education helps the patients to live best quality of life. It increases the self confidence of patients to carry out the necessary behaviour to achieve the goal. Self care of A.V.Fistula will help the patient for better management of vascular access. To promote the knowledge and practice on care of A.V.Fistula by giving brouchers. Hence study is needed to this population and this period[2]. proper education regarding care of A.V. Fistula among patient and relatives should be provided. A list is present regarding care of A.V. Fistula at home. Avoid sleeping at site, don't lift up the heavy objects, keep the area clean, these guidelines provides information like how to admire the sign and symptoms of complication.[3]

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Materials and Method

A present study was conducted by using quantitative approach with non-experimental descriptive research

design. The conceptual framework was based on Nola J Penders health promotion model revised in 1996 with individual characteristics, activities related effect, commitment to plan of action and behavioural outcomes. The reliability was done by using split half method 'r' was calculated by using Karl Pearson's formula coefficient'r'ofthequestionnairewas0.9. Validity was done from 20 experts..Proposal with tool presented in front of ethical committee for permission. Total 100 samples were selected by Probability simple random sampling method. Pilot study was conducted with 10 samples and the study was found feasible. Final study conducted with same data collection tool. Data collection tool had knowledge questions to assess knowledge and practice were assessed by using likehert scale.

Assumptions: Haemodialysis patients may have some knowledge regarding care of A.V. Fistula.

Results

Section 1: The analysis of data related to assessment of the knowledge regarding care of A.V. Fistula among patients.

Table 1: Frequency and percentage distribution of knowledge score.

n = 100

Groups	Frequency	Percentage %
Poor (0-4)	16	16%
Average (5-8)	84	84%

The above table shows that in knowledge scores, 84.00% of subjects were having average knowledge, 16% were having poor knowledge.

The analysis of data related to assessment of the self reported practices regarding care of A.V. fistula among patients.

Section 2: The analysis of data related to assessment of the self reported practices regarding care of A.V. Fistula among patients.

Table 2: Frequency and percentage distribution of Practice score.

n = 100

Groups	Frequency	Percentage %
Inadequate (0-5)	37	37%
Adequate (6-10)	63	63%

The above table shows that, in Practice scores, 37% of subjects were having inadequate practice and 63% were having adequate practice. So it evident that more efforts are needed to impliment to carryout appropriate practices. Knowledge category.

Discussion

This study revealed that 84% of patients were having average knowledge about AVF care and 16% were having poor knowledge. This results suggest that proper implementation of knowledge regarding AVF care and self-practise is needed to heamodialysis patients in appropriate manner, in Practice scores 37% of subjects were having inadequate practice and 63% were having adequate practice.. In our, the study also reveals the previous knowledge regarding AVF care about 47% patients were having previous knowledge and 57% were having no knowledge about AVF care. This indicates that maximum number of patients lack in knowledge of AV Fistula care. So there is need of providing knowledge regarding AVF care. The study also reveals that 74.42% patients got the information about AVF care from articles, 18.60% patients from the newspaper and 6.98% got the information from the television.

The study also reveals about the number of years on dialysis treatment, it shows that 8% of the patients had A.V. Fistula since last one year, 30% patients had A.V. Fistula since 2 years, 14% of patients have A.V. Fistula since 3 years and since last 4 years 29% had A.V. Fistula and since last 15% had AV Fistula since last 5 years. So the study indicates that maximum of patients have AV Fistula since 2 years as well as 4 years. Which indicates that there is need of implementing education about A.V Fistula care and its importance to reduce the complications and increase the compentancy of A.V. Fistula.

The result of our study suggested the need of introduction to A.V. Fistula care which help to improve the life style pattern of patients in long term. Appel et al stated that intervention from healthcare providers makes good sense, to help patients reduces the controllable AV fistula failure through proper lifestyle choices.

Conclusion

This chapter gives brief description of study as well as summary and the outcome of the study. It also gives appropriate implications and recommendations for further research study.

The main aim of the study was, to assess the knowledge and self reported practices regarding care

of Arterio Venous fistula among patients at selected haemodialysis units of Sangli city. The design used for the study was non experimental descriptive research design. The study was conducted at selected haemodialysis units of Sangli city. The Sample size of the study was 100 patients of Arterio Venous fistula.

The reliability of the tool was determined Split Half Method of Reliability, the tool was administered to 10 samples. Reliability of the knowledge tool was found to be 0.90 and for the practice tool was 0.82.

The pilot study was conducted, to assess the feasibility of the study and to decide the statistical analysis and practicability of research. It was found feasible.

Finding of the present study revealed that significant amount of patients were lacking the knowledge about A.V. Fistula care and proper implementation of healthy lifestyle.. Planning for implementation of knowledge regarding A.V. Fistuala care and its practices would be beneficial to the patients who are going under haemodialysis treatment for increasing the patency and reducing the complications of A.V.Fistula for reducing the life threatening conditions.

Implimentation of knowledge and self care practices would be beneficial to patients under haemodialysis treatment in many ways like it reduces the chances of A.V. Fistula failure,infection and any other severe life threatening conditions llike bursting of A.V. Fistula due to lack of knowledge and practice regarding taking care of it and its importance. Lifestyle pattern changes are recommended to all patients on haemodialysis treatement to reduce the risk factors and improve the patency of A.V. Fistula car study was done in selected hospital on a limited population to generalize the findings.

Conflict of Interest: Column is Nil.

Source of Funding: Self.

Ethical Clearance: Proposal of research with the data collection tool was presented in the front of research committee for approval prior permission from hospital and haemodailysis unit were taken. Informed written consent from each participant was taken. Which included name, number, organization, time duration of participation, termination of participation, purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance is done with the committee members Dr. Sripriya and Dr. Nilima Bhore mam.

REFERENCES

1. Mary TC, Edwin H, Fistula First Breakthrough Initiative Stratergic Plan Mid – Atlantic renal coalition, Oklahoma 2009;4(2) : 12-6.
2. Steven W, Kimberly N, Christopher S.H. increasing use of arterio venous fistula in haemodailysis: Economic benefits and economic barriers john Hopkins Bloomberg school of public health, Baltimore, Maryland 2007;2(7): 5-8.
3. Stewen MH. Increasing Arteriovenous Fistula in Hemodialysis Patients: Problems and Solutions. Official Journal of ISN. 2007 Jul 15; 22(2): 522-528.
4. Black M Jacob E Medical Surgical Nursing Clinical management for community care.7th Ed. USA: WB Saunders Company; 2004.
5. Smeller CS. Text book of medical surgical nursing. 10th Ed. Philadelphia: Lippincott Williams and Wilkim; 2004.
6. Lewis, Heitkemper, Dirksen. Medical Surgical Nursing Assesment and management of clinical problems. 6th Ed. Missouri: Mosby Elseiver publication; 2004.
7. Stewen MH. Increasing Arteriovenous Fistula in Hemodialysis Patients: Problems and Solutions. Official Journal of ISN. 2007 Jul 15; 22(2): 522-528.
8. Derakhshanfar A, Gholyaf M, Niayesh A. Assessment of Frequency of Complications of Arterio Venous Fistula in Patients on Dialysis. Saudi J Kidney Dis Transpl. 2009 Jul 5; 20(5):872-75.
9. Mendelssohn DC. Ethier J. Assessment of Practice on Care of Fistula 2005. Available from http:// www.ncbi.nlm.gov
10. Mary TC, Edwin H, Fistula First Breakthrough Initiative Stratergic Plan Mid – Atlantic renal coalition, Oklahoma 2009;4(2) : 12-6.
11. Steven W, Kimberly N, Christopher S.H. increasing use of arterio venous fistula in haemodailysis: Economic benefits and economic barriers john Hopkins Bloomberg school of public health, Baltimore, Maryland 2007;2(7): 5-8.
12. Literature Review: Writing Audio Duke University. 2001. Available from http://uwp.aas.duke.edu/wsstudio. (18)
13. K/DOQI Clinical Practice Guidelines for Vascular Access. Am J Kidney Dis. 2002 Mar; 37(2):137–181.
14. Rehman R, Schmidt RJ, Moss AH. Ethical and Legal Obligation to Avoid Long-Term Tunneled Catheter Access. Clin J Am Soc Nephrol. 2009 Feb; 4(2):456-60.

A Study to Assess the Effectiveness of Topical Application of Honey on Lscs Wound Healing among Postnatal Mothers from Selected Maternity Hospitals of Sangli, Miraj and Kupwad Corporation Area

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ABSTRACT

The LSCS wound healing was evaluated by using reeda scale to find the LSCS wound healing status among postnatal mothers who undergone LSCS. The intervention was exercised honey application on LSCS wound among postnatal mothers, 5ml twice in a day for 6 days to the subjects of experimental group. The reliability of the tool was determined by using inter-rater method on 10 samples with 6 days of interval. The reliability coefficient "r" was calculated by using Karl Pearson's coefficient formula, which was more than 0.7, hence the tool was found to be reliable.Also, the reputed and eminent 30 experts from the field related to study had validated the tool for its content, Quasi experimental research study was conducted during the month of August 2018 by selecting the 80 postnatal mothers 40 in each group of experimental and control. The subjects were selected by using non probability purposive sampling technique. Analysis was done using frequency and percentage distribution test.

Aim: To assess the condition of LSCS wound before application of honey &.To assess the effectiveness of honey application on LSCS wound healing.

Keywords: *Effectiveness, honey, L.S.C.S.wound, postnatal mothers*

Introduction

Child birth is end of the pregnancy by one or more babies exit a women's uterus by vaginal passage or LSCS. In 2012 about 23 million deliveries occurred by a surgical method recognised as LSCS.[1] Ensuring secure pregnancy and maternity occupies a pivoted responsibility and has been measured as one of the vital issues in the framework of reproductive and child birth programme. Support from study research denotes that there is rise for LSCS deliveries chiefly during complications confronted at the time of pregnancy and delivery.[2] Lower segment caesarean section is optional when vaginal delivery pose a possibility create hazard to the newborn or mother. Worldwide rise in LSCS rate during the previous three decades, source of alarm and request an in depth study. According to the new studies from Oct 2017-2018 over the phase of six months emergency LSCS (72.1%) and primary LSCS (66.5%) were added everday.The commonest sign for LSCS was previous LSCS in 35% followed by foetal distress, breech presentation, severe oligohydraminos and pre eclampsia.[3] Honey is a viscous, supersaturated sugar solution derivates from nectar gathered and customised by the honeybee and has been used since prehistoric period as a remedy in wound care.[4] Honey is non stained low price substance to be made up of CHO, water, pollens organic composite, enzymes and amino acid pigments having antibacterial and opposed to provocative skin texture.[5] The honey works on the body immunity. Honey thousands of years used to be concerned with innumerable harms like wounds and burns.[6]. It gives quick removal of damaged tissues and disinfects the wounds, and stimulated progress of wound tissues as a result of quick curative and initiates the

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remedial course of action in resting wounds. Its rapidly decreases the pain.[8] The difference in local antiseptic solution and honey on the wound after the surgery showing the using applying of honey giving the fast result of wound healing; lessen hospital stay, size of the scar and the necessity for antibiotics.

Objectives

1. To assess the condition of LSCS wound before application of honey.
2. To assess the effectiveness of honey application on LSCS wound healing.

Material and Method

Quasi- experimental two group pre-test post-test design was directed to assess effect of honey on LSCS wound healing in selected maternity hospitals. 80 samples are choosed by using non-probability purposive sampling method. In experimental group, the wound dressing done by using honey, in control group simple dressing was used. A standardized REEDASCALE was used to assess the effect of honey application on LSCS wound. The study adopted modified Imogene king's goal attainment model for developing the conceptual framework of present study. Analysis was done using frequency and percentage distribution and't' test.

Hypothesis:

H0: There is no effect of application of honey on L.S.C.S. wound healing**.**

H1: There is effect of application of honey on L.S.C.S. wound healing.

Findings

Section I

Table I: Frequency and Percentage Distribution of Demographic Variables

(n = 40 + n = 40)

Sr. No.	Variable		Experimental		Control	
			Frequency	Percentage	Frequency	Percentage
1	Age in years	Below 20yrs	3	7.50	2	5.00
		21-25yrs	19	47.50	20	50.00
		26-30yrs	17	42.50	17	42.50
		above 30yrs	1	2.50	1	2.50
2	Gravida	Primi	17	42.50	20	50.00
		Multi	23	57.50	20	50.00
3	Diet Pattern	Mixed	22	55.00	22	55.00
		Veg	18	45.00	18	45.00
4	Income	up to Rs. 10000	5	12.50	3	7.50
		Rs.10001-20000	28	70.00	26	65.00
		Rs.20001-30000	7	17.50	11	27.50
5	Weight	46-55kg	12	30.00	11	27.50
		56-65kg	19	47.50	28	70.00
		66-75kg	9	22.50	1	2.50

1. **AGE:** According to the age in the study, highest number of samples i.e.47.50% are from experimental group belongs to age group of 21-25 yrs. Whereas 50% are from control group belongs to age group of 21-25 years.
2. **GRAVIDA:** According to the Gravida in the study, highest numbers of samples i.e. 57.50% from Experimental group are multigravida whereas 50% samples from control group are Primi.

3. **DIET:** According to the diet in the study, highest numbers of samples i.e.55% from experimental group are having mixed diet whereas 55% samples from control group having mixed diet.
4. **INCOME:** According to the income in the study, maximum numbers of samples i.e.70% from experimental group are having 10001-20000 income per month whereas 65% samples from control group having 10001-20000 income per month.
5. **WEIGHT:** According to the weight in the study, maximum numbers of the samples i.e.47.50% from experimental group having 56-65kg weight whereas 70% samples from control group having 56-65kg.

Section II

Table 2: Condition of LSCS Wound Healing between Experimental and Control Group

(n = 40 + n = 40)

Experimental Group					
Group	**Frequency**	**Mean**	**S.D.**	**t value**	**P value**
Day 1	40	12.65	0.89	43.91	0.000
Day 6	40	4.45	0.87		
Control Group					
Group	**Frequency**	**Mean**	**S.D.**	**t value**	**P value**
Day 1	40	12.40	0.90	25.85	0.000
Day 6	40	8.32	1.07		

Above table shows that the comparison of the LSCS wound healing score of the day 1 and day 6 of experimental and control group was done by the paired t test.

In experimental group day 1 score was 12.65 with SD of 0.89 and day 6 score was 4.45 with SD 0.87. The value of the paired t test was 43.91 with p value 0.000.

In control group day 1 score was 12.40 with SD 0.90 and day 6 score was 8.32 with SD 1.07.The value of the paired t test was 25.85 with p value 0.000.shows that there was significant difference in the average LSCS wound healing score, at 5% level of significant.

Section III

Table 3: Assessment of the Condition of L.S.C.S. Wound Healin before and After Application of Honey

(n = 40 + n = 40)

Experimental Group		Day 1		Day 6	
Healing Score		**Frequency**	**Percentage**	**Frequency**	**Percentage**
Good	0-5	0	0.00	37	92.50
Medium	6-10.	0	0.00	3	7.50
Raw	11-15.	40	100.00	0	0.00

Control Group		Day 1		Day 6	
Healing Score		**Frequency**	**Percentage**	**Frequency**	**Percentage**
Good	0-5	0	0.00	0	0.00
Medium	6-10.	0	0.00	39	97.50
Raw	11-15.	40	100.00	1	2.50

The above table shows that, according to the state of LSCS wound healing before and after application of honey, before application in experimental group all 100% were in raw healing category. And after administration

of honey, 7.50% were in medium healing condition and 92.50% in the good healing category.

In control group LSCS wound healing on day 1without administration of honey all 100% in raw healing category and on 6th day 97.50% in medium healing condition and2.50% in raw healing category.

Conclusion

The study was conducted to evaluate the effectiveness of topical application of honey on LSCS wound healing among postnatal mothers. Samples selected in the study were postnatal mothers with LSCS wound. The result shows that honey application on LSCS wound is proven to be an effective on healing of LSCS wound. Analysis of data showed that there was a significant difference between the control group and experimental group.

The quasi experimental design was used and 2 groups were included for this study, experimental and control group. Pre and post test was done for both groups. Each group has 30 samples. The samples were selected on the basis of the sampling criteria set for the study.Pre-test was done before intervention in both the groups, then post intervention was done to evaluate the effect of honey on LSCS wound.

Based on objective and the hypothesis, the collected data was analysed by using descriptive and inferential statistics and the t test was used to find the significance.

Honey is effectiveness on LSCS wound healing and statistically findings shows that it is significant difference in the experimental and control group. Hence it is concluded that there is significant effect of honey on LSCS wound healing among postnatal mothers.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The research was approved by the ethical committee after giving proposal with information collection tool. There will be no anxiety and risk to the participants. The time duration of the participation will be 15 minutes. The name of participants and collected data will be kept confidential. The participant may be voluntary. Participants have been allowing withdrawing from the study after giving consent. Permission from concerned authority had taken before final research.

The research became authorized through the ethical committee after offering proposal with information collection device. Where it turned into promised that there may be no pain and risk to the individual. The time duration of the participation can be 15 mins.The data might be saved confidential. The participation may be volundary.Participant have been allowing from take a look at after giving consent. Permission from authority had been taken before final examine.

REFRENCES

1. Molina, Giweiser, TG. Lipstitz, SR, Esquivel, MM: uribe - Leitz, T: Shaah, N: Semrau, k Berry,WR Giawande. Relationship between Caesarean Delivery Rate and Maternal and maternal and neonatal mortality. 2015 December Journal Of The American Medical Association. 314 (21):2263-70.
2. Sabu.s.Padmadas, Suresh Kumar, Sajini b Nair, Kumari. Caesarean section delivery in Kerala India. Evidence from a national family health survey. Social Science and Mewdicine. 2000 september. 51(4):511-21.
3. Neelam Sharma, Anshul Jhanwar. Study of incidence, trends and determinants of caesarean section in tertiary care hospital of Rajasthan India. International Journal Of Reproduction Contraception Obstetrics And Gynecology June 2018;DOI:10.18203/2320-1770. 20182504.
4. Reyes Jr.Benedicto, B.Mendiola, Manila. Effectiveness of honey as a topical agent in healing wounds.
5. Lusby PE, Aoombes A, Wilkinson JM. Honey a potent agent for wound healing? Wound ostomy continence Nursing 2002; 29 (6): 295-300.
6. Dun ford C, Cooper R, Molan P, White R. The use of honey in wound management, Nurse stand November 2000. 15(11): 63-68 10.7748/ns 2000.11.15.11.63.c2952.
7. Ahmad tageldeen Abdelhafeez, Salah Rushdee, Muhammad Rafat Khalaf. Topical honey application for post caesarean section wound infection and gapping.ob/gyn Dept.Assuit university hospital.
8. Peter C Molan BSC (Hons) PhD.Re introducing honey in the management of wounds and ulcers-

theory and practice ostomy/wound management. 48 (11):28-40 (2002).

9. Galati S, Qureshi A, Srivastava A, Kataria K, Kumar P, Balakrishna A. A study to compare the effectiveness of honey dressing verses povidine iodine dressing chronic wound healing. Indian J Surgery. 2014; 76 (3): 193-8.
10. Pregnancy labour and birth. Office on womens health U.S.Department of health & human services. 2017 Feb; retrieved 2017 15 July.
11. Safe prevention of the primary caesarean delivery. American congress of obstetricians and Gynaecologists and the society for maternal foetal medicine.2014 March; retrieved 20 Feb 2014.
12. WHO statement on caesarean section Rates. 2015. Ret rived 2015 May; 6.
13. Braun FH, Jones KL, Smith DW (1975). Breech presentation as an indicator of foetal abnormality pediatr.86:419-21.
14. Sekulic SR, Mikov A, Petrovic DS (2010). Probability of breech presentation and its significance maternal fetal neonatal Med.23 (10): 1160-4.
15. Sekulic SR, Petovic DS, Runic R, Williams M, Vejnovic TR. Does a probability of breech presentation of more than 50% exist among diseases and medical conditions? Twin res Hum Genet.2007; 10:649-54.
16. Moore, Michele C-costa, Caroline m.de (2004): caesarean section understanding and celebrating your baby's birth.
17. Crane E (1990): Honey from honeybees and other insectsethology, ecology and evolution.3 (sup 1):100-105 doi: 10.1080/03949370.1991.10721919.
18. Crane, E Walker, and day.R. (1984): Directory of important world honey sources international research association/SBN 978-0860981411.
19. Lusby PE, coonbes A, Wilkinson JM. Honey: A patent agent for wound healing wound ostomy continence Nursing 2002, 29 (6):295-300.
20. Molan P C.Betts JA. Clinical usage of honey as a wound dressing an update wound care 2004 Oct; 13 (9):353-356.
21. To assess the effect of back massage on let down reflex among mothers undergone caesarean section. International journal of science and research. 2016 March.
22. Effectiveness of calendula oil application on LSCS wound healing among mothers who has undergone LSCS. International journal of nursing education.2018 Oct- Dec; 10 (4): 64-67.

A Study to Assess the Level of Burden and Coping Strategies among Caregivers of Patient with Affective Disorders at Selected Hospitals of Sangli, Miraj, Kupwad Corporation Area

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ABSTRACT

Introduction: Interactions with caregivers of patients with severe mental illness like schizophrenia and bipolar affective disorder have revealed negative feelings about the disability status of their relative and burden related to caring for their relative with mental illness. Many caregivers have expressed that the patient's disability status affects the family pattern, roles of family members, prosperity of the family and relationship among the family members. Patient outcome and compliance with treatment are also dependent on optimal care giving and addressing family's needs. Unfortunately these needs are not routinely considered, addressed or met. Addressing the burden perceived by caregiver and improving their coping can assist with good clinical care of patients with severe mental illness and hence these study to assess the burden perceived by caregiver and their coping[6].

Objectives: 1. To assess the levels of Burden among care givers of patients with affective disorders. 2.To assess the coping strategies among the caregivers of patients with affective disorders.

Materials and Method: The researcher used quantitative research approach to assess burden and coping strategies. The research design was descriptive research design. The tool reliability coefficient 'r' of the scale was 0.7, hence it was found reliable. Total 120 samples were selected by non Probability convenient sampling technique. Total two scale namely Zarit burden interview and Rating scale for assessing coping strategies to collect data. The conceptual framework adopted is Sr.Calista Roy's adaptation model(1984) the main concept of this conceptual framework is human being, stimuli, adaptation models and nursing.

Results and Conclusion: In this study found the level burden among the care givers of affective disorders patients have experienced 60(50%)were had moderate to severe level of burden,29(24.17%) were had severe burden, 13(10.83) were had no or little burden and 18(15%) were had mild to moderate burden and levels of coping strategies among care givers, 19(15.83%) were had moderately adequate coping strategies, 93(77.50%) were had adequate coping strategies and 08(6.67%) were had inadequate coping strategies.

Keywords: *Care giver, Burden, Coping strategies*

Introduction

In 1896, Kraeplin according 'manic-depressive psychoses' as a circumscribed illness entity. Ever since, frenzied depressive mental disease, or the present term used nosologically as 'bipolar' mood disorder, has been studied within the Indian perspective. The mood disorders are commonly known as affective disorders. Broadly speaking, the emotions can be described as two main types Affect which is a short-lived emotional response to an idea or an event, and Mood, which is a sustained and pervasive emotional response which colors the whole psychic life[1].Caregivers of patients of schizophrenic disorder and bipolar major affective disorder (BAD) expertise appreciable burden whereas caring their patients. They develop totally different cope methods to cope with this burden. Care giving is a chronic stressor and different

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coping methods are used to handle such a situation. The present study attempts to assess coping in caregivers of Chronic Schizophrenia and Bipolar Affective Disorder and make a comparison between them. The study also tries to assess the relationship between the burdens experienced by the caregivers of both these groups of patients with the coping strategies adopted by them. It was a hospital based cross sectional and comparative study, conducted in the Department of Psychiatry, Assam Medical College and Hospital with a sample size of 30 primary caregivers of equal number of patients of Chronic Schizophrenia and 30 Primary caregivers of equal number of Bipolar Affective Disorder patients. Appropriate statistical tests were used for analysis of obtained data setting significance threshold at p coping (90%) followed by external attribution and magical thinking. Among the caregivers of patients of BPAD the most commonly used coping strategies included help seeking (93.33%) followed by religious coping strategies and external attribution[2].

Materials and Method

The researcher used quantitative research approach to assess burden and coping strategies. The research design was descriptive research design. The tool reliability coefficient 'r' of the scale was 0.7, hence it was found reliable. Total 120 samples were selected by non Probability convenient sampling technique. Total two scale used namely Zarit burden interview and Rating scale for assessing coping strategies to collect data. The conceptual framework adopted is Sr.Calista Roy's adaptation model(1984) the main concept of this conceptual framework is human being, stimuli, adaptation models and nursing.

Assumption 1: The caregivers of affective disorders patients may experience some level of burden 2. The caregivers of affective disorders patients may use some coping strategies.

Results

Section I: Deals with analysis of data related to assessment of the level of burden among care givers in terms of frequency, percentage.

Table 1: Classification of respondents based on levels of burden among care givers of affective disorders

N = 120

Sr. No.	Level of Burden	Score	Frequency	Percentage %
1.	No or little burden	0-20	13	10.83%
2.	Mild to moderate burden	21-40	18	15%
3.	Moderate to severe burden	41-60	60	50%
4.	Severe Burden	61-88	29	24.17%

The above table describes the levels of burden among care givers of affective disorders, 60(50%) were had moderate to severe burden, 29(24.17%) were had severe burden, 13(10.83%) were had no or little burden and 18(15%) were had mild to moderate burden.

Section II: Deals with analysis of data related to assessment thecoping strategies among care givers of affective disorders patients in terms of frequency and percentage.

Table 2: Classification of respondents based on coping strategies among care givers of affective disorders

N = 120

Sr. No.	Strategies	Score	Frequency	Percentage %
1.	Inadequate coping strategies	01-24	08	6.67%
2.	Moderately adequate coping strategies	25-50	19	15.83%
3.	Adequate coping strategies	51-75	93	77.50%

The above table describes the coping strategies among care givers, 19(15.83%) were had moderately adequate coping strategies, 93(77.50%) were had adequate coping strategies and 08(6.67%) were had inadequate coping strategies.

Discussion

The study was descriptive in nature and the population taken for the study was of a low socioeconomic status. An Exploratory study to assess the level of burden and coping strategies among caregivers of patients with affective disorder at selected hospitals of sangli miraj kupwad corporation area.The findings of the study have been discussed with reference to objective and assumption.

Discussion regarding demographic variables: Majority of the caregivers, 30(25%) were between 31-35 years. The majority of care givers were 70(58.30%) were females. With regard to religion, 80(66.7%) were Hindus. Majority 69(57.5%) were graduates. With regard to monthly income, 50(41.66%) were had Rs. 10000 -15000 income per month. In relation to the type of family, 80(66.70%) were from joint family. With regard to duration of care giving, majority 40(33.33%) were giving for 1 to 3 years, In relation to the care givers relationship, 30(25%) were fathers, 30(25%) were son.

Objective 1: To assesses the levels of Burden among care givers of patients with affective disorders: The study reveals that the majority caregivers of affective disorders patient 60(50%) were had moderate to severe burden, 29(24.17%) were had severe burden, 13(10.83%) were had no or little burden and 18(15%) were had mild to moderate burden.

Objective 2: To assesses the coping strategies among the caregivers of patients with affective disorders: The coping strategies among care givers, 19(15.83%) were had moderately adequate coping strategies, 93(77.50%) were had adequate coping strategies and 08(6.67%) had inadequate coping strategies.

Conclusion

This chapter deals with the conclusion, implication, recommendation and data collected from 120 individual samples regarding the level of of burden and coping strategies among care givers of affective disorders. The data was collected by using the Zarit burden Interview and Rating scale for assessing coping strategies. The study was conducted at selected hospitals, Sangli and Miraj,kupwad corporation area. The data analysis was done by descriptive and inferential statistics. The findings of the study are as follows; The study reveals that the care givers of affective disorders patients was 60(50%) were had moderate to severe levels of burden, 29(24.17%) were had severe burden, 13(10.83%) were had no or little burden and 18(15%) were had mild to moderate burden. The mean percentage score was 54.71 with mean and standard deviation of 48.15 ± 2.75. The coping strategies among care givers of affective disorder using 19(15.83%) were had moderately adequate coping strategies, 93(77.50%) were using adequate coping strategies and 08(6.67%) were using inadequate coping strategies.

Conflict of Interest: Nil

Sources of Funding: Self

Ethical Consideration: Permission was obtained from the research ethical committee of the Bharati Vidyapeeth (Deemed to be) University College of Nursing, Sangli and permission taken for data collection from Hospital authority of sangli Miraj, Kupwad Corporation area. Informed consent was obtained from individual(Samples) who are selected for the study. Ethical clearance was done by head of committee members Dr shripriya and Dr. Nilima Bhore.

REFERENCES

1. Prasad G. Rao, An overview of Indian research in bipolar mood disorder. Indian J Psychiatry. 2010 Jan; 52(Suppl1): S173–S177.
2. Dr. Kavery Bora, Dr. Abhilekh Das. Coping In Caregivers of Chronic Schizophrenia and Bipolar Affective Disorder – A Comparative Study. IOSR Journal of Dental and Medical Sciences. 2017;16 (11):58-64.
3. Rabah Kamal. What are the current costs and outcomes related to mental health and substance abuse. 2017. https://www.healthsystemtracker.org/chart-collection/current-costs-outcomes-related-mental-health-substance-abuse-disorders/
4. Phyllis M. Eaton, Bertha L. Davis, Pamela V. Hammond, Esther H. Condon, and Zina T. McGee. Coping Strategies of Family Members of Hospitalized Psychiatric Patients. Nursing Research and Practice. 2011; Article ID 392705, 12 pages.
5. Murthy R S. Caregiving and caregivers: Challenges and opportunities in India. Indian Journal of Social Pyshciatry. 2016;32:10-18.

6. Bazondlile D. Marimbe, Frances Cowan, Lazarus Kajawu, Florence Muchirahondo, and Crick Lund. Perceived burden of care and reported coping strategies and needs for family caregivers of people with mental disorders in Zimbabwe.Afr J Disabil. 2016; 5(1): 209.
7. S. Vasudeva, Chandra K. Sekhar, and Prasad G. Rao. Caregivers Burden of Patients with Schizophrenia and Bipolar Disorder: A Sectional Study. Indian J Psychol Med. 2013 Oct-Dec; 35(4): 352–357.
8. Deborah A. Perlick, Robert A. Rosenheck, David J. Miklowitz, Richard Kaczynski, et al Caregiver Burden and Health in Bipolar Disorder. J Nerv Ment Dis. 2008 Jun; 196(6): 484–491.
9. Ganguly, K.K and Chadda, R.K. A Study of Socio Cultural Perspectives of Care Givers in Burden Coping Behaviour in Bipolar Disorder and Schizophrenia Cases .the international Journal of Psychosocial Rehabilitation. 2009;13(2):93-103.
10. Sandeep Grover, Pradyumna, Subho Chakrabarti. Coping among the caregivers of patients with schizophrenia. Industrial psycihiatry. 2015;24:5-11.
11. Bazondlile D. Marimbe, Frances Cowan, Lazarus Kajawu, Florence Muchirahondo, and Crick Lund. Perceived burden of care and reported coping strategies and needs for family caregivers of people with mental disorders in Zimbabwe. Afr J Disabil. 2016; 5(1): 209.
12. Shiv Gautam, Madhu Nijhawan. Burden on families of schizophrenic and chronic lung disease patients. Indian Journal of Psychiatry. Indian J Psychiatry. 1984 Apr-Jun; 26(2): 156–159.
13. Masunga K. Iseselo, Lusajo Kajula, and Khadija I. Yahya-Malima. The psychosocial problems of families caring for relatives with mental illnesses and their coping strategies: a qualitative urban based study in Dares Salaam, Tanzania. BMC Psychiatry. 2016; 16: 146.
14. Basavanthappa B T. Textbook of Nursing Theories. 2014;2nd edition, jaypee publications. 98-100.
15. Perlick DA, Rosenheck RA, Miklowitz DJ, Chessick C, Wolff N, Kaczynski R, Ostacher M, Patel J, Desai R; STEP-BD Family Experience Collaborative Study Group. Prevalence and correlates of burden among caregivers of patients with bipolar disorder enrolled in the Systematic Treatment Enhancement Program for Bipolar Disorder. Bipolar Disord. 2007 May;9(3):262-73.
16. K. K. Ganguly ,R. K. Chadda &T. B. Singh. Caregiver Burden and Coping in Schizophrenia and Bipolar Disorder: A Qualitative Study. american Journal of Psychiatric Rehabilitation. 2010; 13(2).19-21.
17. Chadda R K, Singh TB, Ganguly K K. Caregiver burden and coping: a prospective study of relationship between burden and coping in caregivers of patients with schizophrenia and bipolar affective disorder. Soc Psychiatry Psychiatr Epidemiol. 2007 Nov;42(11):923-30. Epub 2007 Aug 13.
18. Setsuko Hanzawa, et all. Study was conducted to assess the Caregivers burden and coping strategies for patients with schizophrenia. Psychiatry and Clinical Neurosciences:2015;64(4):377-86.
19. Sandeep Grover, Subho Chakrabarti, Munish Aggarwal, et all. Comparative study of the experience of caregiving in bipolar affective disorder and schizophrenia. International journal of social psychiatry. 2016;14(2)45-56.
20. Rita Bauer,Hermann Spiessl, and Marina J Helmbrecht. Burden, reward, and coping of adult offspring of patients with depression and bipolar disorder. Int J Bipolar Disord. 2015; 3: 2.
21. Chakrabarti S, Gill S. Coping and its correlates among caregivers of patients with bipolar disorder: a preliminary study. Bipolar Disord. 2002 Feb;4(1):50-60.
22. Akbari m, Alavi M, Irajpur A, Maghsoudi. Cahllenges of family caregivers of patients with mental disorder in iran: A narrative review. Iranian J Nursing Midwifery research. 2018;23:329-37.
23. Binil V and, Dr.Christopher Sudhakar and Sangeetha Priyadarshini. A correlative study of burden and coping strategies among the Caregivers' of patients with affective disorder. Manipal academy of education. 2009;6:43. http://eprints.manipal.edu/id/eprint/1607

24. Ong H C, Ibrahim N, Wahab S. Psychological distress, perceived stigma, and coping among caregivers of patients with schizophrenia. Psychol Res Behav Manag. 2016; Aug 16;9:211-8.

25. Zendjidjian X, Richieri R, Adida M, Limousin S, Gaubert N, Parola N, Lançon C, Boyer L. Quality of life among caregivers of individuals with affective disorders. J Affect Disord. 2012 Feb;136(3):660-5.

26. Chadda RK, Singh T B, Ganguly K K. Caregiver burden and coping: a prospective study of relationship between burden and coping in caregivers of patients with schizophrenia and bipolar affective disorder. Soc Psychiatry Psychiatr Epidemiol. 2007 Nov;42(11):923-30.

27. Chadda RK, Singh TB, Ganguly KK. Caregiver burden and coping: a prospective study of relationship between burden and coping in caregivers of patients with schizophrenia and bipolar affective disorder. Soc Psychiatry Psychiatr Epidemiol. 2007 Nov;42(11):923-30.

28. Steele A, Maruyama N, Galynker I. Psychiatric symptoms in caregivers of patients with bipolar disorder: a review. J Affect Disord. 2010 Feb;121(1-2):10-21.

29. Sujata Chodankar Walke, Varalakshmi Chandrasekaran,[1] and Shreemathi S. Mayya. Caregiver Burden among Caregivers of Mentally Ill Individuals and Their Coping Mechanisms. J Neurosci Rural Pract. 2018; Apr-Jun; 9(2): 180–185.

30. Aditya Gupta, R K Solanki, G D Koolwal, Sanjay Gehlot. Psychological well-being and burden in caregivers of patients with schizophrenia. International Journal of Medical Science and Public Health. 2015;4(1):23-28.

Factors Affecting Awareness and Perception of Youth Regarding the Public Health and Hygiene Related Campaigns though Social Marketing

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ABSTRACT

Social Marketing is a universally beneficial relationship between a corporation and a non-profit activity intended to promote the former's sales and the latter's cause. It links economic or in-kind donations to product sales or other consumer action. One of the interesting facts about Marketing which is Social Marketing is the way it connects with corporate level of giving to consumers. Because of this, the Social Marketing initiatives involve agreements in detail and also need to coordinate with non-profit partners involving some important activities like establishing specific advertising offers, developing co-branded campaigns.The aim of this study is to analyze Awareness and Perception of youth regarding the Social Marketing campaigns. Five of the most popular and well known Social Marketing campaigns are shortlisted for conducting the study on the basis of focus group discussions. The campaigns selected are "Say No To Drugs", "Wear a Helmet", "Swatch Bharat Abhiyan", "Tubecolosis" and "Usage of Sanitary Pad". Factor analysis is used to find out the most important factors affecting the Social Marketing. Identified factors show that there is both favourable and unfavourable response when it comes to being aware about Social Marketing.

Keywords: *Social Marketing, Awareness, Perception, Youth.*

Introduction

It is generally acknowledged that Social Marketing is a specialized apparatus for expanding customer loyalty and building brand reputation. The normal change in an organization's picture on account of CRM crusades seems to rely upon a lot upon how customers see the explanations behind an organization's association in Social Marketing projects and the measure of assistance given to the reason through an organization's inclusion[1]. Consumers with a high level of disbelief will be less likely to respond positively to various CRM campaigns as compared to consumers with a low level of distrust.

"Social Marketing is the process of formulating and implementing Marketing activities that are characterized by an offer from the firm to contribute a specific amount to a designated cause when customers engage in revenue providing exchanges that satisfy organisational and individual objectives"[1].

Social Marketing campaigns are formed from various campaigns regarding the social advertisement and their perception and awareness among youth. These include the product featured in any campaigns, the donation promised to be given and the donation received. Government of India and private agencies are running various campaign related to social cause such as "Say No To Drugs","Wear a Helmet", "Swatch Bharat Abhiyan", "Tubecolosis" and "Use of Sanitary Pads".

Literature Review

A cross-sectional survey was applied, with stratification and non-probability, implying both computers as well as paper and pen method to conduct the survey. Findings showed that the target audience was well exposed to the anti-smoking advertisements and not only this but they said that it helps them in the long run in lessening smoking by inculcating more initiatives among youth to quit smoking[2]. Ajike *et al*. (2016)[3] found that there was a significant relationship between green Marketing and consumer buying behavior of fast moving consumer goods in Lagos State.. The study thus recommended that for green products, emphasis

should be placed on pricing strategy in a synergistic manner. Debbie. H (2016)[4] concluded that, within the Social Marketing study arena, product involvement and donation recipient specificity have received limited attention. The previous donation expression format and donation scale findings have been vague and indicative that their effect often occurs in collaboration with other elements. Findings from study[5] showed that Digital India campaign has a visible awareness among youth mainly because of their television broadcasting, followed by Swatch Bharat Abhiyan while the least popular came out to be Tubecolosis campaign. Singh & Rai (2016)[6] found that students were being aware of the Marketing which were telecasted frequently. Also the respondents said that the campaigns in which contribution through purchase is not required are better Social Marketing strategies. Bina (2015)[7] said that research should be done in the field of various elements of Social Marketing strategies. He concluded that Social Marketing has good influence on consumer buying behavior. Choudhary & Ghai (2014)[8] found out that Social Marketing, if done rightly, works as a great differentiator in FMCG as there are so many similar offerings in the market. A well rated & effectively communicated cause Marketing campaign creates a positive impact on buying behavior of the young consumers in favor of the brand. Shah (2013)[9] pointed out that people tend to attract to those companies which dwell with cause- related Marketing. He gave the example that customers will be interested towards those companies which do charity or do research for the societal cause. Mir & Thokar (2013)[10] concluded that consumer purchase intentions are influenced by the charity with Social Marketing campaigns. Correlation and regression analysis was used to test the key hypothesis derived from literature of positioning, brand awareness and charity in connection with the relationship between CRM and purchase intentions. Cheron (2012)[11] found a high brand-cause Marketing efficiency. Japanese female plaintiffs were showing more positive attitudes as parallel to men, endorsing results in previous research lessons conducted in the West. Previous participation in philanthropic activities was also found to increase positive attitudes especially when it comes to brand-cause fit and duration were high. Hunjra et al. (2011)[12] concluded that the Social Marketing campaigns have positive influence on the sale activities of companies. This linkage is also intermediated by product loyalty and buyer purchase intention that ultimately have optimistic effect on auctions. Murukutla (2011)[13] showcased that campaign affected smokeless tobacco users as follows: 63% of smokeless-only users and 72% of dual users (i.e., those who consumed both smoking and smokeless forms) recalled the campaign advertisement, primarily through television delivery. The vast majority (over 70%) of those aware of the campaign said that it made them stop and think and was relevant to their lives and provided new information. Campaign awareness was associated with better knowledge, more negative attitudes towards smokeless tobacco and greater cessation-oriented intentions and behaviors among smokeless tobacco users.

Research Methodology

Sampling Procedure and Participants: The sample of this study involves the students studying in a large Private Indian University (Lovely Professional University, Punjab). Random sampling technique was used for data collection from the respondents. Youth in the age group of 16-35 were taken as target audience in order to study their awareness and perception of regarding the Social Marketing campaigns. Among the vast population of youth a sample size of 600 was taken for the study. The participation of the respondents was entirely voluntary.

Instrumentation & Measurement: Objectives of the research were achieved using a structured questionnaire. The questionnaire was divided into two sections. First part of the questionnaire comprises of questions about the demographic and psychographic characteristics of the respondents related to participant's gender, age, nationality, education. Second part of the questionnaire was designed to measure the awareness towards different social causes by asking respondents to rank these social causes in order of their preference in a similar way as used by Maheshwari & Suresh (2013)[14]. Open ended questions were also asked in this section to know about the reason for the recall of these campaigns individually. The secondary data was also collected from various sources like published articles, research papers, business magazines, journals, periodicals and internet etc.

Selecting Social Marketing Campaigns: In the first phase of the research a focus group discussion was conducted and data was collected from 37 respondents aged between 16 to 35 years having awareness about Social Marketing campaigns being aired by government (NGO) agencies, both state and central and private companies. The main purpose of this focus group was

to generate a pool of cause related causes that could be used for further use.

Before running the whole data analysis sample size conducting a pilot study is important[15]. The same has been done. Say No To Drugs",“Wear a Helmet", “Swatch Bharat Abhiyan", “Tubecolosis" and “Use of Sanitary Pads".

Results and Discussion

Reliability Statistics

Table 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.648	0.784	13

The data has a Cronbach's alpha of 0.648. This shows that our data is reliable enough to proceed with factor analysis.

Awareness about Social Marketing Campaigns: According to the study, out of 600 respondents which were surveyed the majority of the respondents were male accounting for 54.3% compared to the females which are 44.7%. Further the age group which showed major interest in filling the questionnaire was between 21-25 followed by the age group (16-20), (26-30), (31-35) respectively. The age group (21-25) accounted 69.4 % of the total 600 respondents.

Factors Affecting Youths Awareness Related to Social Marketing Campaigns

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.877
Bartlett's Test of Sphericity	Approx. Chi-Square	2679.177
	Df	253
	Sig.	0.000

From KMO and Bartlett's Table, it can be observed that the KMO registered a 0.877 sampling adequacy. This value strongly suggests that the use of factor analysis is appropriate. KMO and Bartlett's Test of Sphericity both indicate that the set of variables are at least adequately related for factor analysis.

Table 3: Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.194	22.582	22.582	5.194	22.582	22.582
2	1.576	6.854	29.436	1.576	6.854	29.436
3	1.283	5.577	35.014	1.283	5.577	35.014
4	1.201	5.221	40.235	1.201	5.221	40.235
5	1.108	4.818	45.053	1.108	4.818	45.053
6	1.035	4.501	49.554	1.035	4.501	49.554
7	.993	4.317	53.871			
8	.952	4.141	58.011			
9	.917	3.987	61.998			
10	.882	3.836	65.834			
11	.876	3.809	69.642			
12	.782	3.402	73.045			
13	.713	3.099	76.144			
14	.708	3.079	79.222			
15	.681	2.959	82.181			
16	.649	2.823	85.005			
17	.618	2.687	87.692			
18	.562	2.443	90.135			

Conted…

19	.530	2.306	92.442			
20	.490	2.132	94.574			
21	.442	1.923	96.497			
22	.421	1.832	98.329			
23	.384	1.671	100.000			

Based on the component matrix the 6 factors and the variables comprised under each factor are stated below:

Table 4: Factor Table

Factors	Variables	Factors Loading
Favorable response of youth awareness towards Cause- related Marketing	These campaigns makes me more aware and learned about Social Marketing	0.695
	Social Marketing provides vast knowledge to me	0.609
Favorable perception of youth towards Social Marketing	The ongoing Social Marketingcampaigns are really popular among youths	0.591
	I believe the ongoing campaigns are benefitting the youths of the country	0.668
Unfavorable awareness and perception towards Cause-related Marketing	The Concept of Social Marketing sounds irrelevant to me	0.521
	I connect mostly through internet and social media	0.625
Product & Price affects perception towards Social Marketing	There must be synchronization between product and campaign	0.709
	Products involved in Social Marketing plays a major role in affecting the perception towards campaigns	0.751
Nature of campaigns a sensitive decisive factor	Free of cost campaigns related to societal causes affects me emotionally	0.505
	Irrespective of the price, product itself and the nature of the campaigns are the decisive factors for me	0.581
Cost of campaigns a decisive factor	Utilization of money at the right place with authenticity of the same is important to me	0.594
	Luxury goods are the most irrelevant inclusion in Social Marketing	0.593

Findings

1. Looking into the awareness of the respective campaigns Say No To Drugs with 87.7% and Swachh Bharat Abhiyan with 87.2% lies in the most popular campaigns followed by Tubecolosis with 81.7% of the respondents being aware about the same
2. Research also reveal that respondents are aware about the government run campaigns more rather than the private run campaigns, as we can see the private campaigns like use of Sanitary Pads has only 22.6% of the awareness while when compared to the govt. run campaign of Swachh Bharat Abhiyan.It is hugely lacking behind as it's not even has covered half of the respondents unlike Swachh Bharat Abhiyan which has covered 87.2% of the respondents.
3. Some identified factors show that there is both favorable and unfavorable response when it comes to being aware about Social Marketing or about the perception of the same. Favorable responses are related to getting vast knowledge through said campaigns and unfavorable responses are like Social Marketing is irrelevant to them.

Recommendations

1. Study showed that most of the youths are being aware by watching commercials on T.V and are aware about Social Marketing campaigns.

However campaigns being run by Private brands are less popular and respondents were not much aware about it, so in order to increase the awareness of these campaigns the private brands should focus more on youth's centricity awareness strategies by incorporating those factors which grabs youth's attention and urges them to know about the cause as well as the campaigns.

2. It is also noticeable from the responses that there is not much concern about the money involved in these campaigns the respondents often finds it a hoax by the private brands as they see these campaigns majorly as another Marketing gimmick. So in order to change the perception of most of the youth's brands require gain the trust of the youths by displaying results and showing the effects of their campaigns in the society not merely through commercials and advertisements but also by providing a real world feel of the change that these campaigns brings.

3. It is also analyzed that Wear a Helmet by Govt. of India is the campaign about which most of the respondents is having awareness. As Govt. of India is spending good amount on promotions to make people aware about the campaign by providing in-depth information in the form of presenting message behind the campaign in subtle manner, catchy slogan and there is a visible effect in the society of the same winning trust of the youths. Survey also reveals that the respondents are loyal towards the campaigns which had a visible effect on the betterment of the society and therefore they are more inclined towards the Govt. campaigns. Even a hint of selfishness or personal excelling motive in such campaigns can turn the campaigns into a failure as causes related to society are everybody's everyday problems and hence they are really sensitive towards the same.

4. Research also indicated that youths are highly affected by the synchronization of the product and campaigns many a times they showed negative response as they were unable to find a sync between the two and hence they withdrawn themselves completely from the campaigns. It is henceforth advisable for strategizing a clear sync between product and campaign in order to attract the youth and convey the Social Marketing to them.

Ethical Clearance: NA

Source of Funding: Self

Conflict of Interest: The authors have no affiliations with or connection in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

REFERENCES

1. Webb DJ, Mohr LA. A typology of consumer responses to Social Marketing: From skeptics to socially concerned. Journal of Public Policy & Marketing. 1998 Sep;17(2):226-38.
2. Varadarajan.P.R.,Menon.A. Social Marketing. Journal of Marketing. 1998; 52 (3): 58-74.
3. Ajike, et al.. Green Pricing and Consumer Buying Behaviour of Fast Moving Consumer Goods in Lagos State. International Journal of Innovative Research in Social Sciences and Strategic Management Techniques. 2016; 3(1): 131-142.
4. Debbie, H. The Influence Of Social Marketing Campaign Structural Elements on consumer Intention, Attitude and perception. Journal of Distribution Science. 2016; 11(12): 63- 69.
5. Sarmah R, Maharishi N. Popularity and Perception of Youth regarding Social Marketing Campaigns like Digital India, Swatch Bharat Abhiyan and Tubecolosis. International Journal of Engineering and Management Research (IJEMR). 2016;6(3):439-44.
6. Singh, K. M., & Rai, K. U. Awareness and Influence of Social Marketing: A Study on Graduate and Post Graduate Students of Varanasi. Research gate. 2016
7. Bina, T. & Priya, S. P. A Study on Social Social Marketing and Its Impact on Consumer Brand Preferences. International Journal of Innovative Science, Engineering & Technology. 2015; 2 (9): 65-77.
8. Choudhary M., Ghai S. Perception of Young Consumers Towards Cause Marketing of FMCG Brands. International Journal of Sales &Marketing, 2014: 4 (2), 21-26.
9. Shah MG. Social Marketing Practice of Some Selected Firms In Bangladesh And Its Effect

On Target Segment. International Journal Of Scientific & Technology Rsearch, Vol2. 2013 Jan(1).

10. Mir RA, Thokar SA, Mir MA. Social Marketing campaigns and Charity Influence on consumer purchase intentions. Journal of Business and Management, 2013; 8: 54-59.
11. Chéron E. Perception of Social Marketing: preliminary comparison of Western and Japanese consumers. Sophia International Review. 2010;32:1-7.
12. Hunjra AI, Azam RI, Humayoun A. Social Marketing and its impact on sales: mediating by brand loyalty and customer purchase intention. Available at SSRN 2130320. 2012 Aug 16.
13. Murukutla N, Turk T, Prasad CV, Saradhi R, Kaur J, Gupta S, Mullin S, Ram F, Gupta PC, Wakefield M. Results of a national mass media campaign in India to warn against the dangers of smokeless tobacco consumption. Tobacco Control. 2012 Jan 1;21(1):12-7.
14. Maheshwari.R.,& Suresh.G. Asia Pacific Journal of Marketing & Management Review. 2013; 2 (2).
15. Gupta V. Research Methodology in Social Science. Enkay Publication; 2012.

Three Stepped Approach to Screening of Cervical and Breast Cancer among Rural Women

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ABSTRACT

Introduction: Screening of cervix and breast cancer is not considered a routine activity at PHCs.

Aim and Objectives: To study a three-stepped approach of creating awareness, train ANMs while screening and possibly continue educational and screening activity after withdrawing the mobile team.

Material and Method: A mobile team at KIMS deemed to be University, Karad, Maharashtra was formed of specialists from concerned faculties. Four PHCs were randomly selected from the Satara district. Three selected ASHA workers motivated fifty women >30 years to attend camp at PHC on a prefixed date. Pre-training and post-training assessments of knowledge among women and health care workers, training of two ANMs and Medical Officer per PHC in cervical and breast cancer screenings by VIA, VILI, and CBE respectively while screening was done by the mobile team during intensive weekly activity of three months at each PHC. After withdrawal of the team, PHCs were visited to see continuity of educational and screening activities.

Results: Of 1440 women motivated by 12 ASHA workers from 4 PHCs, 1037 attended awareness programme and 430 got screened. Of the 37 VIA positive and 17 lump in breast cases identified, one cervical and two breast cancers confirmed cases were managed. Nonsurgical treatment was given there. Out of four PHCs, the activity of education and screening was continued satisfactorily at two, sporadically at one and absent at one PHC.

Conclusion: There was significant improvement in knowledge scores of community and health-care workers after the awareness programme. The ANMs could be trained in screening cervical and breast cancer. Education and screening activities continued after one year of withdrawal of the mobile team in 50% of PHCs. An entire district should be studied to find possible solutions of screening cervical and breast cancer as routine activities at PHCs after this pilot project.

Keywords: *Cervical Cancer, Breast Cancer, Colposcopy*

Introduction

Mortality due to cancer is very high in India due to late detection of cancers. Incidence and mortality due to cervical and breast cancer are very high and rank first two sights of cancers among women [1, 2]. The screening tests are available for early diagnosis of both sights of cancers and are routinely used in the developed world and in urban hospital settings in India. In spite of equally high prevalence of cancer in urban and rural areas, no routine screening is undertaken for rural women in Rural Hospitals (RH) or at Primary Health Centers (PHCs). About 70% population of India resides in rural areas where the opportunity to screen the women for cervical and breast cancer is lost only because the health care workers at PHCs do not have the skill for screening and the rural women are ignorant about the possibility of screening and adverse outcome related to late diagnosis of cancer. The rural women rarely come forward on

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their own for screening of breast or cervical cancer and diagnosis of cancer in rural women is often very late and the cancer is too advanced for the life saving interventions.

A strategy of three stepped approach i.e. step I health education of rural women, step II training of health care workers by a mobile team of experts to impart skill of screening of cervical and breast cancer while screening the women above the age of 30 years and step III referral of suspected cases for appropriate management were therefore planned and tried.

Material and Method

Four PHCs namely Kale, Masur, Kole and Umbraj were randomly selected from 11 PHCs of Karad Taluka. Permission from Directorate of Health Services was obtained and the visit schedule of twelve serial weekly visits to each PHC was planned. A mobile team was formed of the specialists from Obstetrics and Gynecology, Community Medicine, resident surgeon and nursing superintendant.

From all available screening tests, tests to be used in the project were identified taking into consideration the efficacy, availability, feasibility, affordability and ease of carrying them out at PHC level. Visual Inspection after application of 5% acetic acid (VIA), Visual Inspection after application of Lugol's Iodine (VILI) and taking of PAP smear were identified as screening tests for cervical cancer screening. For cancer breast, thorough Clinical Breast Examination (CBE) was decided as a screening test.

Three ASHA workers were randomly identified as field level workers; two ANMs were appointed under the project for coordination of the activities and data collection of the project in addition to two ANMs working at each of four PHCs. ASHAs would pay home visits in their respective areas, identify the women above 30 years of age and motivate them to attend the awareness and screening camps organized on specific day of the week at the PHC where they were working.

During every visit to the PHC by the mobile team, pre training questionnaire was filled for HCW and women gathered for the camp. Awareness of women folk was undertaken followed by screening and hands on training of the Medical Officer (MO) and two ANMs designated by the MO of the PHC. Using same questionnaire post tests knowledge scores were determined after 15 days of awareness programme for HCWs as well as women beneficiaries of the camp.

During first visit to the PHC, the standard procedure of VIA and VILI was explained [3] and demonstrated on subjects after seeking their informed consent and giving attention to privacy and confidentiality. Instructions about keeping the place of examination ready, making the instruments including Cusco's speculum sterile and available, preparing 5 % acetic acid from the glacial acetic acid were given and availability of Lugol's Iodine was ensured. Similarly the standard procedure of CBE namely inspection in three positions and palpation of breast and lymph nodes was explained and demonstrated taking care of privacy and confidentiality after informed consent of the women.

From second visit onwards hands on training was undertaken while screening of beneficiaries was done by the specialists. During every visit to the PHCs awareness of women folk followed by screening and hands on training was undertaken. The MO was suggested to keep designated day of the week as "Cancer Detection Clinic Day" and to continue activity of screening after the withdrawal of mobile team.

The project was financially supported from the KIMSDU. Clearance from Institutional Ethics Committee was obtained before commencement of the project. After completion of all twelve visits to each of four selected PHCs, a follow up round of visits was done to know the status of continued cancer detection activities and to give boost to the screening activity by the ANMs under the guidance of MOs.

Results

About 1000 population was covered by each ASHA worker; and there were about 180 women more than 30 years of age. About 50 women were called for the awareness programme at the time of PHC visit by the mobile team from KIMS. The expected attendance of women $\geq$ 30 years at the PHCs was 1440. The attendance for awareness programme was between 20 to 30 women (40 to 60%). Out of them 10 to 12 (20 to 25%) women were ready to get examined themselves immediately after the awareness programme. A total of 430 (41.5%) women above the age of 30 years were examined out of 1037 women attending the awareness programme. There was a significant improvement of knowledge score in

both HCW and women attending the camp. The mean age of 430 women screened was 38.4 ± 8.0 years and average number of children born to them were 2.4 and 14 (3.3%) were nulliporous. The profile of the women who could be screened was as follows.

Table 1: Martial status of 430 women screened

	Frequency	%
Married and staying with their husbands	393	91.4
Widows	34	7.9
Separated/Divorcee	03	0.7

There were 39(9.1%) women VIA/VILI positive and 17(4%) women were detected as having lump in the breast. Pap smear was taken for 210 (48.8%) women.

Table 2: The Pap smear cytology results (TBS 2001)

Histopathological findings	Frequency	%
NILM	202	12.4
ASCUS	04	01.9
LSIL	04	01.9
Total	210	100

NILM: Negative for Intraepithelial Lesion or Malignancy ASCUS: Atypical Squamous Cells of Undetermined Significance, LSIL: Low Grade Squamous Intraepithelial Lesion

Calposcopy was done on 99 women at primary centre by the mobile team. Their colposcopic findings were as follows

Table 3: Colposcopic findings of suspected cases at PHCs

Colposcopic findings	Frequency	%
Normal	63	63.6
Ectopy	09	09.1
CIN	12	12.1
Unsatisfactory	10	10.1
Atrophy	05	05.1
Total	99	100

CIN: Cervical Intraepithelial Neoplasia

All 99 cases undergoing calposcopy were VIA positives. Twelve of them were positive for precancerous lesions by calposcopy.

Table 4: Signs and symptoms present among 430 women screened

Associated findings	Frequency	%
Backache	199	46.3
Leucorrhoea	85	19.8
Abdominal pain	75	17.4
Irregular Menstruation	63	14.7
DUB	28	6.5
Uterine prolapsed	17	4.0
Infertility	14	3.3
Uterine Cervical Polyp	4	0.9
Uterine fibroid	3	0.7
Total	488	100

DUB: Dysfunctional Uterine Bleeding

There were 52 (12.1 %) women who did not have any symptom and on vaginal examination were clinically normal. Number of signs and symptoms were more than one in 60% women. Out of 85 patients in need of management, 12 were suspected cases of cancer cervix and 17 suspected cases of cancer breast, 49(57%) were treated for infection, and 10 had surgery for associated findings not related to cancer cervix like fibriod, polyp, prolapse. Four underwent Loop Electrical Excision Procedure (LEEP), four were treated with cryo cauterization for precancerous lesions and one received chemotherapy. Thus, out of 12 suspected cases of cancer cervix, 8 were precancerous lesions and were treated with excision or ablation and one was treated with chemotherapy for cervical cancer. Three cases were lost for follow up. Out of 17 suspected cases of breast cancer 2(11.2%) were identified as breast cancer and underwent appropriate management and remaining were benign lesions. Two were operated for breast cancer. Out of four PHCs in two centres, the activity of screening was continued satisfactorily, at one centre the activity was not up to the mark and at one centre it was totally absent where the MO was on the long leave.

Discussion

Cancer of cervix and the cancer of breast are best suited for early detection as both sites are accessible; cancer begins as localized lesion after a long period of existence of pre malignant lesions which can be identified by the screening tests.

Screening for cervical cancer by PAP smear is an accepted clinical practice, which requires laboratory

equipments and trained personnel. VIA and VILI are alternative screening tests which are equally effective and sensitive which are less expensive, easy to carry out and the skill can be easily transferred to healthcare workers [4].

SBE, CBE, Mammography, Ultrasonography and thermography are tried for screening of breast cancer. Mammography is the most sensitive and specific method but there is risk of exposure to radiation which is manifold more than the dose received by chest X-ray and increases the risk of development of breast cancer itself [5]. Secondly it requires an equipment of high standard and an experienced radiologist for its interpretation which increases the cost of screening. It may lead to the increased number of biopsies of suspicious lesions with a high possibility of false positive results. Thermography is not associated with radiation exposure but the sensitivity is low [6].

American College of Obstetricians recommended both SBE and CBE. Cochrane review on self breast examination has revealed that SBE has no impact on cancer mortality. There can be poor compliance with follow up and increased number of biopsies performed on benign lesions [7].

In rural India, the women are illiterate and may not be able to learn correct technique of self breast examination. CBE if carried out carefully giving attention to technique and thoroughness may be an effective screening tool. Although no trials are available for comparing CBE alone to no screening but Canadian National Breast Screening Study-2 (CNBSS-2) [8] included randomized screening of 39405 women aged 50-59 years in two groups. Group one was CBE alone and the second group was CBE with mammography. No mortality advantages was seen when mammography was added to annual standardized 10-15 minute breast examination implying that careful CBE may be effective as mammography. Thus for screening of women from rural areas for cancer breast and cancer cervix in developing countries like India at PHCs constrains are with limited resources and skilled manpower. This project can be considered as a pilot project. CBE, VIA and VILI could be considered as appropriate screening tests.

Step I of the strategy was imparting knowledge about cancer of breast and cervix to HCW and women attending the camps. Awareness programme conducted for about 30 women at a time with audiovisual aids resulted in a significant improvement in knowledge scores in both. The women could understand the role of known risk factors like age of women at marriage, early marriage, and possibility of infection with HPV due to multiple sex partners, early menarche, multiparity and lack of cleanliness during menstruation and delivery for cervical cancer as well as family history, age, nulliparity, early menarche and late menopause, high fat diet and obesity, exposure to radiation for breast cancer as risk factors.

The motivation to get themselves screened due to awareness generation was evident by acceptance of screening by 430 (41.50%) women out of 1037 women attending the camp.

Step II was skill transfer. Four MO and 8 ANMs could be trained by mobile team with twelve weekly visits. Out of four PHCs, two PHC continued awareness activity, screening and referral proactively, one PHC was carrying out the activities but did it passively, i.e.; only those women > 30 years who attended the PHC for any reason were screened and referred and at one PHC, no activity related cancer detection was going on where MO was on long leave after end of year of the project. There is a scope for improvement. Now all MOs and ANMs are trained under the cancer component of non-communicable disease control programme. If the MO as a team leader is motivated and ensures the availability of acetic acid and Lugol's iodine, charts are prepared and displayed at the PHCs, field level staff during their routine home visits or for any other health related activity motivates the women above 30 years to come to PHC on a fixed day of week for awareness and screening activity at least 30-40% of the women will get benefit of early diagnosis of cancer cervix and cancer breast.

At present screening for cervical cancer at PHCs is undertaken sporadically as a special health camp in some places near about specialized centres or cancer hospitals but not routinely done as an ongoing activity on a fixed day as cancer detection clinic. There is a possibility of implementing this, three stepped approach in all PHCs for primary and secondary prevention of breast cancer and cervical cancer at PHCs for the rural population by making it as a routine activity of the PHC may be once in a week, once in a fortnight or once in a month.

There are medical colleges public or private in almost all districts of Maharashtra. If advantage is taken

of the expertise of these medical colleges under NCD programme, it will go a long way in preventing and down staging the two most common sites of cancers in females.

Source of Funding: Intramural funds of Krishna Institute of Medical Sciences "Deemed to be University", Karad

Conflict of Interest: Nil

REFERENCES

1. Sreedevi A, Javed R, Dinesh A. Epidemiology of cervical cancer with special focus on India. *Int J Womens Health* 2015; 7:405-14.
2. Ahmedin Jemal, Freddie Bray, Melissa M. Center, Jacques Ferlay, Elizabeth Ward, David Forman. Global Cancer Statistics. *Ca Cancer J Clin* 2011; 61: 69-90.
3. Padubidri VG, Daftary SN. Howkins and Bourne Shaw's Textbook of Gynaecology. 6th Edition. Reed Elsevier. 2002: 488-9.
4. Govt. of India, WHO, Guidelines to cervical cancer screening programme, Department of Cytology and Gynaecological Pathology, Post Graduate Institute of Medical Education and Research, Chandigarh, India, 2006.
5. Tabár L, Fagerberg CJ, Gad A, Baldetorp L, Holmberg LH, Gröntoft O, *et al*. Reduction in mortality from breast cancer after mass screening with mammography. Randomised trial from the Breast Cancer Screening Working Group of the Swedish National Board of Health and Welfare. *Lancet* 1985; 1 (8433):829-32.
6. Kennedy DA, Lee T, Seely D. A comparative review of thermography as a breast screening technique. *Integr Cancer Ther* 2009; 8(1): 9-16.
7. American College of Obstetricians and Gynacologists Breast Cancer Screening ACOG Practice Bulletin No. 42, Washington, DC: COG-2003.
8. Miller AB, To T, Baines CJ, Wall C. Canadian National Breast Screening Study-2: 13-year results of a randomized trial in women aged 50-59 years. *J Natl Cancer Inst* 2000 20; 92(18):1490-9.

Single-Visit versus Dual-Visit Endodontics— A Comparative Study

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ABSTRACT

Traditionally root canal treatment was completed in multiple visits so as to eradicate microorganisms and maintain sterility of prepared canals. Currently evidence based studies have shown that there no difference in healing potentiality of single visit as opposed to dual or multiple visits. Modern concepts and protocols in diagnosis, instrumentation, disinfection and obturation systems have made single visit endodontics (SVE) a faster regimen with a predictive outcome. Clinical study aimed to investigate the effectiveness of single visit as compared with dual visit endodontics was conducted. 399 adult patients with pulpal and periapical diseases of endodontic origin who were selected for endodontic therapy in various dental centres in Delhi were included in the study. 201 cases underwent single sitting (Group A) and 198 were treated in two visits (Group B). Endodontic failure rate of 3.68 % was observed in single visit group as opposed to 4.78 % in dual visit. Though statistically there was no significant difference in outcome of both protocols, the advantages of SVE outweigh those of dual visit. Thus single visit endodontics can serve as an acceptable, alternative treatment modality as compared to dual or multiple visit endodontics.

Keywords: *Single visit endodontics, root canal treatment*

Introduction

Single visit endodontics (SVE) is defined as "the conservative nonsurgical treatment of an endodontically involved tooth consisting of complete biomechanical cleaning, shaping and obturation of the root canal system during one visit" [1]. Concept of SVE has been mired in controversy for over a couple of centuries. It was first documented by Dodge in 1887.The primary reason it was not embraced universally was due to unresolved issues like differences in clinical outcomes, microbiological concerns as determined by culture testing and post obturation pain. Endodontic success or end point was till recently solely determined by culture testing which was neither a specific or sensitive tool. Today newer materials, techniques and scientifically proven concepts have refined the end point of endodontic success. This has given the much-needed impetus to SVE [2- 3].

The main indications for single visit endodontics are in vital teeth which are exposed due to trauma or any other mechanical cause. It is also advocated, when intentional endodontics is an inescapable necessity for prosthetic rehabilitation to correct axial inclination of the abutment. It is contraindicated for patients suffering from muscular dystrophy or any psychiatric condition which may prevent them from cooperating for the long duration of the single visit protocol. In cases of anatomical variations or procedural errors it may be difficult to perform endodontics in single visit [3-4].

Material and Method

A study aimed to investigate effectiveness of single visit as compared with dual visit endodontics was conducted. Adult patients with pulpal and periapical diseases of endodontic origin who were selected for endodontic therapy were included in the study. Cases of acute apical periodontitis were not included in the study.

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Procedure

Patients fulfilling the inclusion criteria were enrolled in the study and preoperative radiographs were taken by digital radiographic machine. The size of periapical lesion was noted, both in horizontal and verical axis and it served as a baseline record. The anterior and posterior teeth were randomly divided into two groups, Single sitting i.e (GROUP A) and Dual sitting i.e (GROUP B). Some patients had multiple teeth which were indicated for nonvital endodontics, in such a situation each selected tooth of the patient was taken as an unit and referred to as a case. A total of 399 cases were included with 201 cases in Group A and 198 in Group B. In both the groups there were 98 posterior teeth and remaining anteriors. Standardardized endodontic protocol was followed in both groups by three operators. The selected tooth was isolated with rubber dam and disinfected with 2 percent sodium hypochlorite. The access was prepared with cavity access burs. Caries and old restoration was removed at this stage. The patency of the canal was achieved with a 6/8/10/15 nos K FILE of 21mm length for posterior teeth and 25 mm length for long rooted anteriors. The working length was radiographically determined. The cleaning and shaping was done using NiTi Hyflex files as per the advocated sequence by manufacturer. Recapitulation was done sequentially. Canals were irrigated with sodium hypochlorite and EDTA gel was used as a chelating agent. The canals were dried with paper points. The guttapercha point corresponding to the last file used in apical preparation was selected and a master cone selection radiograph was taken. The canal were dried and coated with AH plus sealer. The master cone was also coated with sealer and was placed in the canal. Additional acessory cones were placed in space created by spreaders. The canals were obturated following the lateral condensation method. The access filling was done with either glass ionomer alone or a combination of glass ionomer and composite. High points if any were removed (FIG 1). For Dual Sitting, the same protocol was followed, except that in the first sitting the canal was prepared and an intracanal dressing of calcium hydroxide was given and a temporary restoration placed. In the next sitting the canal was obturated as in single sitting group (FIG 2). The indices used in this study were PAI [(Periapical index) preoperatively and during follow Up] and Strindberg criteria as an evaluation tool. Both Groups were evaluated clinically at 7, 15, 30 days and a 9 month follow up was done. The result were computed, correlated and subjected to statistical analysis. The following models of statistical analysis have been used in this study. The Excel and SPSS 16(SPSS Inc, Chicago) software packages were used for data entry and analysis. The unit of analysis was the tooth and teeth were referred to as cases. Median survival time was compared using Wilcoxon test. At the bivariate levels, the following independent variables were assessed: patient's gender, age and treatment modality. The student's 'T' test was used to determine whether there was a statistical difference between expired and survived in the parameters measured. Chi-square was used to ascertain the association (or independence) between category variables assessed.

Clinical Case—Single Visit

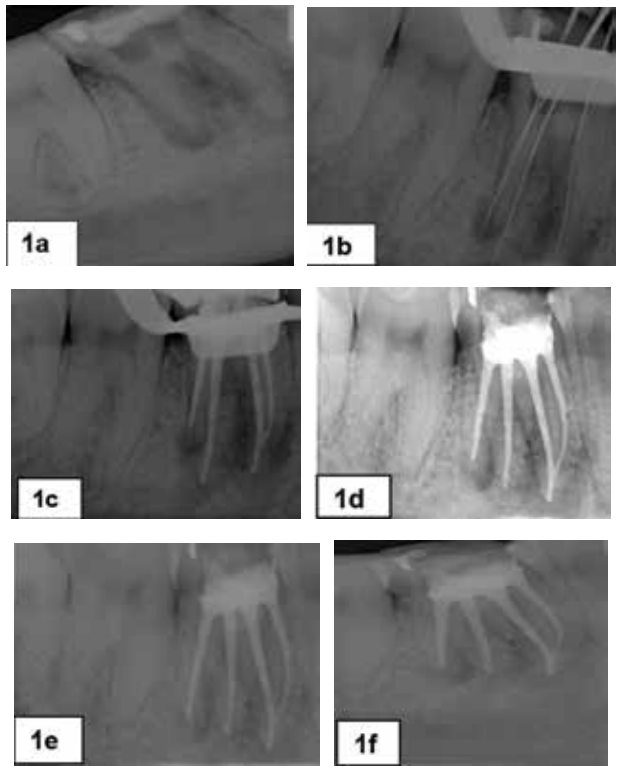


Figure 1

1a) Preoperative radiograph. 1b) Working length determination radiograph shows shadow of another root, confirmed by modification of access preparation & repeat working length determination. 1c) Master Cone Selection.1d) Obturation. 1e) Follow Up-3 Months. 1 f) Follow Up 9 Months

Clinical Case—Two Visit

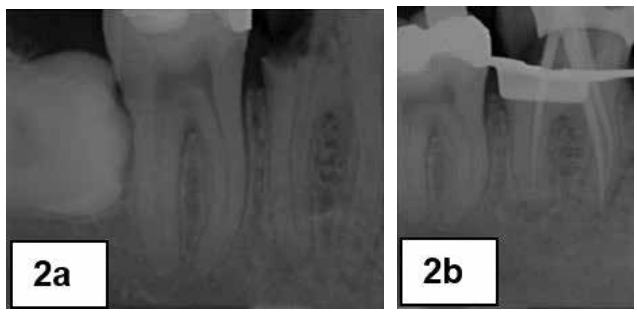
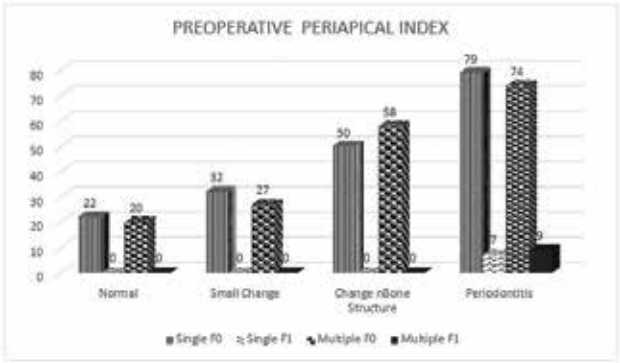




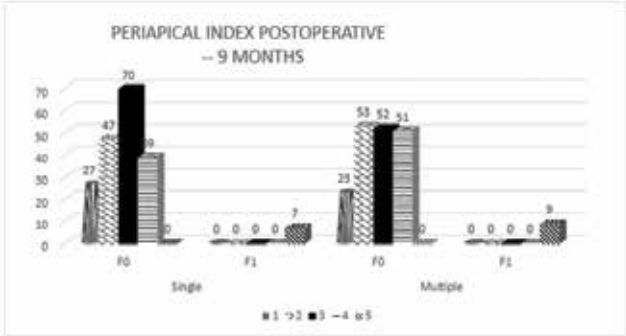
Figure 2
2a) Preoperative radiograph. 2b) Working length determination radiograph. 2c) Master Cone Selection.2d) Obturation. 2e) Follow Up-3 Months. 2 f) Follow Up 9 Months

Results

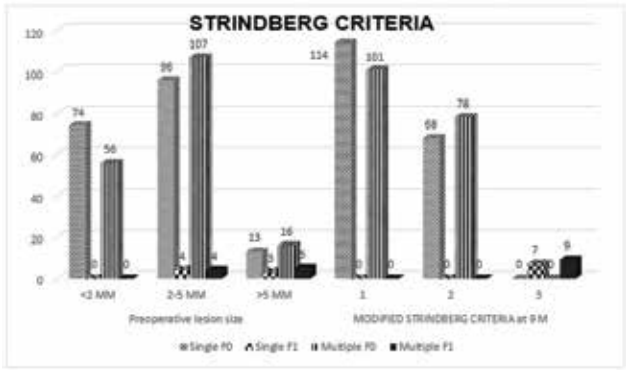
Results are summarized in the graphs (1-3). There was equi gender distribution of cases. The mean age group was 3rd and 4th decade, however age and gender had no bearing on the failure rate. The endodontic failure rate of 3.68 % was observed in single visit group as opposed to 4.78 % in dual visit.



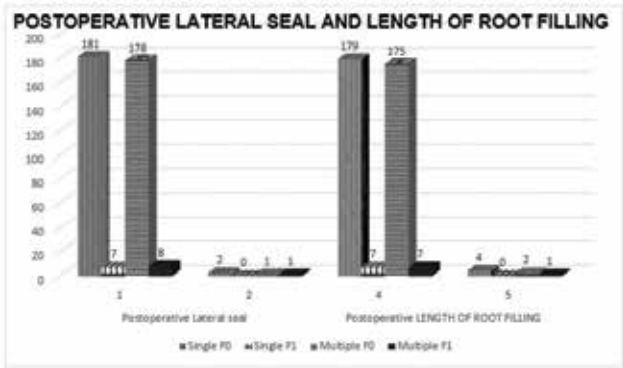
Graph 1: Correlation of Preoperative Periapical Status and Failures



Graph 2: Correlation of Postoperative Periapical Status and Failures



Graph 3: Correlation of Preoperative lesion size, Strindberg criteria and failures at 9 months



Graph 4: Correlation of Postoperative lateral seal and length of root filling on failure rate

Discussion

Currently with the changing concepts of the endodontic protocol, the use of contemporary endodontic techniques not only reduce the treatment time but also increases the success rate, and this has led to single visit endodontics being revisited [1-4]. However the contemporary question "Is single visit root canal treatment a biologically compromised treatment?" has not been conclusively answered, although numerous studies have addressed various aspects of this clinically

relevant query [1, 3]. This study was undertaken to compare contrast and correlate both the modalities of treatment and to assist clinicians in making informed treatment protocols made on current thought-provoking evidence based scientific data.

Case selection has a definitive bearing on the outcome. Trope et al found that there was no flare – ups in cases without preexisting symptoms [5-6]. Studies have shown that teeth with periapical radiolucency exhibited less pain than nonvital teeth without periapical radiolucency [1-3]. In this study, for uniformity, the inclusion criteria were patients of either gender above 18 years of age exhibiting the following conditions: irreversible pulpitis, chronic apical periodontitis, nonvital/necrotic teeth. Teeth with compromised periodontal status, acute apical periodontitis and acute alveolar abscess were excluded from the study.

Studies by Sathorn et al [4] and Spanberg et al [7] concluded that small sample size would give a skewed statistical analysis. Statistical power is the likelihood that a study will detect an effect when there is an effect there to be detected. If the statistical power is high, the probability of making a Type II error, or concluding that there is no effect when in fact there is one, goes down. Statistical power is affected chiefly by the size of the effect and size of the sample used to detect it. Hence in the present study sample size of 201 teeth were included in Group A – single visit protocol and 198 teeth in Group B - dual visit protocol. The samples were randomly assigned to each group to remove any bias. Observer calibration was conducted by twice scoring a set of 100 case on individual radiographs. The "true score" was by consensus of two dentists involved in the study. Radiographs were independently assessed by two examiners. The size of periapical radiolucency was calculated by measuring with a ruler tool on radiovisiography (to the nearest millimeter) its largest horizontal and vertical width. This methodology was consistent with all radiological studies in field of endodontics [1, 4, 8-9].

One of the major causes of apical periodontitis is attributed to microorganism inhabiting the root canals [10-12]. Cleaning and shaping with meticulous irrigation protocol will only reduce bacterial load by 40-60% [12]. Thus, the use of an antibacterial inter-appointment medicament was advocated. Hence In the present study we used calcium hydroxide in-group II cases without finding any significant difference in healing between the two groups. Studies by Sathorn,and Fava have proved that there is a similar healing pattern in periradicular region in both protocols [4,11]. Complete elimination of bacteria is not strictly necessary and maximum reduction of bacteria and effective canal filling may be sufficient in terms of healing. [7-9]. In the present study we used calcium hydroxide in-group II cases without finding any significant difference in healing between the two groups. Our findings are in agreement with past studies [11-13].

Pain and swelling are the signs that the underlying cause is a diseased tooth. Root canal treatment aims to result in resolution of the disease process and in the bargain the patient is free from the associated sign and symptoms [14]. Lot many dentists believe that postoperative pain is sequelae of single visit endodontics [15-17]. The causative factors of flare-ups encompass mechanical, chemical and or microbial injury to the pulp or periradicular tissues. Of these factors, microorganisms are the main causative factors leading to flare ups [18-20]. Eleazer and Eleazer reported fewer flare-ups for the single-visit group (3.0%) than (8.0 %) for the multiple-visit group [21]. In the present study on reviewing patients soon after the completion of the treatment protocol and reviewing again at seven days and fifteen days, there was no increased incidence of pain with single visit protocol as compared to dual visits. Numerous studies evaluating the postoperative pain after RCT have been published, with the incidence of postoperative pain ranging from 1.9%–48%, and they showed conflicting findings [20-24]. In the present study the incidence of postoperative pain was not attributable to the number of visits. This was in confirmation to study by Hammed et al [25].

In our study outcome of treatment was classified by using modified Strindberg criteria and Periapical Index both preoperatively and postoperatively [Graph1 - 3]. Teeth with symptoms of persisting periapical inflammation were scored as not healed as were cases with increased size of the periapical radiolucency. Teeth with a reduced size of the periapical rarefaction at end of 9 months follow up (sum of horizontal and vertical reduction 2 mm) were judged as healing. Teeth with complete restitution of the periodontal contours were judged as healed. Teeth with unchanged size were registered as uncertain. In teeth with more than one root, the least favorable outcome was registered.

In a Cochrane systematic review of single versus multiple visits endodontic treatment, Sathorn concluded that no detectable difference was found in the effectiveness of root canal treatment in terms of radiological success [4]. In the present study it was found that the failure rate or the rate of healing was more consistent in teeth, which did not have a discernible periradicular rarefaction. It was also found that preoperative asymptomatic teeth with apical periradicular lesion of 2-5 mm in diameter were healing at the end of the follow up in both the groups. But the success rate diminished with increase in size of preoperative lesion (Graph 1, 2, 3). These finding were constant irrespective of the number of visits. Complete resolution of periapical lesion was not recorded; this could be because the follow up time was limited to 9 months. One-year follow up time is the soonest possible to determine whether or not the lesion has healed [9-10]. But marked reduction in lesion size was noted in 60 % of cases in single sitting group as compared to 53.72 % in dual sitting group. Discernible healing was seen in 35.7 % of single visit group as compared 41.4 % in dual visit. Thus there was no statistical difference between healing between the two groups (Graph 1-3). The differences in size of periapical lesion between subjects of treatment groups at entry to end of the study might act as a significant confounder. The differences in severity of apical periodontitis (high PAI score) might affect healing time and/or chance of healing. Healing was judged as a decrease in the PAI score overtime [26-27]. Decrease in PAI values at follow up has been taken as a predictor for healing, as a complete resolution of healing in a short follow up is not possible. A longer follow up of 2- 3 years would be required for evaluating preoperative lesions size of greater than 5mm.

In the present study, the endodontic failure rate of 3.68 % observed in single visit group as opposed to 4.78 % in dual visit, seemed to compare favorably with published values given by Yingying Su [4-7]. Failures are observed more in teeth in which there has been less than acceptable limit of obturation and in which the preoperative lesion is more than 5mm periradicular [3, 9, 25-27]. In the present study it was observed that whenever the lateral seal as well as apical seal was violated, the incidence of failure increased.Teeth that are not satisfactorily obturated show higher rate of failure. Unsatisfactory and incomplete obturation was minimal in this study.

Each study has its limitations and no study is flawless [28], as is envisaged in this study. The most reliable way to assess the clinical impact of a novel technique is through its effect on a well-defined clinical endpoint such as healing of a radiographic lesion. However, this may be impractical, due to a prerequisite of large sample size and a long duration of time required for these clinical endpoints to be achieved. Healing of apical periodontitis, for example, may take many years to show clearly on radiographs [8,9,25-28]. A surrogate endpoint is defined as a biomarker that is intended to substitute for a clinical endpoint [29-30]. A surrogate endpoint is expected to predict clinical benefit based on epidemiologic, therapeutic, pathophysiologic, or other scientific evidence. Thus, correlating our clinical out come over a longer follow up period with a surrogate end point would have made the present study more stringent.

Another limitation of this study is that a patient preference of both the protocols has not been assessed. Various studies have concluded that patients should be involved in treatment decision-making [4, 8-9 28-30]. The introduction of the patient's point of view in quality and effectiveness studies can be considered a further step towards a more comprehensive humanistic approach to the patient.

Conclusion

Though statistically there was no significant difference in outcome of both the protocols, single visit endodontics advantages outweigh those of dual visit protocol : number of patient appointments is reduced leading to increased level of patient comfort, the chances of inter-appointment microbial contamination and associated flare-ups caused by leakage or loss of the temporary seal are reduced, an immediate aesthetic replacement can be given for anterior teeth, there is no need for re familiarization with the canal anatomy at the recall appointment. The therapy is cost-effective as there is reduction in clinical time.

Ethical Clearance: Institutional (ADC R & R) ethical clearance obtained.

Source of Funding: Declaration of AFMRC Project: This paper is based on Armed Forces Medical Research Committee Project No 4256/2012 granted by the office of the Directorate General Armed Forces Medical Services and Defence Research Development Organization, Government of India.

Conflict of Interest: Nil

REFRENCES

1. Mohammadi Z, Farhad A, Tabrizizadeh M. One-visit versus multiple-visit endodontic therapy – a review. Int Dent J. 2006;56(5): 289–293
2. Nandkishore K J, Shija A S, Vinaychandra R. Single – visit Endodontics – A Review. Journal of Health Sciences and Research 2011; 2 (1): 23-28.
3. Wong A W Y, Zhang C, & Chu C. A systematic review of nonsurgical single-visit versus multiple-visit endodontic treatment. Clinical, Cosmetic and Investigational Dentistry 2014:6 45–5.
4. Sathorn C, Parashos P, Messer H. Effectiveness of single- versus multiple-visit endodontic treatment of teeth with apical periodontitis: a systematic review and meta-analysis. Int Endod J 2005; 38:347-55.
5. Trope M. Flare up rate of single –visit endodontics. Int Endod J 1991; 24:24-2.
6. Trope M, Delano O and Ørstavik. Endodontic treatment of teeth with apical periodontitis: Single vs. Multivisit. J Endod. 1999; 25(5): 345-350.
7. Spångberg LS. Evidence-based endodontics: the one-visit treatment idea. [editorial] Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, & Endodontics. 2001; 91: 617-8.
8. Soares JA, Cesar CA. Clinical and radiographic assessment of single- appointment endodontic treatment in teeth with chronic periapical lesions. Brazilian Oral Research 2001; 15: 138-44.
9. Molander A, Warfvinge J, Reit C, Kvist. Clinical and radiographic evaluation of one- and two-visit endodontic treatment of asymptomatic necrotic teeth with apical periodontitis: a randomized clinical trial. J Endod 2007; 33:41-45.
10. Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. Int Endod J 1997; 30:297–306.
11. Fava LR. A clinical evaluation of one and two-appointment root canal therapy using calcium hydroxide. Int Endod J. 1994;27:47–51.
12. Lin LM, Lin J, Rosenberg PA. One appointment endodontic therapy: biological considerations. Am Dent Assoc. 2007; 138(11): 1456-62.
13. Molander A, Reit C, Dahlén G. The antimicrobial effect of calcium hydroxide in root canals pretreated with 5% iodine potassium iodide. Endodontics and Dental Traumatology. 1999; 15:205-9.
14. McGurkin-Smith R, Trope M, Caplan D, Sigurdsson A. Reduction of intracanal bacteria using GT rotary instrumentation, 5.25% NaOCl, EDTA, and $Ca(OH)_2$. Journ of Endod 2005; 31: 359-63.
15. Calhoun RL, Landers RR. One-appointment endodontic therapy: a nationwide survey of endodontists Jour of Endod 1982; 8: 35-40.
16. Reit C, DahlenG. Decision making analysis of endodontic treatment strategies in teeth with apical periodontitis. Int Endod J 1988; 21:291–9
17. Slaus G, Bottenberg P. A survey of endodontic practice amongst Flemish dentists International Endodontic Journal. 2002; 35: 759-67.
18. Ghoddusi J, Javidi M, Zarrabi MH, Bagheri H. Flare-ups incidence and severity after using calcium hydroxide as intracanal dressing. New York State Dental Journal 2006; 72: 24-8.
19. Roane JB, Dryden JA, Grimes EW. Incidence of postoperative pain after single- and multiple visit endodontic procedures. Oral Surg Oral Med Oral Pathol. 1983; 55: 68–72.
20. Mulhern JM, Patterson SS, Newton CW, Ringel AM. Incidence of postoperative pain after one-appointment endodontic treatment of asymptomatic pulpal necrosis in single-rooted teeth. J Endod. 1982; 8: 370–5.
21. Eleazer P & Eleazer. Flare-up rate in pulpally necrotic molars in one-visit versus two-visit endodontic treatment. J Endod. 1998; 24(9): 614-616.
22. Walton R, Fouad A. Endodontic interappointment flare-ups: a prospective study of incidence and related factors. J Endod. 1992;18(4):172–7.
23. Al-Negrish AR, Habahbeh R. Flare up rate related to root canal treatment of asymptomatic pulpally necrotic central incisor teeth in patients attending a military hospital Journal of Dentistry 2006; 34:635-40.
24. Albashaireh ZS, Alnegrish AS. Postobturation pain after single- and multiple-visit endodontic

therapy. A prospective study Journal of Dentistry. 1998; 26: 227-32

25. Abdel Hammed H. Postoperative Pain in Multiple-visit and Single-visit Root Canal Treatment. J Endod 2010; 36:36–39.
26. Ørstavik D, Kerekes K, Eriksen HM. The periapical index: a scoring system for radiographic assessment of apical periodontitis. Dental Traumatology 1986; 2, 20-34.
27. Yingying Su, Chenglin Wang, and Ling Ye. Healing Rate and Post-obturation Pain of Single- versus Multiple-visit Endodontic Treatment for Infected Root Canals: A Systematic Review. J Endod 2010; 1– 8.
28. Dugas NN, Lawrence HP, Teplitsky P, Friedman S. Quality of life and satisfaction outcomes of endodontic treatment Jour of Endod 2002;8: 819-27.
29. De Gruttola VG, Clax P, De Mets DL et al. Considerations in the evaluation of surrogate endpoints in clinical trials. Summary of a National Institutes of Health workshop Controlled Clinical Trials 2001; 22:485-502.
30. Fleming TR, DeMets DL Surrogate end points in clinical trials: are we being misled? Annals of Internal Medicine 1996; 125: 605-13

A Study to Evaluate the Effectiveness of Ginger Tea on Morning Sickness among Antenatal Mothers in Selected Area of Sangli, Miraj, Kupwad, Corporation

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ABSTRACT

Quasi experimental research study was conducted during the month of August 2018 with the aim of establishing the effectiveness of ginger tea in reducing the morning sickness. Total of 60 antenatal mothers were selected and grouped into 30 in each for experimental and control respectively. The subjects were selected by using Non probability purposive sampling technique. The level of morning sickness was evaluated by using modified Rhodes index scale among antenatal mothers. The intervention was exercised i.e. Ginger tea 200ml once in a day for 5 days was administered to the subjects of experimental group. The reliability of the tool was determined by using split half method. The reliability coefficient "r" was more than 0.7, hence the tool was found to be reliable. Also, 30 eminent experts from all over India had validated the tool for its content. Data was analyzed using descriptive ie. Frequency and percentage distribution, inferential statistics ie. 't' test, z test.

Study results showed that, the ginger tea is effective on morning sickness and statistically there is significant difference in the experimental and control group. Hence study concludes that there is significant effect of ginger tea on morning sickness among antenatal mothers

Keywords: *Effectiveness, Ginger tea, Morning sickness, Antenatal mothers*

Introduction

During pregnancy every woman have different experience and it is wonderful response when pregnancy is confirmed and maximum woman have experience normally in early pregnancy with Morning sickness that means nausea and vomiting, and slowly adjusted to it.[1] During 9 month of pregnancy period, various physiological changes are experienced by pregnant women. Some physical changes are, growing abdomen size, increasing body weight till 9 months that is, the normal weight is up to 10 to 11 kg, morning sickness and backaches, these changes may be sudden and it occur in some women by unknowingly.[3]

The woman experiences with sudden and dramatic increases in estrogen and progesterone during pregnancy intended to aid the fetal and maternal development. Nausea associated with pregnancy in first trimester because of fast increase in estrogen level.[4]

Seventy to eighty percent of all pregnant woman are encountering NVP. Most of the women have NVP only in 1st trimester whereas, very thin population of pregnant mother's experience a long period of NVP extended until the initiation of labour process. The data of pregnant women affected with NVP in US and shows that, around 4,000,000 and 3, 50,000 women are experiencing the symptoms of NVP each year respectively.[5]

Usually nausea and vomiting begins at 6-7 weeks of gestation, and it peaks at 9-13 weeks, and decreases in most cases by 12-14 weeks with a symptoms of nausea

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and vomiting. Symptoms continue beyond 20 weeks in up to 10% of pregnancies. Estimates that, 1 in 5 women suffer with morning sickness in 2nd trimester and few for the complete duration of their pregnancy.[6] A survey findings reveal that, woman's having nausea and vomiting at 2nd week of gestation, 73 of 409 women (17.8%) were having nausea without vomiting and from 409 (2.7%) in that 11 women's were having nausea with vomiting..[7] It is the most common disorders during pregnancy and affecting almost 80% of pregnant women.[8]

A cross sectional study among Norwegian population shows that, Total of 712 women had nausea and vomiting during pregnancy in that 62% had mild, 439% had moderate, and 210 were having severe nausea and vomiting pregnancy.[9] Eight nine percent of women were nauseous in early pregnancy, in that most commonly, the NVP experienced was mild (48%) moderate (30%) and sever 11% had experienced nausea vomiting during early pregnancy.[10]

Nausea and vomiting is the most common medical condition in pregnancy, affecting 50-90% of women Nausea and vomiting of pregnancy can have a profound effect on a woman and her family's health and quality of life, therefore early recognition and management is important. [6]

As there are increased rates of nausea and vomiting in early pregnancy; the women and health professional's needs to create and adopt the optimal guidance and effective & safe intervention to manage the event.[11]

Traditional Chinese medicine, Ayurveda, traditional Thai medicine, Japanese Kampo medicine, and several other traditional medicines around the world, says that ginger is a basic herbal treatment, ginger can treat numerous disease and further investigations are showing the clue of health related benefits.[12]

Ginger has "Gingerols" and "Shogaols" and that acts as most vigorous elements in ginger are the pungent principles, and related clinical studies have assessed that for nausea and vomiting during pregnancy, ginger as an effective and safe treatment.[13]

Ginger named, the root or the rhizome of the plant 'Zingiber Officinale'. Ginger is considered as herbal medicine and popular spice for thousands of years and it has a long history of use in Asian, Indian and Arabic herbal traditions. Minor health problems like common cold, headaches, painful menstrual periods, flu, like symptoms ginger treatment is helpful. Even nausea and vomiting during pregnancy, ginger is more effective treatment or prevent nausea and vomiting in pregnancy and cancer chemotherapy. And several human research studies say that ginger is most effective treatment for short day use of 1gm daily may decrease nausea and vomiting in pregnant women.[14]

Ginger contains phenolic are known to treat of relieving gastrointestinal irritation, stimulate saliva and bile production, and reduces gastric contractions as food and fluid move through GI tract. Ginger provides variety of vitamins and minerals that are carbohydrates, calories, fiber, protein, sugar, sodium, iron, vitamin-C, vitamin-B_6, Magnesium, Phosphorus, Zinc, Folate, Riboflavin, and Niacin. Ginger root is true storehouse of vitamins and minerals that are necessary during pregnancy.[15]

By considering above all ginger in pregnancy, mode of action of ginger on morning sickness and the scientific evidences I feel that nothing beats morning sickness like cup of ginger tea.so rather than treating (NVP) with anti-emetics it is always better and safe to treat by ginger tea. Hence the investigator felt to select this topic as project in order elicit the usefulness of ginger as home remedies and medicinal benefits while managing the patients with morning sickness, specifically about the ginger tea as to how it helps in pregnant women when they suffer from morning sickness.

Objectives

1. To assess the level of morning sickness before administration of ginger tea.
2. To evaluate the effectiveness of ginger tea on morning sickness after administration of ginger tea.
3. To compare the morning sickness between experimental and control group.

Materials and Method

A quantitative pre-experimental one group pre-test and post-test design was used to evaluate the effectiveness of ginger tea on morning sickness among ANC mothers in selected area of Sangli, Miraj and Kupwad corporation area. The conceptual framework based on the general system theory, introduced by Ludwig von Bertalanffy

(1968) with input, process, output and feedback. The reliability was statistically computed by using split-half method. The **"r"** value **0.86**, which was more than 0.7 hence the tool was found to be reliable. Validity was done from 35 experts. Total 60 sample were selected by non-probability convenient sampling technique was used. A Modified Rodhes Index Scale was administered to collect data.

Hypothesis

H_O: There is no difference in the morning sickness after administration of ginger tea among antenatal mothers.

H_1: There is difference in the level of morning sickness after administration of ginger tea among antenatal mothers

Findings

Section I: Frequency and percentage distribution of demographic variables.

Table 1: Frequency distribution of ANC mothers according to demographic variables

Sl. No.	Variable	Category	Experimental Group		Control Group	
			Frequency	%	Frequency	%
1	Age in year	15-25	18	60	24	80
		26-35	12	40	6	20
2	Education	No Formal Education	Nil	Nil	Nil	Nil
		Undergraduate	22	73.33	19	63.33
		Graduate	07	23.33	09	30
		Post graduate	01	3.33	02	6.67
3	Occupation	Housewife	29	96.67	28	93.33
		Staff Nurse	Nil	Nil	02	6.67
		Clerk	01	3.33	00	00
4	Gestational week	10-20.	17	56.67	24	80
		21-30	11	36.67	06	20
		31-40	02	6.67	Nil	Nil
5	Diet pattern	Vegetarian	06	20	07	23.33
		Non Vegetarian	24	80	23	76.67
6	Gravida	Primi	18	60	15	50
		Multi	12	40	15	50
	Para	Primi	12	40	15	50
		P_1	10	33.33	13	43.33
		P_2	04	13.33	01	3.33

Section II: Asses the level of morning sickness before and evaluate after the administration of ginger tea in experimental and control groups.

This section deals with the effectiveness of ginger tea among ANC Mothers with morning sickness

A. Level of morning sickness before the administration of ginger tea.

Table 2: Level of morning sickness before the administration of ginger tea in both group

N = 3 0 + 30

Level / Groups	Experimental Group (Day-1)				Control Group (Day-1)			
	Frequency	%	Mean	SD	Frequency	%	Mean	SD
Mild	02	6.66	6.5	2.12	03	10	7.33	1.15
Moderate	22	73.33	12.9	2.06	27	90	12.66	3.23
Sever	06	20	17.5	0.83	00	00	00	00
Total	30	100			30	100		

B. To evaluate the effectiveness of ginger tea on morning sickness within experimental group:

Table 3: Effectiveness of ginger tea on morning sickness after administration of ginger tea in experimental group

N = 30

Group	Frequency	Mean	S.D	't' value	'P' value
Before administration on day 1	30	12.80	3.32	11.31	0.000
After administration on day 5	30	5.70	1.82		

Section III: To Compare between experimental and control group

A. Compare the morning sickness in experimental group.

Table 4: Effectiveness of morning sickness in experimental group

N = 30

Experimental Group	Frequency	Mean	S.D.	't' value	'P' value
Day 1	30	12.80	3.32	11.31	0.000
Day 5	30	5.70	1.82		

B. Compare the morning sickness in control group.

Table 5: Compare the morning sickness in control group

N = 30

Group	Frequency	Mean	S.D.	't' value	'P' value
Day 1	30	12.13	3.48	5.80	0.000
Day 5	30	8.73	2.58		

C. Comparison of morning sickness after the day 5 in Experimental and Control Groups

Table 6: Comparison of morning sickness after the day 5 in Experimental and Control Groups

N = 30 + 30

Day 5	Frequency	Mean	S.D.	't' value	'P' value
Experimental	30	5.70	1.82	5.25	0.000
Control	30	8.73	2.59		

Conclusion

Based on objective and the hypothesis, the collected data was analysed by using descriptive and inferential statistics. And the `z test was used to find the significance.

Ginger tea is effective on morning sickness and statistical findings showed that there is significant difference in the experimental and control group. Hence study concludes that there is significant effect of ginger tea on morning sickness among antenatal mothers.

Recommendations & Implications

Nursing Practice: Based on the study findings,

- Nurses can focus their independent nursing intentions towards such natural remedies,
- Nurses can encourage the patients to adopt the consumption of ginger tea, as it is cost effective, safe and natural source.
- Community health nurses and midwives can take the lead in implementation of the ginger tea intervention in reduction of morning sickness.
- Nurses can further brain storm about the effectiveness of ginger tea on morning sickness at large platforms such as conference, workshop, and seminar.

Nursing Education

- Study highlights the knowledge related to usefulness of ginger in management of morning sickness.
- It is impetus to include the information related to the ginger and its uses into higher and/or institution level curriculum.

- Nurses can have educated regarding the role of ginger in reducing morning sickness.
- Student nurses can adopt the techniques and usefulness of ginger tea on management of morning sickness.

Nursing Administration

- Nursing administrators, can frame the proactive policies especially related to remedial benefits of ginger and use during pregnancy.
- Nursing administrator\s should direct the nurses to strategically adopt the topic of usefulness of ginger while caring the antenatal mothers.
- Nursing administrators can allocate the necessary man power, money and material for effective awareness on ginger and its benefits during pregnancy.

Nursing Research

- This study would be handful reference for further investigations on ginger and uses.
- The study can be made available for supplementary reference into the field of natural remedies in relation to the obstetrical conditions.
- This study can be impetus to practice nursing profession as an evidence based practice.
- This study can be a stem for framing the theoretical framework in nursing profession.

The study recommends the following:

- Methodologically similar study can be conducted on large sample size to generalize it at larger population
- The study can be conducted to compare the effectiveness of ginger tea on heterogeneous samples among antenatal mothers such as primigravida and multi gravid mothers.
- The study can be conducted to investigate the other benefits of ginger particularly on Gastro Intestinal Tract disorders.

Conflict of Interest: No any conflict of interest

Source of Funding: Self

Ethical Clearance: Permission was obtained from the research ethical committee of the Bharati Vidyapeet (Deemed To Be) University College of Nursing, Sangli, and permission taken for data collection from Sangli Miraj Kupawad Corporation Area. Informed consent was obtained from individual (samples) who are selected for the study. Ethical clearance was done by head of committee members **Dr. Sripriya and Dr. Nilima Bhore.**

REFERENCES

1. Diane M. Fraser and Margaret A. cooper and is it foreword by Jill Crawford," text book of Myles for midwives, 15th edition, published by Churchill Livingstone Elsevier 2002-2008.
2. D.C. DUTTA'S text book of obstetrics, 7th edition, published by new central book agency (p) Ltd.2011-2013, page no-46.
3. Cari Nierenberg, Live Science contributor body changes during pregnancy, May 19,2015.
4. Debra Rose Wilson, PhD, MSN, RN, IBCLS, AHS-BC, CHT, on August 21, 2017, nausea and vomiting,available:https://www.healthline.com/health/how-to-get-rid-of-nausea.
5. Noel M Lee, gastro-enterology Md, and sumona saha Md professor of medicine, and 2011 Jun guideline, nausea and vomiting Available:https://thewomens.r.worldssl.net/images/uploads/downloadable-records/clinical-guidelines/nausea-and-vomiting-in-pregnancy_160517.pdf
6. Stefanie n Hinkle PhD Mumford, Katherine graniz, albort m silver, Emily m Mitchel, Lindsey A sjaarda, rose g radin Neil, Jama internal med 2016.
7. Rukh L, Nazar H, Usmanghani K. Efficacy of Gingocap as com to pyridoxine In the treatment of nausea and vomiting during pregnancy. Pak j pharm sci. 2016 Nov;29(6):1937-1943.
8. Heitmann k, solheimsnes A, Havnen GC, Nordeng H, HOLST L. Treatment of nausea and vomiting during pregnancy-a cross-sectional study among 712 Norwegian women. Eur j clin pharmacol.2016 May;72(5)72(5);593-604.
9. Crozier SR, Inskip HM, Godfrey KM, cooper C, Robinson SM; SWS Study Group. Nausea and vomiting in early pregnancy: Effects on food intake and diet quality. maternal child Nutr.2017 oct;13(4).

10. Matthews A, Haas DM, O'Mathuna DP, Dowswell T. Interventions for nausea and vomiting in early pregnancy. Cochrane Database Syst Rev.2015 Sep 8;(9): CDOO7575.
11. Naturopath, medical benefits of ginger in the prevention of nausea and vomiting, 2March 31 2016.
12. Lete I, Allué J. The Effectiveness of Ginger in the Prevention of Nausea and Vomiting during Pregnancy and Chemotherapy. Integr Med Insights. 2016 Mar 31;11:11-7.
13. Yuva Bellik, Fadila Benabdesselam, Abdelhanine Ayad, Zina Dahmani, Laid Boukraa, Abderrahim Nemmar, Mokrane Iguer-Ouada. (2013) Antioxidant Activity of the Essential Oil and Oleoresin of Zingiber Officinale Roscoe as Affected by Chemical Environment. International Journal of Food Properties 16:6, pages 1304-1313.
14. Megan Ware RDN LD. Ginger: Health benefits and dietary tips. Medical News Today. 11th September 2017. Available from: https://www.medicalnewstoday.com/articles/265990.php
15. Kramer J, Bowen A, Stewart N, Muhajarine N. nausea and vomiting of pregnancy, prevalence, severity and relation to psychosocial health. MCN Am J Matern child nurs. 2013Jan-Feb, 38(1):21-7.
16. Emelia nova S, Mazzotta p, Einarson A, koren G. Prevalence and severity of nausea and vomiting of pregnancy and effect of vitamin supplementation. Clin invest Med. 1999 Jun, 22(3):106-10.
17. Lacroix R, Eason E, Melzack R. Nausea and vomiting during pregnancy. A prospective study of its frequency, intensity, and patterns of change. Am J Obstet Gynecolgy.2000 Apr 18, 2(4):931-7.
18. Hinkle SN, Mumford SL, Grantz KL, Silver RM, Mitchell EM, Sjaarda LA, Rain RG, Perkins NJ, Galai N, Schisterman EF. Association of nausea and vomiting during pregnancy with pregnancy loss. A secondary analysis of a randomized clinical trial. JAMA Intern Med. 2016 Nov 1;176(11):1621-1627.
19. Suzane R Trupin. Morning Sickness (Vomiting during Pregnancy) reviewed on 2018 Jan 1.
20. Wood H, Mckellar l v, lightbody M. Nausea and Vomiting in Pregnancy, Blooming or Bloomin Awful? A review of the literature. Women birth. 2013 Jun 26(2):100-4.
21. Shirin Adel P.R and jamuna Prakash. Chemical composition and antioxidant properties of ginger root (zingiber officinale). Journal of medical plants research. 18 december,2010. Vol. p 2674-79.
22. Mashhadi NS, Ghiasvand R, Askari G, Hariri M, Darvishi L, Mofid MR. Anti-oxidative and anti-inflammatory effects of ginger in health and physical activity: review of current evidence. Int J Prev Med. 2013; 4(Suppl 1): S36-42.
23. Haniadka Raghavendra, Saldanha Elroy, Venkatesh Sunita, et al. A review of the gastro protective effects of ginger (Zingiber officinale Roscoe). Journal of Food Funct. Publisher The Royal Society of Chemistry. 2013; 4 (6): 845-55.
24. Viljoen E, Visser J, Koen N, Musekiwa A. A systematic review and meta-analysis of the effect and safety of ginger in the treatment of pregnancy-associated nausea and vomiting. Nutr J. September 2017; 13:20.
25. Dante G, Bellei G, Neri I, Facchinetti F. Herbal therapies in pregnancy: what works? Curr Opin Obstet Gynecol. 2014 Apr;26(2):83-91.
26. Haji Seid Javadi E, Salehi F, Mashrabi O. "Comparing the Effectiveness of Vitamin B6 and Ginger in Treatment of Pregnancy-Induced Nausea and Vomiting," Obstetrics and Gynecology International, vol. 2013, Article ID 927834, 4 pages, 2013. https://doi.org/10.1155/2013/927834.
27. Thomson M, Corbin R, Leung L. Effects of ginger for nausea and vomiting in early pregnancy: a meta-analysis. J Am Board Fam Med. 2014 Jan-Feb; 27(1): 115-22.
28. Keating A, Chez RA. Ginger syrup as an antiemetic in early pregnancy. Altern Ther Health Med. 2002 Sep-Oct;8(5):89-91. PubMed PMID: 12233808. Available from:
29. Ozgoli G, Goli M, Simbar M. Effects of ginger capsules on pregnancy, nausea, and vomiting. J Altern Complement Med. 2009 Mar;15(3):243-6.
30. Mohammadbeigi R, Shahgeibi S, Soufizadeh N, Rezaiie M, Farhadifar F. Comparing the effects of ginger and metoclopramide on the treatment of pregnancy nausea. Pak J Biol Sci. 2011 Aug 15;14(16):817-20. Available from: https://www.merriam-webster.com/dictionary/morning%20sickness.
31. Renuka. K. Study to evaluate the effectiveness of ginger tea on morning sickness. MSc in Commjunity Health Nursing. The Tamilnadu Dr. MGR Medical University, Chennai, 2011.

Contraceptive Methods: Knowledge, Practice and Their Attitude among the Women of Rural Population in and Around Bangaluru City of Karnataka State, India

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ABSTRACT

The main objective of this study was to assess the knowledge attitude and practice of contraceptives in rural women. this is across sectional study of rural women between 20-45 age groups attending the Outpatient department of obstetrics & gynaecology at AIMS&RC situated at Devanahalli rural Bengaluru, Karnataka. Methodology- 500rural women were interviewed by giving the questionnaire which assesses the KAP of contraception and the various methods like barrier intrauterine contraceptive device, Oral contraceptive Pills' Tubectomy Vasectomy and injectable contraceptive withdrawal technique and emergency contraception. The socio-demographic characteristics like age, parity, educational status and their income were assessed for the awareness of the various contraceptive methods among the rural women residing in and around Bangalore city of Karnataka state. It was found that 95 % women were aware of bilateral tubal ligation, 85% known for condoms and 72% known for IUCD and also other various contraceptive methods. However, lack of knowledge on their usage and attitude to the contraceptive methods, birth control is not reaching its target.

Conclusion: The above results only reaffirms the fact that there is a gap between knowledge and practise due lot many factors discussed in this study.

Keywords: *knowledge, attitude, Practice, rural, contraception.*

Introduction

India is a home to 17% of the world's population – a population of diverse cultures, languages and religions. The relevance and importance of family planning in India has to be understood in the context of the burgeoning population, and the persistence of relatively poor social indicators in spite of a booming economy. India, the second most populous country in the world, is projected to exceed 2billion people by the turn of the twenty-first century. According to the Census of India 2011, the population was nearly 1.210 million, of which 31% are below the age of 15 years and 53% ofwomen are in the reproductive age group (15–49 years)[1-3]. Govt of India along with state Governments launched a family planning programme in 1952, with the objective of reducing birth rate to the extent necessary to stabilise the population at a level consistent with requirement of national economy. Data for India, especially regarding contraceptive use, are a little out of date as no nationally representative surveys have been undertaken following the third round of the National Family Health Survey (NFHS) – India's DHS – in 2005–2006. Due to intense efforts to control population growth in India, the Total fertility rate (TFR) has been steadily declining over the past few decades. The current TFR of 2.4 in 2012 is down from 3.1 children per woman in 2001, but is still above replacement level fertility. In urban areas, the TFR has reached below replacement levels at 1.8, but in rural areas the TFR is 2.6[4-5].

A typical female sterilization in India renders most women permanently infertile. Because many women in India marry in their late teens and quickly experience multiple pregnancies, women who already have two or

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more children and can't care for more often opt for—or are pressured into—sterilization. Women in rural and semi urban areas have no easy access to medically accurate information, high-quality healthcare from providers who patiently answer their questions, and no clear idea of the risks and benefits of various forms of birth control, and time to weigh their options and give informed consent. Given that the reality in many parts of India today is that women are still being pressured or incentivized to undergo mass sterilization.

In the present study, apart from the sterilization, other contraceptive methods known to the females in around Bangalore city were investigated.

Methodology

This was carried out from 1st March 2018 to 30th Dec, 2108 at Akash Medical College hospital, Bangalore. The study was conducted in the outpatient clinic of Gynaecology Unit. The definition of rural was women residing in Bangalore who have come for lively hood from other rural places of Karnataka. The selection criterion was married women between the ages of 15-45 years, living with their husbands at the time of interview. Women who were pregnant, had a child younger than 2 years or had any medical disorder were excluded from

the study. The questionnaire elicited information regarding their age, educational status, number of children, knowledge and source of contraceptive methods, practicing of either male or female family planning methods. The attitude of females towards contraception was asked, while the attitude of husbands was assessed what their females perceived. To assess the knowledge, the following 8 methods were separately asked: pills, Injectable contraception, Intra-uterine Contraceptive Devices (IUCDs), condoms, tubal ligation, vasectomy, Norplant and withdrawal method. The practice defines the usage of contraceptive methods by either partner. Descriptive analysis was conducted to describe the results in percentages.

Results

The socio-demographic characteristics like age, parity, educational status and their income were analysed.. The age group of 20-30 was the most productive age constitutes 70%.

Less than 50% females were accessible for primary and secondary education and their monthly income varies from 5 to 40%. Table-1 shows the awareness of females to different contraceptive methods Viz vasectomy, natural, IUCD, condoms, bilateral tubal ligation and progesterone pill were known and ranges from 50 t0 95%. Other contraceptive methods like oral, emergency contraception were known by 30 and 2% respectively. However, some of the contraceptive methods are poorly implementing. Bilateral tubal ligation method was practicing by 28% women whereas other methods were n the range of 1 to 18% only (Table-2). The attitude of the women for these methods was also poor and ranges from 2 to 24% (Table 3).

Table 1: Awareness of contraceptive methods among the rural women in around Bangalore

Methods	Numbers	%
Progesterone only pills	-	Nil
Bilateral tubal ligation	475	95%
Condoms	425	85%
IUCD	360	72%
Natural	325	65%
Vasectomy	250	50%
Oral contraceptive pills	120	30%
Emergency contraception	10	02%
None	05	1%

Table 2: Practice of contraceptive methods among the rural women in Bangalore

Methods	Numbers	%
Bilateral tubal ligation	140	28%
IUCD	90	18%
Natural	75	15%
Condoms	70	14%
Oral contraceptive pills	60	12%
None	50	10%
Emergency contraception	05	01%
Vasectomy	05	01%
Injectables	05	01%
Progesterone only pills	Nil	Nil

Table 3: Attitude of the implementation of contraceptive methods among the rural women in Bangalore

Reason	Methods	%
Wants to conceive	12	24%
Fear of side effects	10	20%
Inconvenient	05	10%
Breast feeding	10	20%
Infrequent sex	04	8%
Not staying together	03	06%
Hysterectomy	03	06%
Opposed to family planning	02	04%
Menopausal	01	02%

Discussion

The widespread adoption of family planning, in a society, is an integral component of modern development and is essential for the integration of women into social and economic life. In spite of efforts exerted by the Government of India, the family planning program is not yet as successful especially in rural women as they are practicing the contraceptive methods and also their attitude.

The present study aimed to assess the knowledge, attitude and practice of family planning methods to enhance the contraceptive practice in the rural community in future. Results showed that the knowledge for contraception was 95%. However, similar awareness rate of 81% was found in Pakistan study[6].Women illiteracy is one of the factor that affects the knowledge regarding contraception. Similar results have been reported from Pakistan which has low literacy rate, even lower in rural areas. Literacy level among the women emphasizes the need for education as a key component to combat overpopulation and will encourage the use of contraceptives.

Another factor responsible for knowledge of family planning methods are the exposure of messages through media. Electronic media play an important role in a society where literacy level is low. Women were more likely to use contraceptives when messages of family planning were delivered through effective media or personnel. In India, social circle (70%) and media (39%) were the main sources of information [6]. Similarly, study from rural Nepal also reported an exposure to electronic media messages as the main factor for use of family planning methods among women[7]. An Ethiopian study showed that 80.3% of health personnel contributed in providing information regarding contraception, which is opposite to the results [7]. The positive aspect is that the presently reported contraceptive prevalence rate is high with regard to knowledge, as opposed to Jordan and Nigeria where it was 31.7% and 8.7% with awareness rate of 91% and 85% respectively[10, 11]. Regarding the usage of family planning methods, an important dimension is the type of contraception used. Bilateral tubal ligation was the most common chosen method used by 28% (Table 3) of couples as shown in other studies as well[12, 13]. Oral pills were used by 12% of women in comparison with 32% and 10% in other areas of Pakistan [14 15]. From this study we conclude that the women were aware of most of the contraceptive methods, but lack of implementation and attitude birth control is not reaching its expected results.

Ethical Clearance: Done from ethical committee of AIMSRC Devanahalli bengaluru.

Conflict of Interest: Nil.

Source of Funding: Self

References

1. World Bank. India. Reproductive health at a glance; India. Washington, DC: World Bank. 2011 http://documents.worldbank.org/curated/en/2011/06/14703604/india-reproductive- health-glance
2. International Institute for Population Sciences (IIPS) and Macro International (2007), National Family Health Survey-3(NFHS-3), India Volume II. Mumbai: IIPS. 2005 -06.
3. International Institute for Population Sciences (IIPS) and ORC Macro (2000), National Family Health Survey-2 (NFHS-2), India. Mumbai: IIPS. 1998-99:
4. Ministry of Health and family Welfare (MoHFW), Framework for Implementation, National Health Mission. 2012-2017.
5. Ministry of Health and family Welfare (MoHFW), Material for Annual report Family Planning. 2012-13

6. Srivastava R, Srivastava DK, Jina R, Srivastava K, Sharma N, Sana S. Contraceptive knowledge, attitude and practice (KAP Survey). *J ObstetGynecol India* 2005; **55**: 546-50.

7. Boulay M, Storey JD, Sood S. Indirect exposure to a family planning mass media campaign in Nepal. *J Health Commun*2002;7;379-99

8. Senbeto E. A study on knowledge, attitude, practice and quality of care in family planning at Dessie Zuria District.*J Ethiop Med Pract* 2001; **3**:70-6.

9. EL-Qaderi SS, AL-Omari N. Knowledge, attitudes, and practices of family planning among currently married women in Jordan Badia. *Int Q Community Health Educ* 2000-2001; **20**:171-91.

10. Etuk SJ, Ekanem AD. Knowledge, attitude and practice of family planning amongst women with unplanned pregnancy in Calabar – Nigeria.*Niger J PhysiolSci*2003; **18**(1-2):65-71.

11. Khawaja NP, Tayyab R, Malik N. Awareness and practices of contraception among Pakistani women attending a tertiary care hospital. *J ObstetGynaecol*2004; **24**:564-7.

12. Oyedeji OA, Cassimjee R. A gendered study of young adult contraceptive use at one university in Kwa Zulu-Natal.*Curationis* 2006; **29** (3):7-14.

13. Essien EJ, Ogungbade GO, Kamiru HN, Ekong E, Ward D, Holmes L Jr. Emerging sociodemographic and lifestyle predictors of intention to use condom in human immunodeficiency virus intervention among uniformed services personnel. *Mil Med* 2006; **171**:1027-34.

14. Ali S, White FMM. Family planning practices among currently married women in Khairpur District, Sindh, Pakistan. *J Coll Physicians Surg Pak* 2005; **15**: 422-5.

15. Khawaja NP, Tayyab R, Malik N. Awareness and practices of contraception among Pakistani women attending a tertiary care hospital. *J ObstetGynaecol*2004; **24**:564-7.

Comparison Prophylactic Glycopyrrolate, Dexamethasone, Metoclopram ide in Control of Nausea and Vomiting after Spinal Anaesthesia for Caesarean Delivery

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ABSTRACT

Background: The effects of spinal anesthesia on women in their labour period are different from those observed in non-obstetric patients. The distribution of the anaesthetic drug in cerebrospinal fluid (CSF) is less predictable than non-obstetric patients, Moreover side effects including hypotension, nausea and vomiting are more common.

Aims: To compare the efficiency of inj glyocopyrolate 0.2 mg iv, inj dexamethasone 8mg i.v, inj Metoclorpromide 10mg i.v in control of post-operative nausea and vomiting after spinal anesthesia for caesarean delivery

Method and Material: All consenting women were explained and women were randomly allocated in to four groups of 20 each, Group A inj.Glycopyrrolate 0.2 mg, Group B, inj. Dexamethasone 8 mg, Group C inj. Metoclopramide 10 mg and Group D (n=20) inj. Normal saline 2m1. Level of spinal block, hemodynemic changes, incidence of intraoperative and post-operative nausea and vomiting were noted in all four groups. The incidences of nausea and vomiting were compared in different groups and the differences were tested for significance by calculating 'z' value. A `p' value <0.05 was considered significant.

Results: The overall (intraoperative & postoperative) incidence of nausea and vomiting which was 20% in group A, 35% in group B, 50% in group C and 60% in group D. Statistical analysis showed that the all three drugs decrease incidence of nausea and vomiting, but glycopyrrolte found to be more effective in preventing nausea and vomiting.

Conclusion: The incidences of nausea and vomiting were high fallowing spinal anesthesia during cesarean delivery. Administration of glycopyrrolate intravenously before spinal in caesarean section effectively control the incidence and severity of intraoperative and early postoperative nausea and vomiting compared to the non-treatment group.

Keywords: *Post-operative nausea and vomiting, Spinal anesthesia, Glycopyrrolate, Dexamethasone, Metoclopramide.*

Introduction

Intra-operative and postoperative nausea and vomiting (IONV and PONV) can be distressing to patients undergoing Caesarean section (CS) under regional anaesthesia. The incidence of IONV are common, studies with rates up to 60–80% were reported.[1]

Nowadays, cesarean sections account for about 7% of all surgical procedures worldwide[2] and the majority of

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them are performed under spinal anaesthesia. Nausea and vomiting present during the surgical procedure produce discomfort for the parturient, impair surgical conditions for the gynecologist and can lead complications such as aspiration of gastric content.[3] PONV can lead to an increased, stay in the recovery room, nursing care, and potential hospital admission- all these contribute to total health care costs[4]. Unpleasant distressing experience for patient and also in severe cases may cause problem such as dehydration, electrolyte imbalance. Suture dehiscence, bleeding and esophageal rupture [5].

Pharmacological attempts to reduce PONV include preemptive therapy with metoclopramide, dexamethasone and prophylactic use of vasopressor. [6] It has been reported that glycopyrrolate could successfully minimize the incidences of PONV during neuraxial anaesthesia for a caesarean without affecting the fetal outcome. [7]

The aetiology of PONV in women undergoing caesarean delivery with neuraxial anaesthesia is multifactorial and no single intervention will eliminate it completely, therefore the aim of this study is to do the comparative evaluation, among glycopyrrolate, dexamethasone and metoclopramide in preventing PONV after spinal anaesthesia in caesarean section, in ASA grade I and II patients

Materials and Method

After obtaining approval from institutional scientific, ethical committee and written informed consent, 80 women (American society of anaesthesiologist grading I & II, between 20 to 35 years of age) at term undergoing caesarean delivery were enrolled for the study.

All the consenting women were randomly allocated into four groups to receive:

Groups	Drugs
Group A (n = 20)	inj.Glycopyrrolate 0.2 mg
Group B (n = 20)	inj. Dexamethasone 8 mg
Group C (n = 20)	Inj. Metaclopramide 10 mg
Group D (n = 20)	Inj. Normal saline

The efficacy and safety of i.v glycopyrrolate 0.2mg, i.v. dexamethasone 8mg, and i.v. metoclopramide 10mg were evaluated and compared for the prevention of IONV and PONV in a randomized double blind placebo controlled study[Table/Fig-1].

Any patient having a history of an acid peptic disease, previous history of PONV or any antiemetic medication, pregnancy-induced hypertension, hepatic dysfunction, diabetes mellitus, and allergies to local anaesthetics were excluded from the study [Table/Fig-1].

All patients vitals were recorded before pre-loading with Ringer's lactate solution 20m1/kg and this followed by intravenously administration of study agents prior to spinal anaesthesia.

Spinal anaesthesia was administered in the sitting position with 0.5% hyperbaric bupivacaine (2.2m1) with 25 gauge Quincke's lumbar puncture needle at the interspace between L3-4. After administration of spinal anaesthesia, women were put in the supine position with a 15° wedge under the right hip for left uterine displacement and supplementation of oxygen 5L flow per minute was administered through poly mask. Following confirmation of spinal block by a loss of sensation to cold and pinprick, to T4-T5 level, surgery was started and oxytocin (20 units) was administered through intravenous infusion at the time of umbilical cord clamping.

Assessment: Oxygen saturation, pulse rate, arterial blood pressure and respiratory rate of each woman were recorded every 05 minutes during the surgery and post-operatively every 20 minutes during the study period. The decrease in systolic blood pressure (more than 20%of baseline value and/or less than 90mm Hg) after spinal anaesthesia was treated by increasing the rate of intravenous fluid administration and 3mg increments of ephedrine administered intravenously (every 3-5 minutes) until resolution of hypotension.

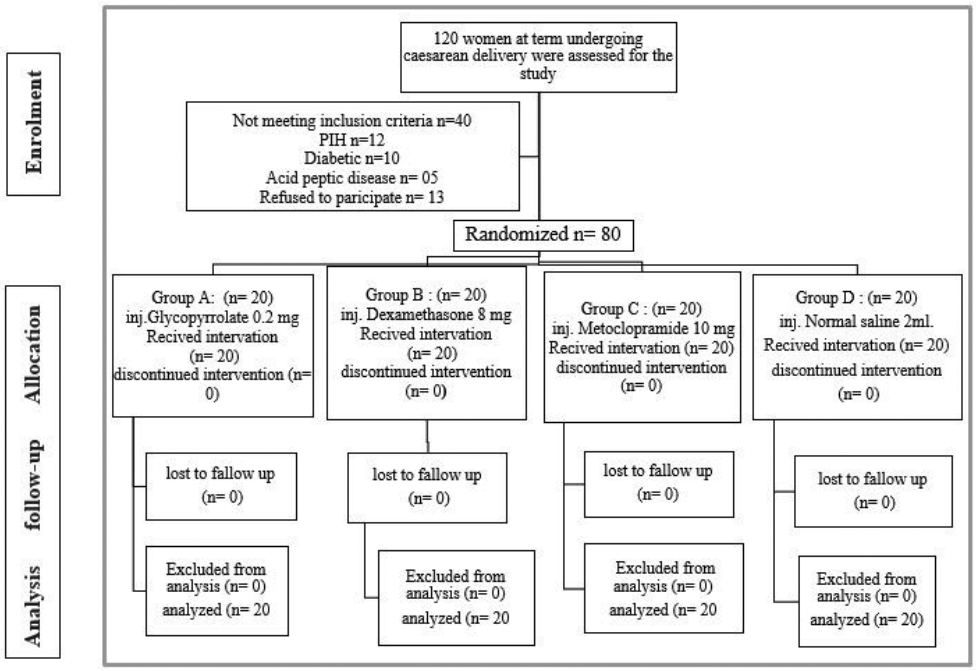
Emetic episodes (nausea and/or vomiting) experienced by women were recorded intra-operatively and up to 4 hours post-delivery period in the postoperative ward by anaesthesiologist who was blinded to the treatment patient had received.

NAUSEA is defined as an unpleasant sensation referred to a desire to not t associated with expulsive muscular movement

VOMITING is the forceful expulsion of even a small amount of upper gastrointestinal contents through the mouth. If two or more episodes of emesis occurred in each observation period 0-4 hrs), 4mg inj. Ondansetron intravenously was administered as rescue antiemetic to the patient.

The incidences of nausea and vomiting were compared in different groups and the differences were tested for significance by calculating 'z' value. A `p' value <0.05 was considered significant.

Table/Fig-1: Consort diagram showing flow of participants



Results

The age, weight, ASA status, surgery duration were comparable in all group of patients and level of spinal anesthesia in different study groups are shown in [Table/Fig-2]. The level of spinal anesthesia were found statistically insignificant in association with nausea and vomiting.

Table/Fig-2: Level of spinal anesthesia in different groups:

		Group A	Group B	Group C	Group D	Total
Level	T4 N(%)	6 (30%)	10 (50%)	9 (45%)	7 (35%)	31 (38.9%)
	T5 N(%)	7 (35%)	5 (25%)	7 (35%)	8 (40%)	27 (33.8)
	T6 N(%)	7(35%)	5 (25%)	4 (20%)	5 (25%)	21 (26.3%
Total N (%)		20 (100%)	20 (20%)	20 (100%)	20 (100%)	80 (100%)

Blood Pressure: Mean variation in SBP (111.9 mmHg) was least in group A and maximum in group D (104.5 mmHg) after spinal anaesthesia compared to other groups. But this variation in SBP was statistically insignificant [Table/Fig-3]. So variation should not be a contributing factor for nausea and vomiting in a different group.

Table/Fig. 3: Systolic blood pressure (measured after 5 minutes of spinal anesthesia)

	N	Mean	SD	Minimum	Maximum
Group A	20	111.90	13.05	90.00	130.00
Group B	20	107.00	15.16	80.00	130.00
Group C	20	104.70	14.35	80.00	130.00
Group D	20	104.70	11.90	90.00	120.00

Intraoperative Nausea and Vomiting: The incidence of intraoperative nausea which was 15%, 25% 30% and 55% in group A, B, C &D respectively which was statistically Significant, It was lowest in the glycopyrrolate group [Table/Fig-4]. Statistical analysis showed that the incidence of nausea in group D was significant ($p<0.05$) than the other three groups. The intergroup comparison between glycopyrrolate, dexamethasone and metoclopramide showed that all the three reduce the incidence of nausea but the antiemetic effect was least in the metoclopramide group.

The incidence of intraoperative vomiting which was 10%, 25%, 30% and 45% in group A, B, C &D respectively which was statistically Significant, It was lowest in the glycopyrrolate group [Table/Fig-4].Statistical analysis showed that the incidence of vomiting in group D was significantly more ($p<0.05$) than the other three groups. Two Out of three patient complaining nausea in glycopyrrolate group had vomiting, whereas in other groups all complaining of nausea had vomiting.

Table/Fig. 4: Incidence of intraoperative (0-2hrs) nausea and Vomiting among different group

	Nausea		Vomiting	
	Present N(%)	**Absent N(%)**	**Present N(%)**	**Absent N(%)**
Group A	3 (15%)	17(85%)	2 (10%)	18(90%)
Group B	5 (25%)	15(75%)	5 (25%)	15(75%)
Group C	6(30%)	15(75%)	6(30%)	15(75%)
Group D	9(45%)	11(55%)	9(45%)	11(55%)

Postoperative Nausea and Vomiting: On Comparing Incidence of postoperative nausea in four groups, group D was 50%(10/20) compared to group A, B &C which were 15%(3/20), 15%(3/20) & 30%(6/20) respectively[Table/Fig-5]. Compared to intraoperative nausea in dexamethasone group, only 3 out 5 had complained of postoperative nausea.

The incidence of postoperative vomiting in group D was 40% (8/20) compared to group A, B&C which were 15% (3/20), 20% (4/20) & 40% (8/20) respectively[Table/Fig-4]. Statistical analysis showed that the incidence of postoperative vomiting was high in group D but it was not significant. The intergroup comparison between glycopyrrolate, dexamethasone and metoclopramide showed that the decrease in incidence was more in the glycopyrrolate.

Comparing overall (intraoperative & postoperative) incidence of nausea and vomiting[Table/Fig-6].which was 20% in group A, 35% in group B, 50% in group C and 60% in group D. Statistical analysis showed that the overall incidence was significant($p<0.05$) in group D than the other 3 groups.

Table/Fig. 5: Incidence of postoperative (2-4 hours) Nausea and vomiting among different groups

	Nausea		Vomiting	
	Present N(%)	**Absent N(%)**	**Present N(%)**	**Absent N(%)**
Group A	3 (15%)	17(85%)	3 (15%)	17(85%)
Group B	3 (15%)	17(85%)	4 (20%)	16(80%)
Group C	6(30%)	14(70%)	8(40%)	12(60%)
Group D	10(50%)	10(50%)	8(40%)	12(60%)

Table/Fig. 6: Total incidence of nausea and vomiting

		Group A	**Group B**	**Group C**	**Group D**	**Total**
Present	N(%)	4 (20%)	7 (35%)	10 (50%)	12 (60%)	33 (41.3%)
Absent	N(%)	16(80%)	13(65%)	10 (50%)	8 (40%)	47(58.5%)
Total N (%)		20 (100%)	20 (100%)	20 (20%)	20 (100%)	80(100%)

Discussion

Nausea and vomiting during neuraxial anesthesia for a caesarean delivery are high without prophylactic antiemetic. The hypotension due to sympathicolysis during neuraxial anesthesia is principle underlying mechanisms of IONV and PONV in the obstetrical setting. Bradycardia owing to an increased vagal tone, the visceral stimulation via the surgical procedure, peritoneal traction, exteriorization of the uterus and intravenously administered opioids are other factors contributing for nausea and vomiting [8-10]. The time of occurrence of nausea and vomiting after general anaesthesia for caesarean section is postoperative in contrast to regional anaesthesia which is mainly intraoperative.

The result of our study clearly demonstrates that the total incidence of nausea and vomiting was 20% in group A, 35% in group B, 50% in group C, & 60% in group D. Data of group A, B & C were compared with placebo group D and results in glycopyrrolate group were found statistically significantly less than placebo group. Comparing the incidence of nausea and vomiting in between group it was found that the incidence of nausea and vomiting was significantly reduced in group A as compared to group B and group C.

Biswas BN et al. concluded the incidence of nausea and vomiting in inj. glycopyrrolate 0.2mg group was much less than in, inj. dexamethasone 8mg, in metachlorpramide10mg, inj. normal saline 2m1(placebo). The total incidence of nausea and vomiting were noted in 15% of women belonging to glycopyrrolate as group compared 20%, 30%, 55% in dexamethasone, metoclopramide and saline group respectively. The p value <0.05 was considered significant. [6]

D Ure et al. also concluded that Patients who received glycopyrrolate prophylactically reported a reduction in the frequency and severity of nausea compared to placebo. [7]

The mechanism of action of study drug glycopyrrolate is not clear. The antiemetic effect may be due to the reduction in hypotension episodes because of heart rate mediated increase in cardiac output. The results of our study correlate with the studies mentioned above

Henzi I et al. conducted a quantitative systematic review of randomized placebo-controlled studies of 18 different regimens of metoclopramide, they found in adults the best documented regimen was 10mg I.V. But they concluded that 10mg metoclopramide dose was clinically ineffective as a prophylaxis for PONV. [11]

In our study, the dosage used for metoclopramide was also 10mg which is suboptimal for preventing nausea and vomiting as mentioned in the above studies. This explains the high incidence of 50% in group C as compared to group A (20%) & B (35%).

Wang JJet al. Found that dexamethasone 8mg in laparoscopic cholecystectomy decreased the incidence of nausea and vomiting significantly.[12] In a Similar study, J C Huang et al. found prophylactic i.v.dexamethasone 5mg reduces the incidence of postoperative nausea and vomiting in women undergoing ambulatory laparoscopic tubal ligation, And also concluded, dexamethasone 5mg is more effective than metoclopramide 10mg or placebo. [13]

In our study, the incidence of nausea and vomiting with saline was 60%. But with the administration of dexamethasone incidence of nausea and vomiting was (35%). Above mentioned studies show that dexamethasone is better than saline and metoclopramide and is effective in preventing nausea and vomiting after gynecological surgery.

Antiemetic mechanism of dexamethasone is by inhibiting synthesis and release of serotonin both centrally and peripherally, by inhibiting synthesis of prostaglandins and also by changing the permeability of the blood-brain barrier to serum proteins. Dexamethasone is most commonly used corticosteroid and is integral component of almost all antiemetic regimens in acute and delayed nausea and vomiting [14].

The aetiology of nausea and vomiting in women undergoing caesarean section with spinal anaesthesia is multifactorial, and no single intervention is available to eliminate it completely, it is important to provide adequate aspiration prophylaxis with histamine(H_2), dopamine receptor antagonist along with sufficient infusion of crystalloid or colloid solutions before and during the central neuraxial blockade to preventive hypotension.[1] fall in blood pressure should be corrected liberally with antihypotensive drugs such as ephedrine, phenylephrine. Concomitant measures such as the low-dose local anestahetics, use of intrathecal opioids to reduce the amount of local anesthetics needed. [15]

Although the incidence of nausea in women treated with glycopyrrolate was reduced, no single antiemetic drug has proved to be a universal solution to postoperative nausea and vomiting. It is not feasible to give very high doses of any single drug because of saturation effects and safety, so combinations of antiemetic drugs are a possibility.

Conclusion

We found that although prophylactic administration of all the three drugs decreased the incidence of nausea and vomiting, the control of nausea and vomiting was better with glycopyrrolate compared with dexamethasone and metoclopramide.

Therefore from the results of this study, we conclude that the administration of glycopyrrolate intravenously before spinal in caesarean section effectively controls the incidence of nausea and vomiting.

Ethical Clearance: Taken From Institutional Ethical Committee

Source of Funding: Self

Conflict of Interest: Nil

REFERENCE

1. Balki M, Carvalho JC. Intraoperative nausea and vomiting during cesarean section under regional anesthesia. Int J Obstet Anesth 2005; 14: 230–41
2. Weiser TG, Haynes AB, Molina G, et al. Size and distribution of the global volume of surgery in 2012. Bull World Health Organ. 2016;94(3):201F–209F.
3. Kranke P, Eberhart LH. Possibilities and limitations in the pharmacological management of postoperative nausea and vomiting. Eur J Anaesthesiol. 2011;28(11):758–765.
4. Macario A, Weinger M, Carney S, Kim A. Which clinical anesthesia outcomes are important to avoid? AnesthAnalg 2001; 92:393-400.
5. Ajay k, Sumith A, Puneet D. A comperative intravenous ondenseteron and palonosetron in preventing post operative nasea and vomiting after laproscopic cholecystectomy a randomized double blind study. Asian J Pharm Clin Res. 2013;11:128-31.
6. Biswas BN, Rudra A, Das SK, Nath S, Biswas SC. A comparative study of glycopyrrolate, dexamethasone and metoclopramide in control of postoperative nausea and vomiting after spinal anesthesia for caesarean delivery. Indian J. Anaesth 2003; 47(3):198-200.
7. Ure D, James KS, Mcneill M, and Booth JV. Glycopyrrolate reduces nausea during spinal anaesthesia for caesarean section without affecting neonatal outcome. Br J Anaesth 1999; 82(2):277-9.
8. Jelting Y, Klein C, Harlander T, Eberhart L, Roewer N, Krankr p. Preventing nausea and vomiting in women undergoing regional anesthesia for cesarean section: challenges and solutions. Local and Regional Anesthesia 2017:10 83–90
9. Ishiyama T, Yamaguchi T, Kashimoto S, Kumazawa T. Effects of epidural fentanyl and intravenous flurbiprofen for visceral pain during cesarean section under spinal anesthesia. J Anesth. 2001;15(2):69–73.
10. Wahab MA, Karantzis P, Eccersley PS, Russell IF, Thompson JW, Lin- dow SW. A randomised, controlled study of uterine exteriorisation and repair at caesarean section. Br J Obstet Gynaecol. 1999;106(9):913–916.
11. Henzi I, WalderBand. Tramer MR. Metoclopramide in the prevention of postoperative nausea and vomiting: a quantitative systematic review of randomized, placebo-controlled studies. Br J Anaesth 1999; 83(5): 761-71
12. Wang JJ, Ho ST, Liu YH, Lee SC, Liu YC, Liao Y Cand Ho C M. Dexamethasone reduces nausea and vomiting after laparoscopic cholecystectomy. Br J Anaesth 1999; 83(5):772-5.
13. Haung JC, Shieh JP, Tang CS, Tzeng JI, Chu KS, and Wang JJ Low dose dexamethasone effectively prevents postoperative nausea and vomiting after ambulatory laparoscopic surgery. Can J Anaesth 2001; 48:973-7.
14. Drisy AP. Emmanuel J. Recent updates in the managment of chemotherapy induced nausea and vomiting. Asian J Pharm Clin Res. 2013;6:5-10.
15. Roofthooft E, Van de Velde M. Low-dose spinal anaesthesia for Caesarean section to prevent spinal-induced hypotension. Curr Opin Anaesthesiol. 2008;21(3):259–62.

A Study to Assess the Effectiveness of Eucalyptus Oil on Knee Pain among Osteoarthritis Patients in Selected Areas of Sangli, Miraj and Kupwad Corporation

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ABSTRACT

Background: Osteoarthritis is a progressive disease that occurs due to age and deterioration of joint health thus leading to pain in the joints. It is one of the primary causes for pain and disability across the globe. Osteoarthritis is mainly treated with pharmacological interventions such as NSAID'S. Persistent use of NSAID'S may have adverse effects on multiple essential organs thus exposing the patient to further complications.

Objectives: 1. To assess the level of knee pain among osteoarthritis patient. 2. To assess the effectiveness of Eucalyptus oil application on level of knee pain among osteoarthritis patients.

Methodology: Quasi-experimental pre-test post-test control group design was directed to assess effect of eucalyptus oil application on knee pain among osteoarthritis patients in selected areas. Total 100 samples were selected by non-probability purposive sampling method, (50 experimental group and 50 non-experimental group). A modified Allina pain scale was used to assess the level of knee pain among the osteoarthritis patients. The study adopted the "General System theory" as a theoretical base for framework of the study. Analysis was done using frequency and percentage distribution and ANNOVA test.

Result: The mean pain score in the experimental group on day one was 6.82, on the third day it was 5.66 and on day seven it was 4.42. The mean pain score on day one was 5.72, on the third day it was 5.42 and on day seven it was 5.34. Variation was found in the mean and SD scores in experimental and control group .p value is less than 0.005.The statistical data shows a variation in mean score of knee pain among osteoarthritis patients in experimental and control group.

Conclusion: Thus it was concluded that, on the basis of statistical tests, eucalyptus oil application was efficient in minimizing knee pain in the experimental set.

Keywords: *Effect, eucalyptus oil, knee pain, osteoarthritis*

Introduction

Osteoarthritis (OA) is the disorder related to the degeneration of joints, and it occurs frequently in daily practice, it is one of the primary causes for disability in the elderly.[1] In all of the rheumatic diseases which are chronic in nature, the osteoarthritis of the hip and the knee is the most common one. Osteoarthritis stands in second place as the commonest problem related to rheumatology and is the most commonly occurring illness, in India the incidence rate is of 22% to 39%. About 45% of women who are above the age of 65 years have symptoms, and radiological proof of the disease is found in 70%.[2] Osteoarthritis Is a disease which is of a huge challenge because of the less number of options to treat it with. Regular treatment and therapy such as acetaminophen, NSAIDs, and opioids are helpful to reduce the intensity of pain but they are not able to reverse the progression of the disease and may even cause adverse effects.[1] Non steroidal anti-inflammatory drugs (NSAIDs) are one of the most frequently used type of drug around the globe. Their main effect is that of reducing inflammation

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and reducing pain in the person consuming them. On the flip side this medicine is potentially harmful as it increases the risk of cardiovascular and gastrointestinal complications. NSAIDs affect the upper and lower gut by harming the mucosa and thus causing topical injury [3] Eucalyptus essential oil is a derivative of the eucalyptus tree.[4] Eucalyptus oil has a variety of medicinal benefits thus unsurprisingly it is a widely used product. It is used as an anti-inflammatory, anti-spasmodic, anti-congestive, disinfectant, antibacterial and antiseptic agent.[4]

Materials and Method

The Quasi-experimental research design- pretest & post test control group design, was adopted to conduct the study. The main purpose of the study was to assess the effect of eucalyptus oil application on knee pain among osteoarthritis patients. The sample size consists of 100 osteoarthritis patients, Out of 100 samples 50 were selected for experimental group and 50 were selected for control group. General demographic variables and the modified Allina pain assessment scale [6] were used as the tool to gather the data. This scale shows reading from 1-10. From 1-3 there is mild pain, from 4-6 there is moderate pain and from 7-10 there is severe pain.

Data Collection was Done in Following Steps

Procedure for data collection

1. **Pre intervention phase:** Osteoarthritis patients as per the criteria were picked and permission was obtained from selected patients after briefing the patient about the study. Gathering and documentation of the Demographic data was done. Determination of the level of pain was done by using the **Modified Allina Pain Assessment Scale** in both groups**.**
2. **Intervention phase:** In experimental group, eucalyptus oil application was done twice a day for 7 days straight. In control group routine checkup was followed.

Steps of intervention:

Articles:

- Eucalyptus oil
- **Modified Allina Pain Scale** Paper scale
- Cotton pad.

Procedure:

- Explain the procedure to patient.
- Explain the intent and how he/she has to cooperate.
- Clean the knee with a cotton pad
- Apply 0.25ml eucalyptus oil on the effected knee.

Post intervention phase: The level of effectiveness on knee pain was assessed with the help of **Modified Allina Pain Scale** after application of eucalyptus oil in both experimental and control group on the 1st day, 3rd day and 7th day one hour after the application

An ethical clearance was obtained from the institution and informed consent was obtained from the participants, samples were selected using the purposive sampling technique. The following hypotheses were formulated for the study

Hypothesis

H_0: There is no effect of Eucalyptus oil application on knee pain among osteoarthritis patients.

H_1: There is effect of Eucalyptus oil application on knee pain among osteoarthritis patients.

Statistical Analysis

Descriptive Statistics: Frequency and percentage distribution were used to analyze the socio-demographic data.

Inferential Statistics: Annova test was used to compare the data within the groups on the 1st, 3rd and 7th day.

Results

Assessment of level of knee pain before administration of eucalyptus oil in Experimental & Control Group

Table 1: Assessment of level of knee pain before administration of eucalyptus oil in Experimental & Control Group

N = 100

Pain (Day 1)		Experimental Group		Control Group	
		Frequency	Percentage	Frequency	Percentage
Mild	1-3	0	0.00	0	0.00
Moderate	4-6	17	34.00	38	76.00
Severe	7-10	33	66.00	12	24.00

Assessment according to level of knee pain before administration of eucalyptus oil, 34% were in moderate category and 66% in the severe and no one in the mild knee pain category in experimental group. According to level of knee pain on day 1 without administration of eucalyptus oil, 76% were in moderate category, no one in the mild and 24% in severe knee pain category in control group.

- Analysis of data related to the effectiveness of Eucalyptus oil application on level of knee pain among osteoarthritis patients in experimental and control groups.

Table 2: Knee pain before and after the application of Eucalyptus oil in Experimental Group

N = 50

Groups	N	Mean	df	F cal value	F table value	p value	Significance
Day 1	50	6.82	2,147	39.39	3.06	0.00	Significant
Day 3	50	5.66					
Day 7	50	4.42					

The above table shows the comparison of knee pain prior and after the application of the eucalyptus oil in the experimental group. The mean pain score on day one was 6.82, on the third day it was 5.66 and on day seven it was 4.42. The 'p' value is 0.00 thus rejecting the null hypothesis.

Table 3: Knee pain without application of Eucalyptus oil in Control Group

N = 50

Groups	N	Mean	df	F cal value	F table value	p value	Significance
Day 1	50	5.72	2,147	1.29	3.06	0.28	Not Significant
Day 3	50	5.42					
Day 7	50	5.34					

The above table shows the comparison of knee pain in the control group. The mean pain score on day one was 5.72, on the third day it was 5.42 and on day seven it was 5.34. The 'p' value is 0.28 for this table.

- Comparison of knee pain in Experimental and Control Group

Table4: Comparison of knee pain in Experimental and Control Group

N = 100

Group (day 7)	Frequency	Mean	S.D.	t value	P value
Experimental	50	4.42	1.26	3.58	0.001
Control	50	5.34	1.30		

The comparison of the average knee pain score of the experimental and control group after 7 days was done by the unpaired t test. The average knee pain score of experimental group was 4.42 with standard deviation of 1.26. The average knee pain score of control group was 5.34 with standard deviation of 1.30. The test statistics value of the unpaired t test was 3.58 with p value 0.001. This shows that there was significant difference in the average knee pain score at 5% level of significance

Discussion

The findings in the study as per shows that in the experimental group the maximum population was from the age group of 51-60 years (40%) while in the control group, the maximum population was also in the age group of 51-60 years (54%). Age is one of the primary reasons of risk to contract osteoarthritis. The increase of incidence of people facing osteoarthritis is

due to the addition of many different factors, physical and physiological factors that occur with the process of aging, thus making the joint less able to cope with various changes and pressures `applied on it [7].

In the gender criteria, most participants were females (70%) as compared to males (30%). In the duration of disease criteria. The readings were found consistent with a study conducted on Epidemiology of knee osteoarthritis in India and related factors, Osteoarthritis of the knees is found to be more common in females as compared in males. This finding was found statistically significant. [2]

The maximum samples (40%) in the experimental group had the knee pain since 2 years and in the control group the maximum samples (36%) are facing the ailment for more than 5 years. The readings were consistent with a study conducted on Knee pain and health-related quality of life among older patients with different knee osteoarthritis severity in Saudi Arabia. In this, the patients with knee osteoarthritis for an average of 7.5 years severe to moderate knee pain than those with mild to moderate knee osteoarthritis for an average of 4 years. [8]

All the samples (100%) in both the experimental and control group were prescribed pain medications for their pain. The findings were found consistent with a study conducted by on Non-surgical treatment of osteoarthritis-related pain in the elderly showed that, doctors rely heavily on NSAIDs to treat the pain faced in osteoarthritis. Acetaminophen is the choice of drug in the initial stages due to its comparative safety. Thus prescribing medications to deal with the pain faced by osteoarthritis patients. [9]

The findings presented in [Table No-2] shows the comparison of knee pain prior and after the application of the eucalyptus oil in the experimental group. There are three total readings taken, i.e. on day 1, day 3, and day 7. The mean pain score on day one was 6.82, on the third day it was 5.66 and on day seven it was 4.42. The 'p' value is 0.00 thus rejecting the null hypothesis.

The findings presented in [Table No-3] shows the comparison of knee pain in the control group on the 1st day, 3rd day and 7th day of observation. The mean pain score on day one was 5.72, on the third day it was 5.42 and on day seven it was 5.34. The 'p' value is 0.28 for this table.

The findings presented in [Table No-4] shows us the comparison of knee pain between the experimental and control group. The mean pain score on the first day in the experimental and control group is 6.82 and 5.72 respectively with a standard deviation of 1.26 and 1.21 in the experimental group and control group respectively. The mean pain score on day 3 in the experimental and control group is 5.66 and 5.42 respectively with the standard deviation for the experimental and control group being 1.52 and 1.23 respectively. The mean pain score on the 7th day for experimental and control group is 4.42 and 5.34 respectively with the standard deviation for experimental and control group being 1.26 and 1.30 respectively.

The findings of the study were compared statistically, it was found that the study findings were consistent with the study conducted by Mr. Yang Jun, (Et al); Seoul assessed the effectiveness of eucalyptus oil on pain in the knee and swelling after total knee replacement.[10] Which showed that eucalyptus oil was effective on knee pain

The findings of this study were consistent with another study conducted by Mr. Basil Varghese; Mandya on the effectiveness of eucalyptus oil on knee pain reduction in osteoarthritis patients. Which also showed that eucalyptus oil is competent to minimize pain of the knee among osteoarthritis patients. [11]

Delimitations and Recommendations

This study is delimited to men and women diagnosed with osteoarthritis of the knee, with the subjects who are having moderate to severe pain only being included.

1. Comparative studies can be done for testing both the difference between pharmacological treatment and treatment with eucalyptus essential oil
2. A comparative research could perhaps be done on a bigger specimen range along with a prolonged time span thus the findings can be relatable to a bigger community.
3. A parallel analysis could perhaps be executed to analyze the effectiveness of eucalyptus oil on joint pain in other bone diseases
4. A contrastive study could perhaps be done to analyze knee joint pain between men and women suffering from osteoarthritis.
5. A identical analysis could be carried out to evaluate the effectiveness of other essential oils with anti-inflammatory properties on pain among osteoarthritis patients.

Conclusion

In the present study, the effectiveness of eucalyptus oil application on knee pain among osteoarthritis patients was assessed. Eucalyptus oil with its anti-inflammatory properties helps in alleviating pain. It is concluded that the use of eucalyptus oil for knee pain among osteoarthritis patients is a safe, cheap and effective method to decrease the pain among osteoarthritis patients having knee pain.

Conflict of Interest: Column is Nil.

Source of Funding: Self.

Ethical Clearance: Proposal of research with the data collection tool was presented in the front of research ethical committee for approval. Informed written consent from each participant was taken. Which included name, number, organization, time duration of participation, termination of participation, purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance is done obtained under the chairmanship of Dr. Sripriya and Dr. Nilima Bhore.

REFERENCES

1. Wei Zhang, Hongwei Ouyang, Current research on pharmacologic and regenerative therapies for osteoarthritis, Bone Reaserch, Mar 2016:4:15040 [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4772471/]
2. Chandra Prakash Pal, Pulkesh Singh, (et. al.), Epidemiology of knee osteoarthritis in India and related factors, IndianJournal of Orthopedics, 2016Sep;50(5):518-522. [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5017174/]
3. Sostres C, Gargallo CJ,(et.al.), Adverse effects of non-steroidal anti-inflammatory drugs (NSAIDs, aspirin and coxibs) on upper gastrointestinal tract, Best practice and research clinical gastroenterology, 2010 April:24(2): 121-132, [https://www.ncbi.nlm.nih.gov/pubmed/20227026]
4. Kiran Patil, 18 wonderful benefits of eucalyptus oil, October 23,2018, https://www.organicfacts.net/health-benefits/essential-oils/health-benefits-of-eucalyptus-essential-oil.html]
5. Up Nature, Top 20 incredible benefits of eucalyptus essential oil, March 16, 2017, [https://www.up-nature.com/blogs/news/top-20-incredible-benefits-of-eucalyptus-essential-oil]
6. Allina Health's Patient Education Department, Managing Your Pain, 2016 https://wellness.allinahealth.org/library/content/0/10
7. Yuqing Zhang and Joanne M. Jordan, Epidemiology of Osteoarthritis, clinics in geriatric medicine, 2010August;26(3): 355–369, [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920533/]
8. Saad M. Bindawas, Vishal Vennu, (et.al), Knee pain and health-related quality of life among older patients with different knee osteoarthritis severity in Saudi Arabia., 2018 May 15, [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5953496/]
9. Saulat Mushtaq, Rabeea Choudhary and Carla R. Scanzello, Non-surgical treatment of osteoarthritis-related pain in the elderly, 2018 Jun 14:6(6):1062–1066, [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3261252/]
10. Yang Suk Jun, Purum Kang, Sun Seek Min, Effect of Eucalyptus Oil Inhalation on Pain and Inflammatory Responses after Total Knee Replacement: A Randomized Clinical Trial, Evidence-Based Complementary and Alternative Medicine,2013,Article ID 502727, 7 pages, [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3703330/]
11. Basil Varghese, "A Quasi Experimental study to assess the effectiveness of eucalyptus oil massage on pain reduction among osteoarthritis patients who have got admitted in selected hospitals in Mandya",2012-2013, [www.rguhs.ac.in/cdc/onlinecdc/uploads/05_N118_32689.doc]

A Study to Assess the Knowledge Regarding Self-Care Management among the Pregnant Mother with Pih Attending Selected Maternity OPD's of Tertiary Hospitals in Sangli, Miraj and Kupwad Corporation Area

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ABSTRACT

Pregnancy is absolutely one of the most pleasurable experiences in a women's life. Pregnancy may be natural, but it does not mean that it is a problem free.[4] PIH is characterized by high blood pressure and the presence of proteinurea accompanied by edema that has a harmful effect equally on both fetus and mother adversely.[5] The purpose is to assess the knowledge regarding self care management and to find the association between knowledge score with selected demographic variables among the mothers with pregnancy induced hypertension. The study was conducted by using quantitative approach with non-experimental, explorative, descriptive research design. The conceptual framework was based on self care theory, developed by Dorothea Orem.[18] The reliability was calculated by using Karl Pearson's formula coefficient. Total 120 samples were selected by Probability simple random sampling technique, lottery method. Data collection tool had knowledge questionnaire to assess knowledge regarding self-care management of PIH. It was found that 62.50% of mothers with PIH were having poor knowledge regarding self care management of PIH. Thus it was concluded that implementation of knowledge regarding self care management of PIH would be beneficial to mothers having PIH in many ways like it reduces the further complications.

Keywords: *Assess, knowledge, mothers with PIH, self care management*

Introduction

Pregnancy is absolutely one of the most pleasurable experiences in a women's life.[4] The news of pregnancy excites the women; she plans everything for the arrival of the new baby with a lot of care and happiness.[2] Pregnancy may be natural, but it does not mean that it is a problem free.[4] On the other hand a lot of health disorders are acknowledged to make this memorable moment difficult and the most imminent one is Pregnancy Induced Hypertension. PIH is characterized by high blood pressure and the presence of protein in urea accompanied by edema that has a harmful effect equally on both fetus and mother adversely.[5] PIH particularly preeclampsia is a key source of maternal and perinatal morbidity and mortality worldwide.[6] The national occurrence of PIH ranges in between 5-15.2% in India.[9] However hypertensive disorders in pregnancy cannot be arrested and progress of complications can be barred by timely detection and eminence self care management of PIH mothers at home.[7] The components of self care management of mothers with PIH includes rest and sleep, positioning, exercise, stress management, weight monitoring, fetal monitoring, recognition of sign and symptoms of complications and frequency of antenatal checkups, which help the mother to reduce PIH and take prompt action in case of emergency in order to reduce the incidence of maternal morbidity and mortality.

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Aim

To assess the knowledge regarding self care management and to find the association between

knowledge score with selected demographic variables among the mothers with pregnancy induced hypertension.

Assumptions: Mothers with PIH may have some knowledge regarding self-care management.

Materials and Method

A present study was conducted by using quantitative approach with non-experimental, explorative, descriptive research design. The conceptual framework was based on self care theory, developed by Dorothea Orem, with the concept of theory containing self care, self care agency, therapeutic self care demand, self care requisites. The reliability was done by using split half method 'r' was calculated by using Karl Pearson's formula coefficient 'r' of the questionnaire was0.77. Validity was done from 15 experts, out of which 11 had received. Proposal with tool presented in front of ethical committee for permission. Total 120 samples were selected by Probability simple random sampling technique, lottery method. Pilot study was conducted with 12 samples and the study was found feasible. Final study was conducted with same data collection tool. Data collection tool had knowledge questionnaire to assess knowledge regarding self-care management of PIH.

Results

Section II: Frequency and percentage distribution of knowledge score.

Table 1: Frequency and Percentage Distribution of Knowledge Score

N = 120

Knowledge Score	Frequency	Percentage (%)
Poor (0-6)	75	62.50
Average (7-12)	43	35.83
Good (13-17)	2	1.67

Table No. 2 indicates that in knowledge scores, 62.50% of mothers with PIH were having poor knowledge, 35.83% were having average knowledge and remaining 1.67% mothers with PIH were having good knowledge.

Section III: Association between knowledge score with selected demographic variables.

Table 2: Association between Knowledge Score with Selected Demographic Variables

N = 120

Sr. No.	Variable		Knowledge			Chi Square	d. f.	p value	Significance
			Poor	Average	Good				
1.	Age in years.	< 20	7	2	0	13.53	6	0.035	Significant
		21-25	32	17	0				
		26-30	28	16	0				
		31-35	8	8	2				
2.	Education	Informal	20	3	0	13.82	6	0.032	Significant
		Primary	22	14	0				
		Secondary	19	14	0				
		Higher	14	12	2				
3.	Occupation	Housewife	50	30	0	25.46	4	0.000	Significant
		Private	21	10	0				
		Government	4	3	2				
4.	Family Income in Rs.	below 5000	25	17	2	7.04	4	0.134	Not Significant
		5001-10000	24	18	0				
		above 10001	26	8	0				

Table 3: Association between Knowledge Score with Selected Demographic Variables

N = 120

Sr. No.	Variable		Knowledge			Chi Square	d. f.	p value	Significance
			Poor	Average	Good				
5.	Gravid	Primigravida	41	23	1	0.03	2	0.985	Not Significant
		Multigravida	34	20	1				
6.	Gestational age in weeks	20-24	21	10	0	26.41	6	0.000	Significant
		25-28	39	26	0				
		29-32	11	4	0				
		33 & above	4	3	2				
7.	Family history of hypertension	Yes	50	31	2	1.28	2	0.527	Not Significant
		No	25	12	0				
8.	Previous knowledge regarding PIH	Yes	30	20	1	0.52	2	0.771	Not Significant
		No	45	23	1				
9.	Source of information	Friends and family members	12	10	0	10.49	6	0.105	Not Significant
		Mass Media	3	4	1				
		Health personal	6	5	0				
		Books	9	1	0				

The data in table No. 4 and Table No. 5, represented that there was significant association between age in years, education, occupation and gestational age in weeks with knowledge score as the calculated 'p' value is less than tabulated 'p' (0.0) value. It also indicates that there was no significant association between family income in Rs. gravid, family history of hypertension, previous knowledge regarding PIH and sources of information with knowledge score as the calculated 'p' value is more than tabulated 'p'(0.0) value.

Discussion

Section I: As per the analysis of the study finding it was found that most of the mothers with PIH (40.83%) were between the age group of 21-25 years, 27.50% mothers with PIH were secondary educated, 66.67% mothers with PIH were housewife, 36.67% mothers with PIH were from a monthly family income group below Rs. 5000/- , 54.17% were primigravida mothers, 54.17% were in between the 25-28 weeks of gestation, 69.17% mothers with PIH had a family history of hypertension, 57.50% mothers with PIH had no previous information regarding self care management of PIH, 43.14% mothers with PIH got the information regarding self care management of PIH from friends and family members.

Section II: Assessment of knowledge in terms of frequency and percentage

Data of the mothers with pregnancy induced hypertension was analyzed to assess the knowledge, regarding self care management in terms of frequency and percentage.

In knowledge scores, 62.50% of mothers with PIH were having poor knowledge.

Section III: Association between knowledge score with selected demographic variables.

The chi-square test was used to find out the association between knowledge score with demographic variables. In age in years of mothers with PIH 'p' value was 0.035 which is less than 0.05 so there is a significant association between age of mothers with PIH with knowledge score. In education 'p' value was 0.033 which is less than 0.005 so there significant association between the education of PIH mothers with knowledge score. In occupation 'p' value was 0.000, which is less than 0.05 so there significant association between the occupation of PIH mothers with knowledge score. The 'p' value between gestational age in weeks and knowledge score was 0.00, less than 0.05 so there is significant association between gestational age in weeks with knowledge score.

The findings of the present study have been discussed with reference to the objectives and assumption.

The study results were consistent with the research conducted by Tanya Salim et al in Trivandrum; Kerala assessed the knowledge of gestational hypertension and its self care management among primigarvida women. Non-experimental, descriptive research design was used for the study. The subjects were 240 primigravida women selected by using consecutive sampling technique. A semi structured interview schedule was used to collect data from the patients. The results showed that 70.7% of pregnant women had poor knowledge and only 4.2% had good knowledge regarding gestational hypertension. 36.4% of pregnant women had poor knowledge and 26.4% had good knowledge regarding its self care measures. Significant association was noted between knowledge of gestational hypertension and age and education of pregnant women. There is a significant association of knowledge of self care measures of gestational hypertension with age, place of residence, educational status and use of mass media as a source of information.

Conclusion

It gives brief description of study as well as summary and the outcome of the study. It also gives appropriate implications and recommendations for further research study.

The main aim of the study was, to assess the knowledge regarding self care management among the mothers with PIH. The design used for the study was non experimental, explorative, descriptive research design. The study was conducted at selected maternity OPD's of tertiary hospitals in Sangli, Miraj and Kupwad corporation area. The Sample size of the study was 120 PIH mothers.

The reliability of the tool was determined Split Half Method of Reliability, the tool was administered to 12 samples. Reliability of the tool was found to be 0.77.

The pilot study was conducted, to assess the feasibility of the study and to decide the statistical analysis and practicability of research. It was found feasible.

Finding of the present study revealed that significant amount of PIH mothers were lacking the knowledge about self care management of PIH. Planning for implementation of knowledge regarding self care management of PIH would be beneficial to the PIH mothers and reducing the chance of further complications.

The findings of the study recommended that can be conducted on larger populations, in different settings, among the nurses and by using an observational checklist to assess practices.

Conflict of Interest: Nil.

Source of Funding: Self.

Ethical Clearance: Proposal of research with the data collection tool was presented in the front of research committee for approval. Prior permission from hospitals was taken. Informed written consent from each participant was taken which included name, number, organization, time duration of participation, termination of participation, purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance was done with the committee members Dr. Sripriya and Dr. Nilima Bhore mam.

REFERENCES

1. M. Munirathnamma, T. Lakshmamma. Knowledge of staff nurses regarding management of pregnancy induced hypertension (PIH). International Journal of Humanities & Social Science invention. 2013 November; 2(11) :8-12
2. Reddy B., Williams E. Optimal treatment of minor ailments in pregnancy requires careful evaluation of the risk and benefit. Pharmacy in practice. 2009 September:81-84
3. Parmjit Kaur, Mr. Jibin Varghese. A descriptive study to assess the knowledge and attitude on birth preparedness among primigravida mothers attending gynec OPD at selected hospital Patiala, Punjab. Asian Journal Of Nursing Education And Research. 2018. 8(1):106-110.
4. Adele politer, et al., Textbook for maternal and child health nursing. 4th edition. Wippincon William. New York. 2002: 404-410

5. Muhammed Safvan, Namitha B. R, Neetha, Nimitha Cyriac, Pramila, Gracy Silvester. The knowledge on prevention of pregnancy induced hypertension among antenatal mothers. A descriptive approach. International Journal Of Recent Scientific Research. 2014 october: (10): 1914-1918

6. Kathleen A. Pennington, Jessica M. Schlitt, Daniel L. Jackson, Laura C. Schulz, Danny J. Schust. Preeclampsia: multiple approaches for a multifactorial disease. Disease Models And Mechanisms. 2012. 5: 9-18.

7. Tanya Salim, Annamma Kuriakose. Knowledge of gestational hypertension and its self care measures among primigravid woman. Journal Of Medical Science And Clinical Research. 2017 January. 5(1): 15328-15335.

8. Monica Muti, Mufuta Tshimanga, Gombe T. Notion, Donewell Bangure and Prosper Chonzi. Prevalence of pregnancy induced hypertension and pregnancy outcomes among women seeking maternity services in Harare, Zimbabwe. BioMed Central Cardiovascular disorders, 2015 (15): 111

9. Aleem Arshad, Waseem Pasha, Tariq Azam Khattak, Rizwan Bashir Kiyani. Impact of pregnancy induced hypertension on birth weight of newborn at term. Journal Of Rawalpindi Medical College.2011;15(2):113-115. Available from http://www. journalrmc.com/ volume/1394781698.pdf.

10. Dr. Anujeet Kaur Randhawa, Dr. Amarbir Singh, Dr. Sudersan Kapoor. Pregnancy induced hypertension: A retrospective study of 200 cases of pregnant women. IOSR-Journal Of Dental And Medical Sciences. 2016 June. 15(6) :36-34. Available from: http://www.iosrjournals.org.

11. Tesfaye Abera Gudeta, Tefera Belachew Lema, Sena Belina KItila. Pregnancy induced hypertension and associated factors among pregnant women receiving antenatal care services at Jimma town public health facilities South West Ethiopia, Journal Of Gynecology And Women's Health. 2018. 10 (3):555792

12. Muntaha H. Hussian, Dr. Fatin A. Amir Al-Saffar. Self care management of Pregnancy Induced Hypertension for pregnant women attending primary health care centers at Kirkuk city. Kufa Journal For Nursing Sciences. 2016 August. 6(2):1-10.

13. Pramitha P. Compare knowledge on self care management of PIH between primigravida and multigravida. Nitte University Journal Of Health Science. 2014 September. 4(3):61-65.

14. Sikha Saxena, Prem Chandra Srivastava, K.V. Thimmaraju, Ayaz K. Mallick, Kanchan Dalmia, Biswajit Das. Socio-demographic profile of pregnancy induced hypertension in a tertiary care centre. Scholars Journal Of Applied Medical Sciences. 2014. 2(6D):3081-3086. Available from http://www.saspublisher.com.

15. Sarker Shamina Ahmed, Nazma Sultana, Most Luthy Begum, Lobaba Sultana Lima, Md Firoz Abedin, Md Kausar Hosen. Pregnancy induced hypertension and associated factors among pregnant women. Journal Of Gynecology And Women's Health. 2017 March. 3(4) :555623

16. Meher S, Duley L. Rest during pregnancy for preventing preeclampsia and its complications in women with normal blood pressure. Cochrane database system revised.2006 April 19.(2):CD005939.

A Study to Assess the Relationship between Job Satisfaction and Burnout among Staff Nurses Working in Selected Hospitals of Sangli, Miraj and Kupwad Corporation Area

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ABSTRACT

Registered nurses (RNs) are the largest healthcare industry. Despite several rewards to care for a profession, there are many tensions that affect the nurse.[1] The emotional dimension of the nursing work environment provides new insights into the burning experience. Approximately 30% to 50% of work increases the workload burden, which leads to professional pressure.[2] The effect of burnout is intense Nurse Job satisfaction is combined with performance and quality care. The purpose is to assess the level of job satisfaction, level of burnout and to find the association between job satisfaction and burnout among staff nurses[13]. The study was conducted by using quantitative approach with non experimental, explorative, descriptive research design. The conceptual framework was based on job demand control model developed by Karasek 1979. 110 staff nurses were selected through non probability convenient sampling technique.

Data collection tool was standards tool-maslach burnout inventory (BMI) and The Benjamin Rose nurse's assistant job scale is an 18 item scale or instruments. It was found that 80.91% of professional burnout scores were less than burning. 90.91% of nurses have a low level of personality crash. 48.18% of staff and nurses were less fuelled. 57.27% nurses were satisfied with the assessment of employees' well-being. There is no significant link between work and work satisfaction among employee nurses.[14]

There is no significant connection between the disturbances of employee nurses and work satisfaction. There is a significant connection between employee record and job satisfaction. The study concluded that the key findings of work and job satisfaction studies from workforce and nurses. 90.09% nursing personality disorder and 57.27% nurses are satisfied. In addition, the association showed that among the staff and nurses in the data there is a significant difference between burning and job satisfaction.[8]

Keywords: *Assess, job is satisfied, burnout, employee nurse*

Introduction

A. Burned Out: Burn syndrome (BOS) was found in human service specialists in the early 1970s. It can be described as a way to prevent emotional stress in jobs, or to exacerbate the use of energy and resources that lead to feelings of failure and fatigue.[8] Depression affects nearly every aspect of human life, however Bose also has overall health. Maslach reduces and Jackson Maslach Burnout Invoice (MBI) survey and the intensity of species of mammals. Factors that determine working conditions and workloads in workplace syndrome[13]

B. Job Satisfaction: Nurse Job satisfaction has been coupled to performance and to providing quality nursing care. There have been extensive studies in the USA and Europe on nurse's job satisfaction and to some extent in Asian countries like Japan, Korea and Taiwan.[13]This study can investigate the amount of satisfaction among non public hospital nurses and also the factors with that there glad or discontented.

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Aim

To assess the level of job satisfaction, to assess the level of burnout and to find the association between job satisfaction and burnout among staff nurses.

Assumption

There may be relationship between job satisfaction and burnout among staff nurses.

Materials and Method

The present study was conducted by using quantitative approach with non experimental, explorative, descriptive research design. The conceptual framework was based on job demand control model developed by Karasek 1979. Validity was done from 30 experts out of which 25 had received. Proposal with tool presented in front of ethical committee for permission. 110 staff nurses were selected through non probability convenient sampling technique. Pilot study was conducted on 12 staff nurses and the study was found feasible. Final study was conducted with same data collection tool. Data collection tool was standards tool-maslach burnout inventory (BMI) and The Benjamin Rose nurse's assistant job scale is an 18 item scale or instruments.

Result

Section I: Assessment of Level of Job Satisfaction in Terms of Frequency and Percentage: Deals with analysis of data related to assessment of the level of burnout among staff nurses in terms of frequency and percentage.

Table 1: Assessment of the Level of Burnout–Burnout

N = 110

Variable	Burnout	Scores	Frequency	Percentage
Burnout	Low level	< 17	89	80.91
	Moderate	18-29	21	19.09
	High	> 30	0	0.00

The above table shows, the assessment of the burnout of the staff nurses at the work places, in burnout scores 80.91% of staff nurses were having low level of burnout, 19.09% were moderate level burnout and no one in the high level burnout.

Section II

Deals with analysis of data related to assessment of the level of Job Satisfaction among staff nurses in terms of frequency and percentage.

Table 2: Assessment of the Level of-Job Satisfaction

N = 110

Variable	Group	Scores	Frequency	Percentage
Job Satisfaction	Very Dissatisfied	0 -14	0	0.00
	Dissatisfied	14-27	18	16.36
	Satisfied	28-41	63	57.27
	Very Satisfied	42-54	29	26.36

The above table shows, the assessment of the job satisfaction of the by the staff nurses, concludes that 57.27% of staff nurses were satisfied with their job, 26.36% were in very satisfied group, 16.36 were dissatisfied and no one in the very dissatisfied group.

Section III

Deals with analysis of data related to the association between job satisfaction and burnout among staff nurses.

Table 3: Association between Job Satisfaction and Burnout among Staff Nurse

N = 110

Variable	Groups	Job Satisfaction			Chi Square	d. f.	p value	Significance
		Dissatisfied	Satisfied	Very Satisfied				
Burnout	Low level	17	50	22	2.71	2	0.258	Not Significant
	Moderate	1	12	7				
	High	0	0	0				
De personalization	Low level	17	56	27	0.75	2	0.68	Not Significant
	Moderate	1	7	2				
	High	0	0	0				
Personal Achievement	Low level	6	2	15	10.55	4	0.032	**Significant**
	Moderate	1	16	7				
	High	11	15	7				

Discussion

Most researchers and nurses are aged 18-24, that is, 39.09%, the population and nurses are experienced by women, namely 64.55%, and the eligibility criteria that the population and nurses experience ANM 35.45%. Most nurse workers refer to age 90.00, 87 in 87 nurses at ICU, i.e. 79.09%, the maximum nursing monthly income is between 1000-1-15000 rupees, i.e., the marriage rate indicates a maximum of 70.91% of marital marriages. 44.55% No children, 73.64% of nurses are supported by members, and 55.45% of family members are nursing parents the shows.

During the assessment of employees' burning estimates, 90.09% nurse staff showed that the personality disorder and 57.27% nurse workers were satisfied. In addition, the information received from the union showed that there was no significant difference between job loss and job satisfaction between employees and nurses.

Conclusion

An analysis of the relationship between job satisfaction and burning relationships among nurses who work in selected hospitals in Sangli, Miraj and Kupwad. This chapter includes an analysis of key findings of work and job satisfaction studies from workforce and nurses. 90.09% nursing personality disorder and 57.27% nurses are satisfied. In addition, the association showed that among the staff and nurses in the data there is a significant difference between burning and job satisfaction.

The reliability of the Tool is standardized so reliability not done. The tool feasibility, reliability and validity of the proposed research design.

Pilot study is a trial study carried out before a research design is finalized to assist in defining the research question or to test the feasibility, reliability and validity of the proposed research design.

Conflict of Interest: Column is Nil.

Source of Funding: Self.

Ethical Clearance: Proposal of research with the data collection tool was presented in the front of research committee for approval. Prior permission from hospitals were taken. Informed written consent from each participant was taken. Which included name, number, organization, time duration of participation, termination of participation, purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance is done with the committee members Dr. Sripriya and Dr. Nilima Bhore mam.

REFERENCES

1. Hingey P. The human face of nursing. Nursing mirror, 1984;159(21):19-22.
2. Cubrilo-Turek M, Urek R, Turek S. Burnout syndrome-Assessment of a stressful job among intensive care staff. Coll Antropol.2006 ;1:131-5.
3. Kulkarni GK. Burnout. Indian journal of Occupational and environmental medicine 2006 April;10(1):1-2.

4. Poncet MC, Toullic P, Papazian L,Kentish-Barnes N, Timsit JF, Pochard F, Chevrot S, Schlemmer B, Azoulay E. Burnout in critical care nursing staff. American journal of respiratory and critical care medicine. 2007 Apr 1;175(7):698-704.

5. Avarachan A. Say good bye to stress, enhance coping strategies. Nightingale nursing times 2010 Feb;5(11):65

6. Bakkee AB, LeBlanc PM, Schaufeli WB. Burnout contagion among nurses. J Adv Nurs 2005 Aug;51(3):276-87

7. Christine E. The intentionality of compassion energy. Holist Nurs Pract 2009 Jul-Aug;23(4):222-9.

8. Swensson A, Fridlund B. Experiences of and actions towards worries among ambulance nurses in their professional life:a critical incident study. Int Emerg Nurs 2008 Jan;16(1):35-42.

9. Palfi I, Nemeth K, Kerekes Z, Kallai J, Betlehem J. Int J Nurs Pract 2008 Feb;14(1):19-25.

10. Erickson RJ, Grove WJC. Why emotions matter:Age agitation and burnout among registered nurses. The online journal of issues in nursing [serial online] [2010 Jan 6]; Available from: URL:http://www.nursingworld.org/MainMenuCatagories/ANAMarketplace/ANAPeriodicals/OJI.

11. Rios Risquez MI, Penalver Hernandez F,Godoy Fernandez C. Burnout and perceived health in critical care nursing professionals. Enferm Intensiva 2008 Oct-Dec;19(4):169-78.

12. Rios Risquez MI, Godoy Fernandez C, Penalver Hernandez F, Alonso Tovar AR, Lopez Alcaraz F, Lopez Romera A, et al. Comparative study of burn out in Intensive care and Emergency Care nursing staff. Enferm Intensiva 2008 Jan-Mar;19(1):2-13.

13. Zenobi C, Sasoni J. Burnout and intensive care. Prof Inferm 2007 Jul-Sep;60(3):148-54.

14. Buhler KE, Land T. Burnout and personality in intensive care:an empirical study. Hosp Top 2003;81(4):5-12.

15. Olley BO. A comparative study of burnout syndrome among health professionals in a Nigerian teaching hospital. Afr J Med Med Sci 2003 Sep;32(3):297-302.

16. Chen SM, McMurray A. Burnout in intensive care nurses. J Nurs Res 2001 Dec;9(5):152-64.

17. Beumer CM. Innovative solutions:the effect of a workshop on reducing the experience of moral distress in an intensive care unit setting. Dimens Crit Care Nurs 2008 Nov-Dec;27(6):263-7.

18. Polit BF, Beck CT. Nursing research : generating and assessing guidance for nursing practice.8th ed NewDelhi,(India):Wolters Kluwer;2008.

19. Palfine SI. The characteristics of nurses' and caregivers' behaviour in different clinical settings with special attention to burnout syndrome. Orv Hetil 2008 Aug 3;149(31):1463-9.

20. Lai HL, Lin YP, Chang HK, Wang SC, Liu YL, Lee HC, et al. Intensive care unit staff nurses: predicting factors for career decisions. J Clin Nurs 2008 Jul;17(14):1886-96.

21. Lederer W, Kinzl JF, Traweger C, Dosch J, Sumann G. Fully developed burnout and burnout risk in intensive care personnel at a university hospital. Anaesth Intensive Care 2008 Mar;36(2):208-13.

22. Zeng Y. Review of work related stress in mainland Chinese nurses. Nurs Health Sci 2009 Mar;11(1):90-7.

23. Sawatzky JA. Stress in critical care nurses: actual and perceived. Heart lung 1996 Sep-Oct;25(5):409-17.

24. Turner J, Clavarino A, Butow P, Yates P, Hargraves M, Connors V, et al. Enhancing the capacity ofoncology nurses to providesupportive care for parents with advanced cancer: evaluaton of educational intervention. Eur J Cancer 2009 Jul;45(10):1798-806.

25. Pope E, Nel E, Poggenpoel M. The experience of registered nurses nursing in the general adult intensive care unit. A phenomenological qualitative research study. Curationis 1998 Jun;21(2):32-8.

A Study on Awarness among Employees on Health Care and Appraisal System Adopted in Pharmacy Companies

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ABSTRACT

Performance appraisal has been defined as any personal decision that affects the status of employee regarding their retention, termination, promotion, transfer, salary increase or decrease or admission into a training programme. This study focuses on corporate training give by the company and how it has its impact on the changing business scenario. Data are collected through questionnaire and suggestion were give to improve their appraisal procedure.

Keywords: *Technical, Appraisal, Communication & Training*

Introduction and Review

Once the employee has been selected, trained and motivated, he is then appraised for his performance. Performance appraisal is the step where to find out how effective if has been at hiring and placing employees. If any problems are identified steps are taken to communicate with the employee and to namely them. A "Performance Appraisal is a process of evaluating an employee's performance of a job in terms of its requirements. It is the process of evaluating the performance and qualifications of the employees in terms of the requirements of the job for which he is employed, for purposes of administration including placement, selection for promotions, providing financial rewards and other actions which require differential treatment among the members of group as distinguished from actions affecting all members equally viz., recruitment, selection, placement and indoctrination. The appraisal process begins with the establishment of performance standards in accordance with the organization's strategic goals. These should have evolved out of the company's strategic direction – and, more specifically the job analysis and the job description. The performance standards should also be clear and objective enough to be understood and measured. Too often, these standards are articulated in ambiguous in ambiguous phases that tell us little, such as "a full day's work" (or) "a good job". What is a "full day's work" or a "good job"? The expectations a supervisor has in terms of work performance by the employees must be clear enough in her mind so that she will be able to, at some later date, communicate these Expectations to her employees, mutually Agree to specific job performance measures and appraisal their performance against these established standards.

Improving Performance Management Practices in IT Firms of Pakistan. Results indicated that by implementing steps of performance management processes i.e. setting objectives, training, performance agreement, and performance review and reward[1]. Appraising Performance Appraisal Systems in the Federal Government: A Literature Review, The result suggests analyzing performance appraisal system structures, beyond employee survey data; it provides to the scholars with rich research opportunities [2]. A Study of Effect of Performance Appraisal on the Organization and the Employee. The findings of the research showed that there is a noticeable effect of the performance appraisal on the organization as well as on the Individual [3]. Performance Management System in UK Retail Industry: it is a case Study. Findings showed that, the organization is very powerful in employee performance management, as they are concerned for both poor and high performer with corrective action and reward respectively [4]. Efficacy of Performance Management System: An Empirical Study

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at ICICI Bank. This research has attempted to minimize the research gap existing in the field of efficacy of performance management system [5]. An evaluation of the effectiveness of performance management systems on service delivery in the Zimbabwean civil service". It was concluded that the current performance management system was not enhancing the provision of quality [6]. Compensation is given to award the employees for their efforts put in the company and to give guarantee that employees will stay in the same company and are satisfied over a longer period. It is important, as it is a systematic way to plan the compensation for the employees[7]. The significance of the seniors-subordinate rapport and the role of communication system in business are widely discussed in various studies. It highlights the workplace temperature, wetness and airflow in the company and the way it kindle a good relationship between workers, senior and subordinate[8].

Objectives of the Study

- To study whether performance appraisal system is communicated to the employees.
- To study the awareness of health care system in the Pharmacy companies.
- To study the socio-demographic factors of the employees in the Pharmacy companies
- To give viable suggestions.

Research Methodology

Research methodology is a way to solve the research problem systematically it may be understood as a science of studying how search is done scientifically study. We study the various steps that all generally adopted by a researcher in studying problem along with the logic behind them. A study, which wants to portray the characteristics of a group or individual situation, is known as **descriptive study**. The main characteristic of this method are that researcher has no control over the variables. He can only report what has happened and what is happening. The researcher approached the employees individually questions were asked and information was collected. Question were explained so as to around ambiguity. The employees were found co-operative. The data used for this study were both primary and secondary data. Sample size for this study is 100.

Statistical Tools Used:

Percentage and Corelation

Limitations of the Study

- The study is concerned only with in the Pharmacy companies, Chennai.
- The sample size is confined to 100 respondents.
- The result of the study cannot be generalized for the entire organization as it is restricted few employees.
- Some of the employees were reluctant to fill up the questionnaire, as they are feared to give negative aspects against management

Analysis and Findings

Table 1: Department

Department	No. of respondents	Percentage
Technical	44	44%
Non-Technical	56	56%
Total	100	100%

Inference: From above table it inferred that 56% of the respondents fall under the department of Non-technical, 44% of the respondents fall under the department of technical.

Table 2: Designation

Designation	No. of respondents	Percentage
Workmen	64	64%
Supervisor	28	28%
Executive	8	8%
Total	100	100%

Inference: From the above table it inferred that 64% 0f the respondents for under designation of workmen, 28% 0f the respondents fall under the designation of supervisor, 8% of the respondents fall under the designation of executive.

Table 3: Age Group of Respondents

Age	No. of respondents	Percentage
20-30	0	0%
30-35	0	0%
35-40	36	36%
Above	64	64%
Total	100	100%

Inference: From the above table it inferred that 64% of the respondents fall under the age group of above 40, 36% of the respondents fall under the age group of 35-40.

Table 4: Experience Level of Respondents

Experience Level	No. of respondents	Percentage
Less than 10	0	0%
11-20	26	26%
21-30	74	74%
Above 30	0	0%
Total	100	100%

Inference: From the above table it inferred that 74% of the respondents have more than 21-30 years of experience, 26% of the respondents have 11-20 years of experience.

Table 5: Educational Level of Respondents

Educational level	No. of respondents	Percentage
Less than 10 th	0	0%
+2	18	18%
Diploma &ITI	30	30%
Graduate & above	52	52%
Total	100	100%

Inference: From the above table it inferred that 52% of the respondents are graduated & above, 30% of the respondents are diploma or ITI, 18% 0f the respondents have +2 as their holders qualification.

Table 6: Gender

Gender	No. of respondents	Percentage
Male	90	90%
Female	10	10%
Total	100	100%

Inference: From the above table it inferred that majority of the respondents are male i.e. 90% and 10% 0f the respondents are female.

Table 7: Aware of the Employee Health Care System in Your Organization

Description	No. of respondents	Percentage
Fully aware	62	62%
Partially aware	30	30%
Little aware	8	8%
Not at all	0	0%
Total	100	100%

Inference: From the above table it inferred that 62% of the respondents are fully aware of health care system in the organization, 30% 0f the respondents are partly aware to the statement, 8% of the respondents are little aware to above said statement.

Table 8: Performance Appraisal Procedure is Communicated in Advanced to You

Description	No. of respondents	Percentage
Always	0	0%
Often	6	6%
Sometimes	68	68%
Not at all	26	26%
Total	100	100%

Inference: From the table it inferred that 68% 0f the respondents felt that performance appraisal procedure is communicated in advance sometimes only, 26% 0f the respondents says not at all, 6% of the respondents feel often to the above statement.

Suggestions

- The organization may take steps to communicate performance appraisal procedure in advance to employees.
- Mechanisms to identify the employees' potential and to reward based on the potential and performance rather than experience alone.
- Motivate subordinates through recognition and support. Performance appraisal system may help the employee to achieve individual goals and organization's goals.

Conclusion

The study on employee performance appraisal helps to identify the impact on changing business environment. The primary data was obtained through questionnaire. The data are collected from 100 respondents and analyzed using statistical tools like percentage analysis and correlation. Various suggestions had been provided to the organization to improve health care and employees' performance appraisal.

Ethical Clearance: Taken from AMET University, Chennai.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Hassan Danial Aslam, Shakeel Sarwar. Improving Performance Management Practices in IT firms of Pakistan. Journal of management research2010: 2(2).
2. Ellen V, Rubin. The performance of performance appraisal systems: understanding the linkage between appraisal structure and appraisal discrimination complaints, The International journal of human resource management. 2011.
3. Singh Sanjeet. A Study of Effect of Performance Appraisal on the Organization and the Employee. SSRN Electronic journals. 2011.
4. Miah Khasro M. Performance Management System In UK Retail Industry: A Case Study. Far East Journal of Psychology and Business. Far East Research Centre. 2012;7(2): 13-5.
5. Devina Upadhyay, Anu Gupta. Morale, Welfare measures, Job Satisfaction: The Key Mantras for Gaining Competitive Edge. International Journal of Physical and Social Sciences, 2012; 91.
6. Zvavahera, P. The Effect of Leadership on Service Delivery in Universities. Research in Higher Education Journal. 2013.
7. Srinivasan, Divyaranjini R. Impact of salary and reward on the achievement in the pharma companies. Indian Journal of Public Health Research and Development. 2010;9(10): 1139-41
8. Srinivasan, Divyaranjini R. Relationship study in work spot and communication system followed in pharma companies. Indian Journal of Public Health Research and Development. 2010;9(10): 1142-44.

A Study on Impact of Occupational Health and the Changing Business Scenario of Corporate Appraisal

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ABSTRACT

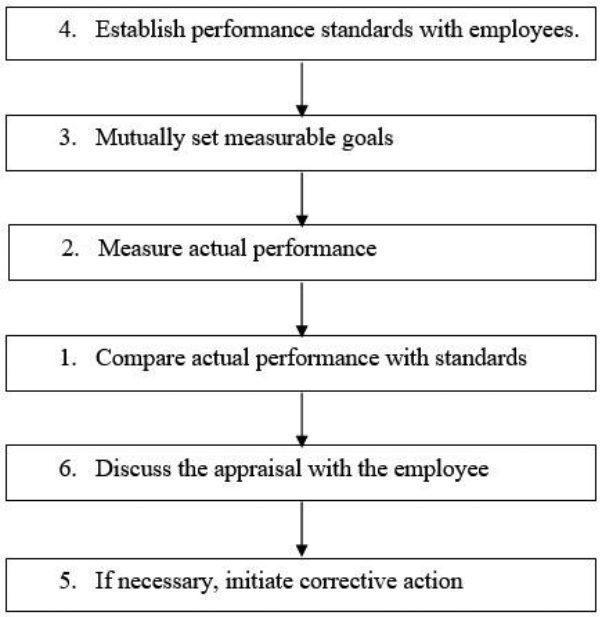
Performance appraisal has been defined as any personal decision that affects the status of employee regarding their retention, termination, promotion, transfer, salary increase or decrease or admission into a training Programme. This study focuses on corporate training give by the company and how it has its impact on the changing business scenario. Data are collected through questionnaire and suggestion were give to improve their appraisal procedure.

Keywords: *Appraisal, Satisfaction, Training & Measures*

Introduction

Improving Performance Management Practices in IT Firms of Pakistan. Results indicated that by implementing steps of performance management processes i.e. setting objectives, training, performance agreement, and performance review and reward[1]. Appraising Performance Appraisal Systems in the Federal Government: A Literature Review, The result suggests analyzing performance appraisal system structures, beyond employee survey data; it provides to the scholars with rich research opportunities [2]. A Study of Effect of Performance Appraisal on the Organization and the Employee. The findings of the research showed that there is a noticeable effect of the performance appraisal on the organization as well as on the Individual [3]. Performance Management System in UK Retail Industry: it is a case Study. Findings showed that, the organization is very powerful in employee performance management, as they are concerned for both poor and high performer with corrective action and reward respectively [4.] Efficacy of Performance Management System: An Empirical Study at ICICI Bank. This research has attempted to minimize the research gap existing in the field of efficacy of performance management system [5.] An evaluation of the effectiveness of performance management systems on service delivery in the Zimbabwean civil service". It was concluded that the current performance management system was not enhancing the provision of quality [6]. Compensation is given to award the employees for their efforts put in the company and to give guarantee that employees will stay in the same company and are satisfied over a longer period. It is important, as it is a systematic way to plan the compensation for the employees[7]. The significance of the seniors-subordinate rapport and the role of communication system in business are widely discussed in various studies. It highlights the workplace temperature, wetness and airflow in the company and the way it kindle a good relationship between workers, senior and subordinate[8].

The appraisal process:



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Methods of Performance Appraisal

Traditional Methods:

1. Ranking method
2. Comparison method
3. Grading
4. Graphic rating scales
5. Forced choice description method
6. Forced distribution method
7. Check lists
8. Free from essay method
9. Critical incidents
10. Group appraisal
11. Field Preview method

Objectives of the Study

- To study the regularity of occupational health issues followed.
- To identify the needs of performance appraisal as per the changes conducted in the organization.
- To study the satisfaction level of present method of performance appraisal.

Research Methodology

Research methodology is a way to solve the research problem systematically it may be understood as a science of studying how search is done scientifically study. We study the various steps that all generally adopted by a researcher in studying problem along with the logic behind them. A study which wants to portray the characteristics of a group or individual situation is known as **descriptive study**. The main characteristic of this method are that researcher has no control over the variables. He can only report what has happened and what is happening. The researcher approached the employees individually questions were asked and information was collected. Question were explained so as to around ambiguity. The employees were found co-operative. The data used for this study were both primary and secondary data. Sample size for this study is 100.

Statistical Tools Used: Percentage and Corelation

Limitations of the Study

- The sample size is confined to 100 respondents.
- The result of the study cannot be generalized for the entire organization as it is restricted few employees.
- Some of the employees were reluctant to fill up the questionnaire, as they are feared to give negative aspects against management

Analysis and Findings

Table 1: Undergone Occupational Health Issues

Options	No. of respondents	Percentage
Yearly	34	34%
Half Yearly	10	10%
Quarterly	56	56%
Any other	0	0%
Total	100	100%

Inference: From the above table it inferred that 56% 0f the respondents have undergone health issues quarterly, 34% of the respondents have undergone yearly, 10% of the respondents have undergone half yearly.

Table 2: Satisfaction Level of Performance Rating Scale on Industry Standard

Description	No. of respondents	Percentage
Highly Satisfied	0	0%
Satisfied	34	34%
Dissatisfied	48	48%
Highly Dissatisfied	18	18%
Total	100	100%

Inference: From the table it inferred that 48% 0f the respondents are dissatisfied with the performance rating scale, 34% of respondents are satisfied to the above statement, 18% of the respondents are highly dissatisfied to the above statement.

Table 3: Identifies Development Needs as Per the Changes in Health Issues

Description	No. of respondents	Percentage
Fully identifies	8	8%
Partly identifies	50	50%
Little identifies	28	28%
Does not identifies	14	14%
Total	100	100%

Inference: From the above table it inferred that 50% 0f the respondents felt that, the health issues to partly identify their developmental needs, 28% of the respondents felt it to be little identified, 14% of the respondents feel it does not identify, 8% of the respondents feel it help them to fully identified their development needs.

Table 4: The Most Appropriate Person to Appraise

Description	No. of respondents	Percentage
Supervisors	30	30%
Self	40	40%
Subordinates	16	16%
All of the above	14	14%
Total	100	100%

Inference: From the table it is found out that 40% of the respondents feel that the most appropriate persons to appraise is self, 30% of the respondents feel supervises are opt to the statement, 16% of the respondents feel subordinates to the above statement and about 14% of the respondents feel that all of the above statement.

Table 5: Satisfaction Level with the Present Performance Appraisal

Description	No. of respondents	Percentage
Highly Satisfied	10	10%
Satisfied	56	56%
Dissatisfied	22	22%
Highly dissatisfied	12	12%
Total	100	100%

Inference: From the above table it inferred that 56**%** of the respondents are satisfied with the present method of performance appraisal, 22% of the respondents are dissatisfied to the statement, 12% of the respondents are highly dissatisfied to the statement, 10% of the respondents are highly satisfied to the above statement.

Table 6: The Performance Rating is Based on the Overall Health Behaviour

Description	No. of respondents	Percentage
Yes	67	67%
No	33	33%
Total	100	100%

Inference: 67% of the respondents was accepted about the performance rating based on the overall health issues and its behaviour 33% of them were not accepted with the statement

Suggestions

- The organization may take steps to create awareness among the employee among the health issues.
- Mechanisms to identify the employee's potential and to reward based on the potential and performance rather than experience alone.
- Motivate subordinates through recognition and support. Performance appraisal system may help the employee to achieve individual goals and organization's goals.

Conclusion

The study on employee performance appraisal helps to identify the impact on changing business environment. The primary data was obtained through questionnaire. The data were collected from 100 respondents and analyzed using statistical tools like percentage analysis and correlation. Various suggestions had been provided to the organization to improve employees' performance appraisal.

Ethical Clearance: Taken from AMET University, Chennai.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Hassan Danial Aslam, Shakeel Sarwar. Improving Performance Management Practices in IT firms of Pakistan. Journal of management research. 2010; 2(2).
2. Ellen V, Rubin. The performance of performance appraisal systems: understanding the linkage between appraisal structure and appraisal discrimination complaints. The International journal of human resource management. 2011.
3. Singh Sanjeet. A Study of Effect of Performance Appraisal on the Organization and the Employee. SSRN Electronic journals. 2011.
4. Miah Khasro M. Performance Management System in UK Retail Industry: A Case Study. Far East Journal of Psychology and Business. Far East Research Centre. 2012;7(2): 13-5.
5. Devina Upadhyay, Anu Gupta. Morale, Welfare measures, Job Satisfaction: The Key Mantras for

Gaining Competitive Edge. International Journal of Physical and Social Sciences. 2012; 91.

6. Zvavahera P. The Effect of Leadership on Service Delivery in Universities. Research in Higher Education Journal. *2018.*
7. Srinivasan, Divyaranjini R. Impact of salary and reward on the achievement in the pharma companies. Indian Journal of Public Health Research and Development. 2010; 9(10): 1139-41
8. Srinivasan, Divyaranjini R. Relationship study in work spot and communication system followed in pharma companies. Indian Journal of Public Health Research and Development. 2010; 9(10): 1142-44.

An Empirical Study on Employee Health and Firo-B Relationship

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ABSTRACT

The Fundamental Interpersonal Relations Orientation–Behavior (FIRO-B) instrument was created in the late 1950s by William Schutz. He developed the FIRO-B theory to aid in the understanding and predicting of how high-performance military teams would work together. This article focus on deterioration of employee's health due to the poor relationship among employees. Convenience sampling techniques is used to collect data for the analysis. The study shows the importance of FIRO B relationship among the employees.

Keywords: *Interpersonal relationship, Policies, Conference and Gaps.*

Introduction

FIRO-B "Fundamental Interpersonal Relations Orientation-Behaviour" was developed by Dr Willis Schultz for the US Government during the Korean War to assess individual's inter-personal needs and how these may affect their behaviour towards others. This instrument has been ethically researched and validated in many countries and is widely used not just in team building in the work-place and management development, but also in individual and family relationship –counselling. FIRO-B "Fundamental Interpersonal Relations Orientation-Behaviour" measures how much people may need others, particularly in terms of: Inclusion and how much contact, attention and recognition you may generally want to give others in your life and receive back;

- Control, and how much influence, responsibility and structure you may seek in your relationships, whether to lead and direct others or to be led;
- Affection, or openness, and how close and warm you are with others and want others to be with you.

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Apart from being a helpful coaching and development tool to build deeper self-awareness, FIRO-B "Fundamental Interpersonal Relations Orientation-Behaviour" can also provide helpful insight into an individual's possible compatibility with others in different situations. It is therefore widely used in any situation requiring a measurement of interpersonal behaviour and the likely needs of others, including management development, team building and employee development.

There has been little research on whether providing a range of family-friendly policies raises workplace performance, there is some evidence to link individual practices with enhanced productivity. It was found that employees had greater enthusiasm for their work where they were employed on a part-time basis, which might then be expected to generate higher productivity [(3).] Certainly, some part-time workers believe that they are more productive than when they were previously working fulltime [(1)]. The fact that part-time employees may not require a paid break can also reduce costs for the employer [(5).] The researchers cite evidence that part-time workers experience lower levels of stress than full-time employees do, and have lower absenteeism rates [(2)]. Employers of part-time workers are also able to call on the skills of a larger number of employees, and retain experienced staff who wish to reduce their hours and might otherwise seek alternative employment [(2).] Given that the average cost of labour turnover has been estimated at £3,546 per employee, the savings

made by retaining employees could be significant [4]. Compensation is given to award the employees for their efforts put in the company and to give guarantee that employees will stay in the same company and are satisfied over a longer period. It is important, as it is a systematic way to plan the compensation for the employees[6]. The significance of the seniors-subordinate rapport and the role of communication system in business are widely discussed in various studies. It highlights the workplace temperature, wetness and airflow in the company and the way it kindle a good relationship between workers, senior and subordinate[7].

Objectives of the Study

- To study employees health issues and its impact onf communications system.
- To study satisfaction level of interpersonal relationship and policies exist in the organization.
- To study the opinion of training session on health issues conducted in the company.

Limitations of the Study

- Time and cost factors.
- Study cannot be generalized.
- Employees are not ready to give the correct answer fearing of action from the management,

Research Methodology

Research design is the arrangement of conditions for collection and analysis of data a systematic manner that aims to combine relevance to the research purposes with economic in procedure. Descriptive research design is used to study Interpersonal Relationship of work place in Tirupattur Co-Operative Sugar Mills Ltd. This study includes both primary data and secondary data.

- Primary data
- Secondary data

Primary data are those which are collected a fresh and for the first time and thus happen to be original in character. For this project study questionnaire method is used. The secondary data are those data which have already been collected by some else and which have already been passed through statistical process secondary data be published or unpublished data.

"A sample design is a definite plan for obtaining a sample form a given population". It refers to the technique (or) procedure that researcher would adopt in selecting item for sample, design may be as well lay down the numbers of items included in the sample i.e. the size of the sample.

The size of the represents sample is for 75 out of the total population 338. In this study the researcher has used convenient sampling techniques to select the sample size.

Data Analysis and Interpretation

Table 1: Opinion about respondents on satisfaction level on Employee health is accepted or consider by management

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Highly Satisfied	10	14
2.	Satisfied	38	49
3.	Neutral	15	20
4.	Highly Dissatisfied	8	11
5.	Dissatisfied	4	6
	Total	75	100

The above table shows that 14% of the respondents are highly satisfied, 49% of the respondents are satisfied, 20% of the respondents are neutral, 11% of the respondents are highly dissatisfied, 6% of the respondents are dissatisfied on satisfaction level on employee health is accepted or consider by the management.

Majority of the respondents are 49%

Table 2: Opinion about Respondents on Important Tool Need to Use by the Employees on Faro-B "Fundamental Interpersonal Relations Orientation-Behaviour" Aspect

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Inclusion	14	19
2.	Control	34	44
3.	Affection	27	37
	Total	75	100

From the above table, it is noted that 19% of the respondents need inclusion and 44% of the respondents

need control and 37% of the respondents need affection as an important tool need to employees on firo-b aspect. Majority of the respondents are 44%.

Table 3: Opinion about Respondents of training on Interpersonal Relationship in an Organization

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	On the Job Training	16	21
2.	External Training	24	30
3.	Conference	16	22
4.	Discussion	14	20
5.	Programmed Instruction	5	7
	Total	75	100

The above table shows that 21% of the respondents are favour of on the job training, 30% of the respondents are favour of the external training, 22% of the respondents are favour of the conference, 20% of the respondents are favour of the discussion, 7% of the respondents are favour of on the programmed instruction on health issues on training and development to employees on interpersonal relationship in an organization.
Majority of the respondents are 30%

Table 4: Opinion about Respondents Opinion Regarding the health issues

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Excellent	12	16
2.	Very Good	33	43
3.	Good	20	27
4.	Average	3	5
5.	Poor	7	9
	Total	75	100

The above table shows that 16% of the respondents are excellent, 43% of the respondents are good, 27% of the respondents are average, 5% of the respondents are below average, 9% of the respondents on training session conducting in the organization at present to increase the employee health.

Majority of the respondents are 43%

Table 5: Opinion about the respondents on the general complaints about failure of the interpersonal relationship between employees in an organization

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Take Away Precious Time of Employees by Giving Training	40	55
2.	Too Many Gaps between the Departments	35	45
	Total	75	100

From the above table, it is noted that 55% of the respondents are make the complaints by taking away precious time of employees by giving training and 45% of the respondents are make on the complaints by too many gaps between the departments in an organization on the inter personal relationship between employees.

Majority of the respondents are 55%

- 39% of the respondents were preferred 1-5 years for making betterment on inter-personal relationship with employees in an organisation.

Conclusion

The FIRO-B "Fundamental Interpersonal Relations Orientation-Behaviour" test was conducted to be find out three main interpersonal aspects of human behaviour i.e., inclusion, control and affection with 75 respondents. The study is conducted among the employees of various departments. It is concluded that there is a need to improve the interpersonal relationship between the employees in order to maintain a cordial relationship.

Ethical Clearance: Taken from AMET University, Chennai.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Lewis S. Family Friendly Employment and Policies: a Route to Changing Organizational Culture or Playing About at the Margins?. Gender, Work and Organization. 1997;4(1):. 13-3.

2. Duffy A, Pupo N. (1992), The Part-Time Experience: the Work Connection in Part Time. Paradox: Connecting Gender, Work, and Family. McClelland and Stewart Inc. Toronto.1992.

3. Skinner D. The Reality of Equal Opportunities: The Expectations and Experiences of Part-Time Staff and their Managers. Personnel Review. 1999;28(5): 425-38.

4. Institute of Personnel and Development. Staff Turnover Costs Rise by 10.5 per cent. People Management. 2000: 8.

5. Industrial Relations Services. Part-Time Workers: In from the Periphery. IRS Employment Trends. 2001;725: 4-10.

6. Srinivasan, Divyaranjini R. Impact of salary and reward on the achievement in the pharma companies. Indian Journal of Public Health Research and Development. 2010; 9(10): 1139-41

7. Srinivasan, Divyaranjini R. Relationship study in work spot and communication system followed in pharma companies. Indian Journal of Public Health Research and Development. 2010; 9(10): 1142-44.

An Enpirical Study on Environmental Hazards and Recruitment Process in Health Care Compnies, Chennai

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ABSTRACT

Importance of environmental hazard in health care companies are raising year by year, due to the problems faced by the employees in the work sport. Recruitment refers to the process of finding possible candidates for a job or function, usually undertaken by recruiters. It also may be undertaken by an employment agency or a member of staff at the business or organization looking for recruits. Advertising is commonly part of the recruiting process, and can occur through several means: through online, newspapers, using newspaper dedicated to job advertisement, through professional publication, using advertisements placed in windows, through a job center, through campus graduate recruitment programs.

Keywords: *Health care, Recruitment, Expectation & Commitments*

Introduction

Environmental hazards is increasing year by year in few companies, since the management is not considering it an important factors which affects the wellbeing of the employees. Suitability for a job is typically assessed by looking for skills, e.g. Communication skills, typing skills, computer skills. Evidence for skills required for a job may be provided in the form of qualifications (educational or professional), experience in a job requiring the relevant skills or the testimony of references. Employment agencies may also give computerized tests to assess an individual's "off-hand" knowledge of software packages or typing skills. At a more basic level written tests may be given to assess numeric and literacy. A candidate may also be assessed on the basis of an interview. Sometimes candidates will be requested to provide a résumé (also known as a CV) or to complete an application form to provide this evidence.

Recruitment and selection practices of the small and medium enterprises and make them to improve their HR practices[1]. The importance of selection and recruitment activities in the organizations must considered while designing the growth[2]. Among recruitment sources internal source of recruitment is effective compared to the external source[2]. Few researchers say that compared to the traditional recruiting sources the modern sources like referrals, casual applicants and direct approaches will benefit at large[3]. Selection procedure also should be in application to the modern techniques[4]. The literature says that employers are doing the traditional method of recruiting rather than the modern technologies. It is noted in an article that around all the organizations are using traditional recruitment sources and 30% of organizations are screening candidate's honestly[5]. According to SHRM (Society for Human Resource Management) that 15% joined in the organizations are placing false resume[7]. Some of the employers select the candidates with discrimination even though it is not supposed to be done in the organizations[6]. Compensation is given to award the employees for their efforts put in the company and to give guarantee that employees will stay in the same company and are satisfied over a longer period. It is important, as it is a systematic way to plan the compensation for the employees[8]. The significance of the seniors-subordinate rapport and the role of communication system in business are widely discussed in various studies. It highlights the workplace temperature, wetness and air flow in the company and the way it kindle a good relationship between workers, senior and subordinate[9].

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Objectives

To study the recruitment practices followed in Health Care Company.

To study the environmental hazards and expectation levels of employees in Health Care company.

To study the opening and employees referrals in the organization.

To give viable suggestions.

Research Methodology

Field of study: The research work was carried out at Health Care companies Chennai.

Research samples: Sample is chosen from the Health care companies as it portrays the needs of the researchers. Research provides an insight into any study top basically evaluate and judge the data or to find the solution to any given problem a simple is representative of a group or population that identifies itself as part of it. The sample chosen for this study is from Health Care Company Chennai.

Data Collection

The data collected contains primary data and secondary data. The primary data has been collected mainly by interviewing and also observation and audit. Secondary data has been obtained from published journals, company broachers, books, internet, etc.

Limitations:

- The study was completed within short span of time that was available.
- The report also suffers from the limitations of exhaustiveness as far as the information is concerned.
- Health Care Company in Chennai only is considered for this study.

Results and Discussion

Table 1: Are you happy with the Recruitment Process?

Recruitment Process	No. of Respondents	Percentage
Yes	68	90.7
No	7	9.3
Total	75	100

The above table shows that 91% of the employees were happy with the recruitment process followed in Health care limited.

Table 2: Did the company meet your expectations on environmental hazards?

Expectation	No. of Respondents	Percentage
Yes	70	93.3
No	--	--
Can't Tell	5	6.7
Total	75	100

It is inferred from the above table that 70% of the respondent feels that the company meet their expectation.

Table 3: Are you happy with the salary offered from the company?

Salary offered	No. of Respondents	Percentage
Yes	24	32
No	51	68
Total	75	100

It is clearly inferred that 68% of employees feels they are happy with the salary offered in the company.

Table 4: Did the company fulfill the commitments given at the time of interview on health issues?

Commitments	No. of Respondents	Percentage
Yes	42	56
No	13	17.3
Can't Tell	20	26.7
Total	75	100

The above table shows that 56% of employees feels that the company fulfills the commitment given at the time of interview, 27% employees selected the option that they can't tell, 18% feels Company does not fulfills the commitments on health issues.

Table 5: How do you come to know about openings?

Opening	No. of Respondents	Percentage
Friends	5	6.7
Internet	23	30.7
News Papers	40	53.3
Others	7	9.3
Total	75	100

The above table shows that 53% of employees came to know about the opening through newspaper advertisement given by the company, 31% feels internet is the major source to know the opening, 7 through friends. % came to know through friends.

Table 6: Do you want to refer more friends on satisfaction of health issues?

Refer friends	No. of Respondents	Percentage
Yes	58	77.3
No	8	10.7
Not Replied	9	12
Total	75	100

77% of employees selected the options that they refer to their friends about the opening and 11% feels that they won't refer to their friends.

Chi-Square Test–Health Care Versus Employee Well Being

Null Hypothesis (Ho): There is no significant relationship between health care and employee wellbeing in the company.

Level of Significance = 5%

Degree of freedom – 9

Calculated value = 34.91

Tabulated value =16.92

Since Calculated value is greater than Tabulated value.

Result

From the above analyses it is inference that the calculated the value is 34.91 greater the tabulated value is 16.92. Hence, null hypothesis is rejected.

Suggestions

- Create awareness among employees on the importance of environmental hazards.
- Increase the competence levels among the employees by giving suitable Training on the use of equipment which causes accidents.
- Provide training to the employee in Health Care company enhances the knowledge, skills and attitude.

Conclusion

Environment hazards, Recruitment and selection plays a important role in the company. The study reveals that the environment practice, recruitment process offered in the organization is very effective. The HR manager of the health care company focus on selecting the right persons through many sources viz., campus placements, internet, private agency, Government employment etc. The selection is done by evaluating the candidate skills, knowledge and abilities which are highly required to the vacancies in selected industries.

Ethical Clearance: Taken from AMET University, Chennai.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Omolo RD. Effect of Recruitment and Selection of employees on the performance of small and medium enterprises in Kisumu municipality, Kenya. International Journal of Human Resource Studies. 2012; 81-98.
2. John HB. Human Resource Management: An Experimental approach. New Delhi: McGraw-Hill, 2003.
3. Barclay LP. Recruiting Sources: Another Look. Journal of Applied Psychology. 1985; 20-8.
4. Smith MI. Personal Selection. Journal of occupational and organizational psychology. 2001; 441-72.
5. Armstrong CP. Current Recruitment and Selection Practices: A National Survey of Fortune 1000 Firms. North American Journal of Psychology. 2006; 489-96.
6. Fomunjong MG. Recruitment and Selection. University of Gothenburg. 2009.
7. Gusdorf ML. Recruitment and Selection: Hiring the Right Person. USA. Society for Human Resource Management. 2008.
8. Srinivasan, Divyaranjini R. Impact of salary and reward on the achievement in the pharma companies. Indian Journal of Public Health Research and Development. 2010; 9(10): 1139-41
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Impact of Health Care Laws and Employee Relationship, Policies in Pharma Companies–A Study

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ABSTRACT

Understanding of Health care laws, friendly responsive policies, employee loyalty, social exchange, role, and social justice plays vital role for the satisfaction theory. Gender, age, qualification differences the likely impact of the differences on satisfaction of policies and friendly relationship is discussed. Finally, it also address the likely connections among friendly policies and company policy

Keywords: *Relationship, policies, health care and friendly policy.*

Introduction

Health care plays a major role for the employees working in the factory where more hazardous elements occurs on day to day basis. Fundamental Interpersonal Relations Orientation-Behaviour is to access the employee's inter-personal needs and how it will affect the behaviour of others. This instrument has been ethically researched and validated in many countries and is widely used not just in team building in the work-place and management development, but also in individual and family relationship. It is therefore widely used in any situation requiring a measurement of interpersonal behaviour and the likely needs of others, including management development, team building and employee development.

There has been little research on whether providing a range of family-friendly policies raises workplace performance, there is some evidence to link individual practices with enhanced productivity. It was found that employees had greater enthusiasm for their work where they were employed on a part-time basis, which might then be expected to generate higher productivity [(3).] Certainly, some part-time workers believe that they are more productive than when they were previously working fulltime [(1)]. The fact that part-time employees may not require a paid break can also reduce costs for the employer [(5).] The researchers cite evidence that part-time workers experience lower levels of stress than full-time employees do, and have lower absenteeism rates [(2)]. Employers of part-time workers are also able to call on the skills of a larger number of employees, and retain experienced staff who wish to reduce their hours and might otherwise seek alternative employment [(2).] Given that the average cost of labour turnover has been estimated at £3,546 per employee, the savings made by retaining employees could be significant [(4).] Compensation is given to award the employees for their efforts put in the company and to give guarantee that employees will stay in the same company and are satisfied over a longer period. It is important, as it is a systematic way to plan the compensation for the employees[6]. The significance of the seniors-subordinate rapport and the role of communication system in business are widely discussed in various studies. It highlights the workplace temperature, wetness and airflow in the company and the way it kindle a good relationship between workers, senior and subordinate[7].

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Objectives of the Study

- To study Health care laws, policy in Health care companies.
- To study satisfaction level of interpersonal relationship and policies exist in the organization and it helps to improve the health care.
- To give a viable suggestion.

Limitations of the Study

- Time and cost factors.
- Study cannot be generalized.
- Employees are not ready to give the correct answer fearing of action from the management,

Research Methodology

Research design is the arrangement of conditions for collection and analysis of data a systematic manner that aims to combine relevance to the research purposes with economic in procedure. Descriptive research design is used to study Interpersonal Relationship of work place in Tirupattur Co-Operative Sugar Mills Ltd. This study includes both primary data and secondary data.

- Primary data
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Primary data are those which are collected a fresh and for the first time and thus happen to be original in character. For this project study questionnaire method is used. The secondary data are those data which have already been collected by some else and which have already been passed through statistical process secondary data be published or unpublished data.

"A sample design is a definite plan for obtaining a sample form a given population". It refers to the technique (or) procedure that researcher would adopt in selecting item for sample, design may be as well lay down the numbers of items included in the sample i.e. the size of the sample.

The size of the represents sample is for 75 out of the total population 338. In this study the researcher has used convenient sampling techniques to select the sample size.

Result and Discussion

Table 1: Opinion about Educational qualification of the respondents

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Sslc	20	27
2.	Hsc	11	13
3.	Diploma	19	27

Conted…

4.	Ug	25	33
5.	Pg	0	0
	Total	75	100

The above table shows that 27% of the respondents belong to the SSLC holders, 13 % of the respondents belong to the HSC holders, 27 % of the respondents belong to the DIPLOMA holders, 33% of the respondents belong to the UG holders, and 0% of the respondents belong to the PG holders.

Majority of the respondents are UG holders 33%

Table 2: Opinion about respondents on marital status of employees

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Yes	73	97
2.	No	2	3
	Total	75	100

From the above table, it is noted that 97% of the respondents are married and 3% of the respondents are unmarried.

Majority of the respondents are married 97%.

Table 3: Opinion about Working Experience of the respondents

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Below 1 Years	2	3
2.	1-5Years	4	5
3.	5-10Years	9	12
4.	10-15Years	11	15
5.	Above 15 Years	49	65
	Total	75	100

The above table shows that 3% of the respondents belong to the below 1 year of experience, 5% of the respondents belong to the 1-5 years of experience, 12% of the respondents belong to the 5-10 years of experience, 15% of the respondents belong to the 10-15 years of experience, 65% of the respondents belong to the above 15 years of experience.

Majority of the respondents are experience 65%

Table 4: Opinions about respondents maintain a friendly relationship with employees in an organization

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Strongly Agree	19	24
2.	Agree	34	45
3.	Neutral	19	26
4.	Strongly Disagree	1	2
5.	Disagree	2	3
	Total	75	100

The above table shows that 24% of the respondents are strongly agree, 45% of the respondents are agree, 26% of the respondents are somewhat agree, 2% of the respondents are strongly disagree, 3% of the respondents are disagree on maintaining a friendly relationship with employees in an organization.

Majority of the respondents are employees in an organization 45%

Table 5: Opinions about respondents on satisfaction about the company policies on health care

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Yes	51	67
2.	No	24	33
	Total	75	100

From the above table, it is noted that 67% of the respondents are satisfied and 33% of the respondents are not satisfied with the policies in the company regarding health care.

Majority of the respondents are policies 67%

Table 6: Opinion about respondents on satisfaction level on opinion on Health laws accepted or consider by management

S. No.	Particulars	No. of Respondents	Percentage (%)
1.	Highly Satisfied	10	14
2.	Satisfied	38	49
3.	Neutral	15	20
4.	Highly Dissatisfied	8	11
5.	Dissatisfied	4	6
	Total	75	100

The above table shows that 14% of the respondents are highly satisfied, 49% of the respondents are satisfied, 20% of the respondents are neutral, 11% of the respondents are highly dissatisfied, 6% of the respondents are dissatisfied on satisfaction level on opinion on health issues is accepted or consider by the management.

Conclusion

The study concludes that implementation of health care law is a must in all the factories. The fundamental Interpersonal Relations Orientation-Behaviour test was conducted to be find out three main interpersonal aspects of human behaviour i.e., inclusion, control and affection with 75 respondents. The study is conducted among the employees of various departments. It is concluded that there is a need to improve the interpersonal relationship between the employees in order to maintain a cordial relationship.

Ethical Clearance: Taken from AMET University, Chennai.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Lewis S. Family Friendly Employment and Policies: a Route to Changing Organizational Culture or Playing About at the Margins?. Gender, Work and Organization. 1997; 4(1): 13-23.
2. Duffy A, Pupo, N. The Part-Time Experience: the Work Connection in Part Time. Paradox: Connecting Gender, Work, and Family. 1992.
3. Skinner D. The Reality of Equal Opportunities: The Expectations and Experiences of Part-Time Staff and their Managers. Personnel Review. 1992;8(5): 425-38.
4. Institute of Personnel and Development. Staff Turnover Costs Rise by 10.5 per cent. People Management. 2000; 8.
5. Industrial Relations Services. Part-Time Workers: In from the Periphery. IRS Employment Trends. 2001; 725: 4-10.
6. Srinivasan, Divyaranjini R. Impact of salary and reward on the achievement in the pharma companies. Indian Journal of Public Health Research and Development. 2010; 9(10):1139-41
7. Srinivasan, Divyaranjini R. Relationship study in work spot and communication system followed in pharma companies. Indian Journal of Public Health Research and Development. 2010;9(10):1142-44.

Antioxidants and Antibodies in Structural Thyroid Diseases

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ABSTRACT

Thyroid nodules are a very frequent finding, and their prevalence steadily increases with age. Routinely clinical factors such as age, gender, and radiation history are meaningful for predicting thyroid nodules. There are few studies exploring the association of serum indexes of thyroid hormones or autoantibodies with the risk of thyroid nodules. Hence present study was undertaken with following objectives. To measure the serum markers of FT3, FT4,TSH, anti TPO antibody, anti-thyroglobulin antibody and role of Vitamin E and vitamin C antioxidants in relation with thyroid serum markers in various thyroid diseases. Correlation of these serum markers with cytological diagnosis was done. Serum analysis of thyroid hormones, autoantibodies level and FNAC was done with patients having thyroid swelling.

It was noted in present study that prevalence of positive serum autoantibodies displays geographical heterogeneity, unrelated to goitre prevalence. Autoantibodies levels are raised in autoimmune thyroid diseases and in few variants of thyroid malignancy. And it was also observed anti-Oxidants (vitamin e and vitamin c) levels were variable in thyroid disorders. To conclude autoantibodies are markedly raised in thyroiditis condition and the incidence of autoimmune thyroiditis is increasing in iodine sufficient as well as iodine deficient geographical areas. In present study it was also observed that autoantibodies levels were raised in papillary carcinoma thyroid indicating role of anti-TPO and anti-TG in etiopathogenesis. Antioxidants levels were variable and low in most of thyroid diseases suggesting its role in etiopathogenesis.

Keywords: *auto-antibodies, antioxidants, goitre, papillary carcinoma*

Introduction

Thyroid diseases are among the commonest endocrine disorders worldwide. India too, is no exception. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. Routinely clinical factors such as age, gender, and radiation history are meaningful for predicting thyroid nodules. There are few studies exploring the association of serum indexes of thyroid hormones or autoantibodies with the risk of thyroid nodules. Although thyroid hormones and autoantibodies are reported to be dependently associated with thyroid function and thyroid diseases, little attention has been paid to whether thyroid hormones and autoantibodies are associated with thyroid nodules[2]. Thyroid nodule, as an entity, is one of the most common diseases originating from the endocrine system. Thyroid nodules may be single, multiple, solid, or cystic and may or may not be functional.[3] Most thyroid nodules are benign tumours and 5% are reported as malignant.[4,5] Autoimmune thyroiditis (AT) is a common disorder of the thyroid gland. It is usually diagnosed when thyroid autoantibodies (TPOAbs/TGAbs) are detected in patients with hypothyroidism or goiter.[6]

Autoimmune diseases (AID) appear when the host immune system turns against its own antigens leading to dysfunction or destruction of tissues and organs. AID may develop in mechanisms involving immune deregulation, genetic predisposition and due to influence of environmental factors.[7] Thyroid autoimmune

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diseases like GD and Hashimoto thyroiditis (HT) affect the thyroid gland and are called autoimmune thyroid diseases (AITD).[8]

Oxidative reactions occur in all tissues and organs, thyroid gland being one, in which oxidative processes are indispensable for thyroid hormone synthesis. Both hyper- and hypothyroidism have been proven to promote cellular oxidative stress by influencing the intensity of oxygen reactions and have been shown to affect concentrations of the vitamins involved in scavenging of free radicals (usually decreasing their concentrations, although study results differ) i.e. vitamins A, C and E.[9]

Therefore, this study was undertaken to determine whether there is an association between thyroid nodules, thyroid hormones levels and thyroid autoantibodies and correlation of these markers with cytological diagnosis. Also an attempt to understand the role of Vitamin E and vitamin C antioxidants in relation in various thyroid diseases was made.

Methodology

This was prospective study carried out in 2016 at out tertiary care hospital. The study group includes patients with thyroid swelling referred to Department of Pathology for FNAC. Patients with thyroid swelling with thyroid hormone therapy or antithyroid drugs were excluded.

Early morning fasting 5ml of venous blood sample was collected in plane vaccutainer and the collected serum sample was run through Vidas biochemical analyzer based on the principal chemiluminescent immunoassay. Serum markers estimation included Free thyroxine(T4), Free tri-iodothyronine (T3), Thyroid stimulating hormone (TSH), Anti thyroglobulin antibody (AntiTG ab), Anti thyroperoxidase (anti TPO), Vitamin C and E levels (HPLC method).

Descriptive statistics as well as 95% confidence interval for a single proportion and a mean was calculated.

Results

In this one year cross sectional study total 54cases with thyroid swelling referred to cytology section were included and all cases we had serum biomarker level estimation. In present study females outnumbered males with 43 females (79%) and 11 males (21%), youngest being 12yrs and oldest age 72yrs.(TABLE I: AGE DISTRIBUTION)

Table I: Age distribution

Sex/age	10-20	21-30	31-40	41-50	51-60	61-70	>70	Total
Female	5	14	10	5	6	2	1	43
Male	1	2	3	3	1	1	-	11

The commonest thyroid disease was colloid goiter followed by thyroiditis. Lymphocytic thyroiditis was common followed by granulomatous thyroiditis and other variants. Papillary carcinoma was commonest malignant lesion affecting females in 3rd and 4th decade.(Table II)

Table II: Various thyroid diseases with sex distribution of disease

Thyroid lesion	Females	Males	Total
Goitre (colloid/nodular/toxic)	13	3	16
Lymphocytic thyroiditis	14	1	15
Granulomatous thyroiditis	2	2	4
Graves disease	7	0	7
Follicular neoplasm			
Follicular adenoma	1	2	3
Follicular carcinoma	0	2	2
Papillary carcinoma	6	0	6
Medullary carcinoma	0	1	1
Total	43	11	54

Thyroid function test (free T3, free T4 and TSH) and autoantibodies level ie anti-TPO and anti-TG levels were measured and mean calculated with SD and observed that most of thyroid disorders were in euthyroid state and auto-antibodies level were raised in autoimmune thyroiditis and few cases of papillary carcinoma. (Table III).

Table III: Thyroid function test and auto-antibodies level in thyroid diseases

Thyroid lesion	Total	TSH 0.4-4.0 muIU/ml	FT3 3.5-7.8 pmol/L	FT4 9 – 25 pmol/L	Anti TG <20 IU/ml	Anti TPO < 35 IU/ml
Goitre (colloid/nodular/toxic)	16	1.62+/-0.76	3.02+/-042	1.22+/-0.24	16.63+/-3.42	35.2+/-3.23
Lymphocytic thyroiditis	15	20.66+/-4.05	1.42+/-0.37	.53+/-0.16	43.25+/-7.46	63.26+/-5.96
Granulomatous thyroiditis	4	2.22+/-0.43	6.24+/-1.56	19.45+/-6.5	26+/-3.50	35.2+/-2.50
Graves disease	7	0.02+/-0.01	13.3+/-3.69	30+/-4.79	34.85+/-6.76	42.28+/-5.92
Follicular neopalsm;						
Follicular adenoma	3	0.83+/-0.16	4+/-1.73	11.3+/-1.67	12.6+/-3.77	25+/-0
Follicular carcinoma	2	2+/-0	3.9+/-0.1	20+/-0	12+/-1.41	17.5+/-2.42
Papillary carcinoma	6	2.1 +/- 0.54	4.65+/-1.16	13.8+/-4.16	30.5+/-14.53	33.3+/-17.93
Medullary carcinoma	1	0.9	4	13	20	39

Also anti-oxidants levels i.e. Vitamin C and Vitamin E were measured and observed that the levels were affected in thyroid abnormality with markedly reduced level in malignancy followed by thyroiditis and then goiter. (Table IV)

Table IV: vitamin C & vitamin E measurements in various thyroid diseases

Thyroid lesion	Total	Vitamin C level 0.2–2.0 mg/dl	Vitamin E level 5–20 µg/ml
Goitre (colloid/nodular/toxic)	16	1+/-0.56	9+/-1.5
Lymphocytic thyroiditis	15	0.1+/-0.01	1.75+/-0.5
Granulomatous thyroiditis	4	0.45+/-0.5	4.5+/-1.2
Graves disease	7	0.5+/-0.06	1.62+/-0.04
Follicular neopalsm;			
Follicular adenoma	3	0.2+/-0.01	4.6+/-1.3
Follicular carcinoma	2	0.2+/-0.01	3+/-1.2
Papillary carcinoma	6	0.7+/- 0.04	2.18+/-0.56
Medullary carcinoma	1	0.4	2

Discussion

Thyroid nodule is one of the most common diseases originating from the endocrine system.. Thyroid swelling may or may not be associated with functional derangement. The thyroid epithelial cells, induced by random mutations or rearrangements, will grow from a normal state to an abnormal state. This induction of growth exacerbates cellular mutagenesis that generates the nodules. [10,11] Most thyroid nodules are benign tumours and 5% are reported as malignant.[4,5] Various studies like Weimin Xu et al, J Paweł et al, showed female preponderance over males in acquiring thyroid disease, which was also noticed in our study.[3,6]

Most of autoimmune thyroid diseases are accompanied by the presence of anti-thyroid peroxidase (TPO), anti-thyroglobulin (Tg), and anti-thyroid-stimulating hormone receptor (TSHR) antibodies. However autoantibodies association with thyroid malignancy is also noted in few papillary carcinoma of thyroid. Antibodies against thyroid antigens such as carbonic anhydrase, megalin, T3 and T4, sodium iodide symporter (NIS), and pendrin have also been detected, although rarely.[12,13]

Prevalence of the thyroid autoantibody positivity is relatively high worldwide. It is well-known that

in iodine-sufficient areas there is a higher rate of AT prevalence than in iodine-deficient ones.[14] Iodine intake is probably one of the most important factors that affects thyroid autoimmunity and the incidence of AT.[15]

TPOAb and TGAb are two important thyroid autoantibodies which are commonly found in patients with thyroid diseases. [16] As shown in some previous studies, TPOAb is correlated with the severity of lymphocytic infiltration and could induce antibody-dependent cell-mediated cytotoxicity. [17,18] Boelaert K. et al.[19] reported that TPOAb was dependently associated with thyroid diseases, but little attention has been paid to whether measuring other thyroid autoantibodies, in addition to TSH, could help predict thyroid nodules in human populations.[3]

Our results showed raised antiTPO and antiTG in lymphocytic thyroiditis and papillary carcinoma which were similar to the findings of M. Parham et al. [20] in Iran. They indicated that the different prevalence of thyroid autoantibodies might explain the wide range of the reported prevalence of thyroid nodules. In addition, Eun Sook Kim et al.[21] reported that TGAb was associated with an increased risk of thyroid cancer in thyroid nodules. Similarly, other studies[22,23] also showed an analogous association with malignancy by considering positive thyroid autoantibodies as a whole, including TPOAb and TGAb.[3]

Oxidative reactions occur in all tissues and organs, thyroid gland being one, in which oxidative processes are indispensable for thyroid hormone synthesis. Both hyper- and hypothyroidism have been proven to promote cellular oxidative stress by influencing the intensity of oxygen reactions and have been shown to affect concentrations of the vitamins involved in scavenging of free radicals (usually decreasing their concentrations, although study results differ) i.e. vitamins A, C and E[9]. A study done by Salwa H. N. Al-Rubae'i and Abass K. Al-Musawi observed that there are marked variations in vitamin A, E and C in both hypothyroidism as well as hyperthyroidism.[24]

Vitamin A is a potent antioxidant and acts as a scavenger of free radicals either independently or as a part of large enzyme system. Vitamin A deficiency (VAD) has multiple effects on thyroid function in animals.[25] Hyperthyroidism is a hyper metabolic state accompanied by an increase in the total consumption of oxygen, fostering formation of reactive oxygen species and other free radicals, or the occurrence of oxidative stress. [26]

Lowered Vitamin E level is presumably due to its use in preventing free radical damage that seems more extensive in thyroid dysfunction patients.[27] Mano et al found in their study patients with various thyroid disorders that they presented elevated Vitamin E levels in their thyroid tissue.[24] Researchers concluded that Vitamin E acts as a scavenger in thyroid follicular cell dysfunction. Additional studies have demonstrated that active oxygen radicals inhibit the activity of an enzyme responsible for the conversion of T4 to the active hormone T3 and that sufficient Vitamin E levels may mitigate that effect.[28] Present study also detects low vitamin E levels in thyroid disorders.

Vitamin C is considered the most powerful natural antioxidant[29] which is capable of ''scavenging" reactive oxygen species by reducing free radicals to more stable species.[30] Present study were in good agreement with those obtained by Mohan et al.[31] and Alicigüzel et al.[32] as these studies described low levels of Vitamin C in hyperthyroidism and increase oxidative stress at the same time, it also indicate that antioxidant vitamin become oxidized and it is eventually consumed in exerting its antioxidant action.

Conclusion

Present study concludes that autoantibodies levels were raised in thyroiditis and papillary carcinoma thyroid indicating role of anti-TPO and anti-TG in etiopathogenesis. vitamin C and E levels in various thyroid diseases were variable.

Ethical Clearance: Taken from Institutional Ethical Committee (IEC)

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Unnikrishnan AG, Usha MN. Thyroid disorders in India: An epidemiological perspective. Indian J Endocrinol Metab. Jul 2011;15: 78–81.
2. Karimi F, Kalantarhormozi MR, Dabbaghmanesh MH, Ranjbar Omrani G. Thyroid disorders and

the prevalence of antithyroid antibodies in Shiraz population. Arch Iran Med. 2014; 17(1): 347 – 51.

3. Weimen X, Huo L, Chen Z, Huang H, Jin X, Deng J,et al. The Relationship of TPOAb and TGAb with Risk of Thyroid Nodules: A Large Epidemiological Study. Int. J. Environ. Res. Public Health 2017; 14(17): 7231-11.
4. Hegedus, L. Clinical practice. The thyroid nodule. N. Engl. J. Med. 2004;351: 1764–71.
5. Ezzat S, Sarti DA, Cain DR, Braunstein GD. Thyroid incidentalomas: Prevalence by palpation and ultrasonography. Arch. Intern. Med. 1994; 154: 1838–40.
6. Paweł J, Felicja L, Małgorzata SL, Marek M. Trends in the prevalence of autoimmune thyroiditis in the leading private health-care provider in Poland. Adv Clin Exp Med. 2017;26(3):497–03
7. Estienne V, Duthoit CH, Reichert M. Androgen-dependent expression of FcγRIIB2 by thyrocytes from patients with autoimmune Graves' disease: a possible molecular clue for sex dependence of autoimmune disease. FASEB J. 2002;16:1087–92.
8. Domoslawski P, Bartosz P, Lukienczuk T, Podhorska M, Piotr D. Expression of estrogen and progesterone receptors and ki-67 antigen in grave's disease and nodular goiter. Folia histochemica et cytobiologica. 2013; 51 (2):135–40
9. Sworczak KT, Wiśniewski P. The role of vitamins in the prevention and treatment of thyroid disorders. Journal of Endocrinology 2011; 62 (4):340-44.
10. Krohn K, Fuhrer D, Bayer Y, Eszlinger M, Brauer V, Neumann S et al. Molecular pathogenesis of euthyroid and toxic multinodular goiter. Endocr. Rev. 2005; 26: 504–24.
11. Erdogan MF, Gursoy A, Erdogan. Natural course of benign thyroid nodules in a moderately iodine-deficient area. Clin. Endocrinol. Oxf. 2006; 65: 767–71.
12. Marcocci C, Marino M. Thyroid-directed antibodies. In: Braverman LE, Utiger R, editors. Part II Laboratory Assessment of Thyroid Function. Philadelphia; Lippincott Williams and Wilkins (2005): 360–72.
13. Fröhlich E, Wahl R. Thyroid Autoimmunity: Role of Anti-thyroid Antibodies in Thyroid and Extra-Thyroidal Diseases. Front. Immunol. 8:521.doi : 10.3389/fimmu. 2017. 00521
14. Lind P, Langsteger W, Molnar M, Gallowitsch HJ, Mikosch P, Gomez I. Epidemiology of thyroid diseases in iodine sufficiency. Thyroid. 1998;8(12):1179–83.
15. Aghini LF, Fiore E, Tonacchera M. The effect of voluntary iodine prophylaxis in a small rural community: The Pescopagano survey 15 years later. J Clin Endocrinol Metab. 2013;98(3):1031– 39.
16. Roberts CG, Ladenson PW. Hypothyroidism. Lancet. 2004; 363: 793–03.
17. Mitchell JD, Kirkham N, Machin D. Focal lymphocytic thyroiditis in Southampton. J. Pathol. 1984;144: 269–73.
18. Kasagi K, Kousaka T, Higuchi K, Iida Y,Misaki T, Alam MS,et al.Clinical significance of measurements of antithyroid antibodies in the diagnosis of Hashimoto's thyroiditis: Comparison with histological findings. Thyroid 1996; 6: 445–50.
19. Boelaert, Horacek K, Holder J, Watkinson RL, Sheppard JC, Franklyn MCet al. Serum thyrotropin concentration as a novel predictor of malignancy in thyroid nodules investigated by fine-needle aspiration. J. Clin. Endocrinol. Metab. 2006; 91: 4295–01.
20. Parham, Aminorroaya M, Amini A. Prevalence of palpable thyroid nodule in Isfahan, Iran, 2006: A population based study. Exp. Clin. Endocrinol. Diabetes 2009; 117: 209–13.
21. Kim ES, Lim DJ, Baek KH, Lee JM, Kim MK, Kwon HS, et al. Thyroglobulin antibody is associated with increased cancer risk in thyroid nodules. Thyroid 2010; 20: 885–91.
22. Rago, Di Coscio T, Ugolini G, Scutari C, Basolo M, Latrofa F, et al. Clinical features of thyroid autoimmunity are associated with thyroiditis on histology and are not predictive of malignancy in 570 patients with indeterminate nodules on cytology who had a thyroidectomy. Clin. Endocrinol. Oxf. 2007; 67: 363–69.
23. Fiore, Rago E, Provenzale T, Scutari MA, Ugolini M, Basolo C, et al. Lower levels of TSH are

associated with a lower risk of papillary thyroid cancer in patients with thyroid nodular disease: Thyroid autonomy may play a protective role. Endocr. Relat. Cancer 2009; 16: 1251–60.

24. Salwa HN, Al-Rubaei and Al-Musawi AB. An evaluation of antioxidants and oxidative stress in Iraqi patients with thyroid gland dysfunction. Afr. J. Biochem. Res.2011; Vol. 5(7): 188-96.

25. Arthur JR, Beckett M, Mitchell JH (1999). Interactions between selenium and iodine deficiencies in man and animals. Nutr. Res. Rev; 12:55- 73.

26. Abalovich M, Liesuy S, Gutierrez S, Repetto M. Peripheral parameters of oxidative stress in Graves's disease: The effect of methimazole and 131 iodine treatment. Clin. Endocrinol. 2003; 59(3):321-327.

27. Garein H, Higueret P. The thyroid hormones in vitamin A deficient rats: Effect of retinoic acid supplementation. Ann. Nutr. Metab. 1983; 27: 495-500.

28. Brzezinska-Slebodzinska E, Pietras B (1997). The protective role of some antioxidants and scavengers on the free radicals-induced inhibition of the liver iodothyronine 5'-monodeiodinase activity and thiols content. J. Physiol. Pharmacol.1997; 48(3): 451-59.

29. Weber P, Bendich A, Schalch W (1996). Vitamin C and human health are view of recent data relevant to human requirements. Int. J. Nutr. Res.1996; 66:19-30.

30. Gumuslu S, Korgun DK, Bilmen S, Yargilcoglu p, Agar A (2000). Effect of sulfur dioxide inhibition on plasma vitamin C and ceruloplasmin in ageing rats. Ind. Health,2000; 38; 319-22.

31. Mohan KM, Bobby Z, Selvaraj N, Kumar DA, Chandra KB, Sen SK, Ramesh R, Ranganathan P (2004). Possible link between glycated hemoglobin and lipid peroxidation in hyperthyroidism. Clin. Chim. Acta.2004; 342:187-92.

32. Aliciguzel Y, Ozdem SN, Ozdem SS, Karayalcin U, Siedlak SL, Perry G et al (2001). Erythrocyte, plasma, and serum antioxidant activities in untreated toxic multinodular goiter patients. Free Radic. Biol. Med.2006; 30(6):665-70.

Enhancement of Facial Aesthetics and Function in Posteriorly Edentulous Mouth: An Orthognathic Surgical Case Report

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ABSTRACT

The goal of orthodontic treatment is to achieve a stable, functional result with enhanced aesthetics. In the discussed case report, a case with skeletal class III malocclusion is presented with compromised periodontal features and a bilaterally posteriorly edentulous mouth in upper and lower jaw. The case report highlights the corrections achieved and their stability without the support and utilization of the posterior teeth, otherwise deemed essential in the orthodontic treatment planning. The case is treated with orthognathic surgery in upper and lower jaw to improve aesthetic balance of the face. With the use of position screws, the case has been concluded displaying a stable occlusion with improved function. A four-year follow-up and an important note on retention and stability is discussed in the following case report

Keywords: *Skeletal Class III, edentulous, Orthognathic Surgery*

Introduction

The goal of an orthodontic therapy is to achieve, a stable, functional and esthetic result. Moderate to severe malocclusion require a combined treatment approach of orthodontic and orthognathic surgery. The basic objective of such malocclusions is to address the patient's complaints, establish optimal functional outcomes, and improve aesthetics.

There are three main treatment options for skeletal Class III malocclusion: growth modification, dentoalveolar compensation, and orthognathic surgery [1]. After growth cessation, treatment of skeletal Class III malocclusion in an adult requires orthognathic surgery combined with conventional orthodontic treatment aiming to improve self-esteem and achieve normal occlusion and improvement of facial aesthetics. [2]

Surgical treatment of Class III malocclusion includes, in most cases, mandibular setback, maxillary advancement, or a combination of both. The effectiveness of the surgical procedure depends on the occlusal stability achieved at the time of surgery and afterwards. In this case, the patient does not have posterior dentition which poses a challenge for the post treatment stability. Therefore, the objective of this paper is to highlight a case of a skeletal Class III malocclusion treated with orthognathic surgery, presenting with bilateral posterior edentulous dentition.

Case History and Diagnosis: A male patient aged 26 years and 1 month reported with the main complaint of poor facial aesthetics associated with mandibular and chin protrusion. On clinical examination, a concave facial profile, maxillary hypoplasia, malar deficiency with an acceptable facial proportion was observed. Family history was also reported by the patient, with a similar facial profile of his grandfather.

Intraoral examination revealed severely proclined maxillary incisors and Class III canine relationships,

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posteriorly edentulous areas in all the four quadrants. The retroclined mandibular anteriors showed slight anterior crowding with a deviation of the mandibular midline to the right side by 3mm, and there was a 5 mm of negative overjet and an overbite of 0 mm. [Figure 1]. The above findings were corroborated by cephalometric assessment as seen in Table 1. The skeletal class III malocclusion can be attributed to the inherent (genetic) deficiency of mid face with a prognathic mandible. This deficiency was further worsened by the loss of molars in all four quadrants, due to gross decay over the period, resulting in the bilaterally posteriorly edentulous mouth.

Table 1: Cephalometric analysis of the case

Variable	Pretreatment	Posttreatment
Horizontal (skeletal)		
N-A-Pg	−5°	3.5
SNA	83	78
SNB	85	77
ANB	-2	1
N-A	-4 mm	-1 mm
N-B	2 mm	-4 mm
N-Pg	4 mm	-3 mm
Vertical (skeletal and dental)		
N-ANS	47 mm	46 mm
ANS-Gn	73 mm	67 mm
PNS-N	46 mm	41.5 mm
Maxilla and Mandible		
ANS-PNS	41 mm	42 mm
Ar-Go	49 mm	43mm
Go-Pg	86 mm	81 mm
B-Pg	8.5 mm	5.5 mm
Ar-Go-Gn	155°	149°
A-B	−6	2
Max1-NF	122°	135°
Mand1-MP	71°	78°
Interincisal angle	124	138
U1-FH	117	112
U1-SN	116	111

Conted…



Figure 1: Pre treatment: Extra oral and intra-oral presentation before the treatment

Therefore, the patient was diagnosed as a case of skeletal dysplasia with class III incisor and skeletal relation with severe mid face deficiency, having posteriorly bilateral edentulous dentition with difficulty in mastication.

Treatment Objectives: The primary treatment objectives were to correct the Class III canine relationship, overjet, and overbite and specially to improve facial aesthetics.

The complementary treatment objectives were to establish good functional and stable occlusion and to improve the smile characteristics and dental aesthetics.

Treatment Plan: Control of periodontal disease was required before orthodontic therapy could be started. The aim of the presurgical orthodontic preparation was to correct the dental disharmonies. The presence of severe malocclusion, assessed through clinical examination, displaying marked deficiency in malar prominence, concave profile with steep anterior divergence and a prominent chin projection, the main goals of the orthodontic-surgical treatment were outlined as, maxillary impaction (5.5mm) and rotational advancement(4.5mm) and mandibular setback(8mm), by bilateral sagittal split osteotomy (BSSO). This was corroborated by cephalometric findings. [Table 1]. Once the orthodontic and orthognathic correction was done, the patient will be advised for rehabilitation of the posterior dentition.

Treatment Progress: After the moderate periodontal disease was brought under control. Preoperative orthodontic preparation was conducted with preadjusted 0.022 inch fixed appliances. Skeletal correction in this case planned was mandibular setback and maxillary advancement. The required negative overjet was created by controlled proclination of the lower anteriors. It was done by inverting the lower incisor brackets. Leveling and alignment with Nitinol was done and stainless steel archwires of progressively increasing thickness were performed. After leveling and alignment, 0.019 × 0.025-inch stainless steel rectangular archwires were placed in the maxillary and mandibular arches in preparation for surgery. The presurgical orthodontic phase lasted for 9 months. Following the completion of the orthodontic phase, surgical planning was done and two splints were made. The intermediate splint was fabricated to position the maxilla after the rotational advancement (impaction by 5mm and advancement by 4.5mm) and the final splint to adapt the mandible, following BSSO setback (8mm), in the desired occlusion.

Earlier case reports have discussed surgery in the edentulous mouths with use of implant supported splints and use of modified gunning splints [3, 4, 5]. However, in the present case report due to the support of the premolar and a bilaterally symmetrical occlusal table, a conventional splint design with extent limiting to premolars could be used successfully.

The surgical procedures included LeFort I osteotomy, impaction and clockwise rotation of the maxilla. This was performed to improve the maxillary retrusion, and the clockwise rotation of the maxilla was done to improve the malar deficiency. A set back of the mandible with a bilateral sagittal split osteotomy to improve the mandibular protrusion and establishan Angle Class I canine position with ideal overjet andoverbite. Genioplasty was performed to balance the effect of the other facial osteotomy on the prominence of the chin.

Rigid internal fixation with titanium plates and screws of 2 mm system was used without any intermaxillary fixation. Due to the absence of posterior teeth, to facilitate settling of occlusion by is of elastics, position screws were used. The position screws also aid in enhancing the fixation stability of miniplate systems. [6] After the orthognathic surgery, orthodontic finishing was performed to obtain better teeth interdigitation. The patient was instructed to wear vertical intermaxillary elastics for nearly three months and gradually reducing the wear time. Fixed canine to canine maxillary and mandibular lingual retainers were placed.

Treatment Results: The post treatment photographs show Class I canine relationship on both sides and normal overjet and overbite. [Figure 2] Maxillary retrusion and mandibular prognathism were eliminated, and facial aesthetics was considerably improved and more over the patient was satisfied with his teeth, profile and smile line. The cephalometric measurements also showed maxillary advancement and mandibular set back contributing to improving the patient's profile and his self-confidence level [Figure 3]. A mild midline shift was observed, however as the patient satisfaction and acceptance to therapy was maximally achieved, hence, further improvement was not considered. The case remained stable for four years after treatment with only formation of a mild imbrication due to loss of bonded

lingual retainer in lower arch and failure to follow up with the same. [Figure 4] The super imposition depicted the changes in the maxilla and mandible. [Figure 5]



Figure 2: Post treatment: Extra oral and intra-oral presentation after the treatment

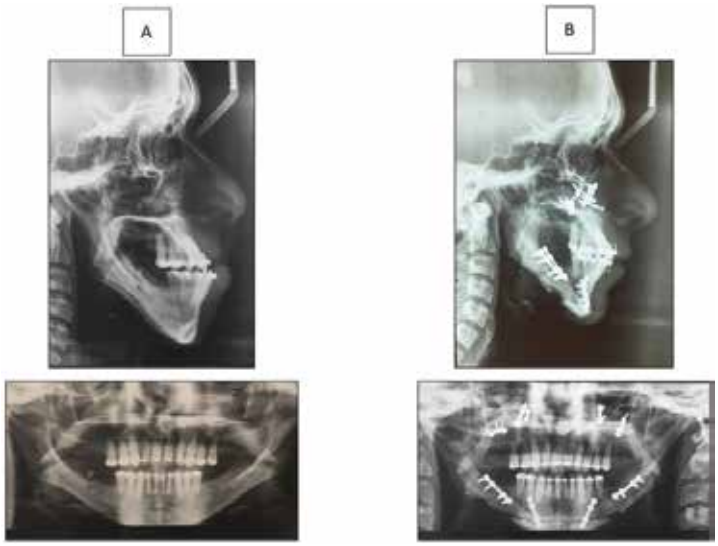


Figure 3: Roentgenographic records before and after treatment.



Figure 4: Follow up: Extra oral and intra-oral presentation 4 years after the treatment.

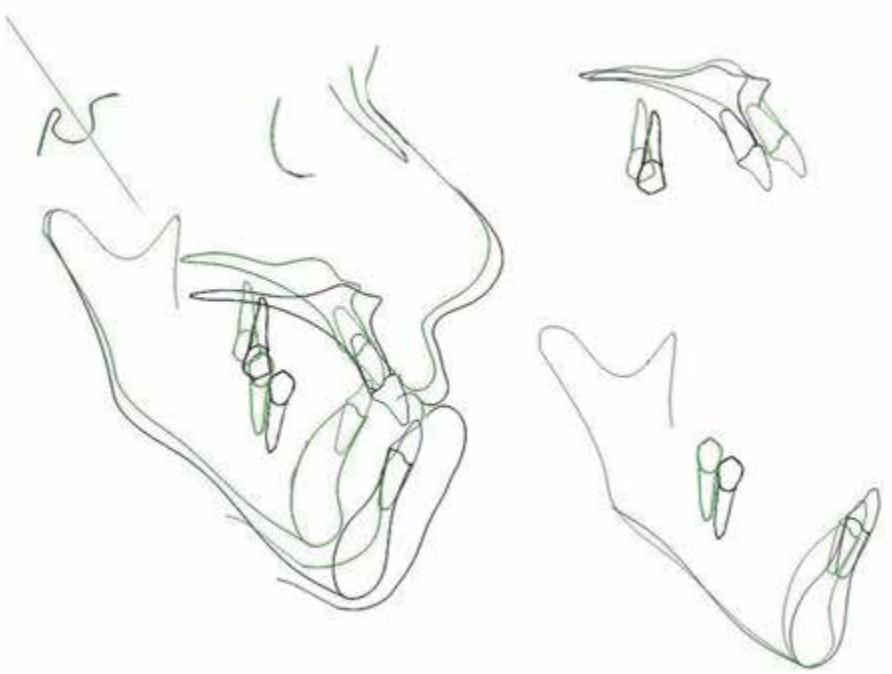


Figure 5: Superimposition tracing is depicting the changes achieved.

Discussion

When the skeletal problem compromises the facial aesthetics, the surgical-orthodontic treatment is the most indicated for patients who do not present facial growth potential. A correct diagnosis and planning, as well as an appropriate execution of the treatment plan, are determinant factors for having success and long-term stability.

From the sagittal standpoint, the parameters that indicate advancement of the maxilla with Le Fort I osteotomy are: flattening of the paranasal areas, accentuated naso-genial fold, moderate flattening of the cheek-bones, obtuse nasolabial angle, maxillary prolabium little in evidence, prominent nose with some degree of hump and tip tilted downwards. Where a larger increase in the middle third is necessary, Bell's high osteotomy may be taken into consideration, because this provides greater filling at the cheek-bones [7].

The relationship between lips and teeth, gummy smile if present, labial competence or incompetence, and the ratio between middle and lower thirds of the face, are the fundamental parameters to take into consideration for correction of vertical dimension. A vertical excess of the maxilla with labial incompetence, gummy smile, and excessive tooth exposure tends to indicate repositioning the maxilla superiorly.[8]

In the present case, the sagittal discrepancy was attended by a high LeFort I osteotomy and rotation of the nasomaxillary complex. The rotational advancement of the maxilla was done to facilitate correction of the midface deficiency. This also contributes to the correction of the inclination between the upper anterior, which tend to be severely proclined in class III skeletal malocclusion. This step, also establishes the necessary overjet for the effective mandibular setback, as required in this case. The mandibular surgical correction was planned with a combination of BSSO setback and an advancement genioplasty. Here, the genioplasty helps to achieve a balance in the vertical and sagittal direction, by establishing an aesthetic curvature, following the mandibular setback.

However, If the maxilla is moved both forward and rotated clockwise as in this case, the vertical component is likely to relapse, although the horizontal component has a good chance of being retained. [9] This can be addressed with the use of rigid internal fixation and post-surgical settling of occlusion.

The severe mid face hypoplasia was attended to by grafting in the malar region, with mandible cortical grafts obtained following BSSO.

But to achieve a stable occlusion in a patient after orthognathic surgery with no posterior teeth is

challenging. Another significant difficulty faced is during the period of orthodontic decompensation. As the support from the posterior teeth is missing, the stabilization of forces, falls largely on the anterior teeth, during the function. Therefore, the maintenance of the stable occlusion was achieved with the help of a combined approach with both surgical and orthodontic treatment, which led to a significant facial, dental, and functional improvement.

Skeletal Class III malocclusion treatment is difficult; however, an orthodontic-surgical approach for the correction of this alteration has wide acceptance among patients [10]. When aesthetics is compromised, only an orthodontic treatment is not enough. In these cases, it is necessary to combine orthodontics and orthognathic surgery to meet the patient's complaints and provide better functional and esthetic results. Another factor that contributes to the stability is the double-jaw surgery, which achieves esthetic correction with a balanced proportion. [11]

Immediately after orthognathic surgery, vertical intermaxillary elastics were introduced to obtain better teeth interdigitation. With a posteriorly edentulous mouth, use of position screws facilitated

Conclusion

Retention, in orthodontic-surgical treatment, serves the dual purpose of stabilizing tooth relationships and contributing to skeletal stability [12]. Although, the latter depends on other factors, such as correct condylar position and condition of the musculature [13]. It is, however, important to stress that good dental retention contributes to maintaining the final occlusion that was achieved surgically, guaranteeing occlusal stability, which will surely have positive repercussions on the final stability in the widest sense. In general, the methods used for retention are those used in traditional orthodontics rather than in surgical treatment. The imbrication in the lower arch seen after four years following the loss of bonded retainer also highlights the significance of a prolonged retention period in a case compromised periodontally and with loss of posterior dentition.

The combined surgical-orthodontic treatment of this case led to a significant facial, dental, and functional improvement. The dental relationship achieved was good. Facially, vertical balance and harmony were obtained, and this is perhaps the most important goal achieved, compliant with the patient's chief concern.

Conflict of Interest: None

Source of Funding: The present case report obtained no external source of funding, apart from the support of the authors' institution.

Ethical Clearance: Ethical clearance was obtained from the Institutional ethical committee ethical clearance from the institutional ethical committee (Protocol Number: 18088), Manipal Academy of Higher Education (MAHE), India.

REFERENCES

1. Proffit WR, Phillips C, Douvartzidis N. A comparison of outcomes of orthodontic and surgical- orthodontic treatment of Class II malocclusion in adults. American Journal of Orthodontics and Dentofacial Orthopedics. 1992 Jun1;101(6):556-65.
2. Eslamipour F, Najimi A, Tadayonfard A, Azamian Z. Impact of Orthognathic Surgery on Quality of Life in Patients with Dentofacial Deformities. International journal of dentistry.2017
3. Dharaskar S, Athavale S, Kakade D. Use of Gunning Splint for the Treatment of Edentulous Mandibular Fracture: A Case Report. The Journal of the Indian Prosthodontic Society.2014;14:415-1
4. Khojasteh A, Payaminia L, Alikhasi M. Implant assisted ortho-surgery in edentulous jaws: a clinical report. Clinical Case Reports.2015;3:920-26
5. Siadat H, Arshad M, Shirani G, Alikhasi M. New Method for Fabrication of Gunning Splint in Orthognathic Surgery for Edentulous Patients. Journal of Dentistry (Tehran, Iran).2012;9:262-66.
6. Shetty V, Freymiller E, McBrearty D, Caputo AA. Experimental analysis of functional stability of sagittal split ramus osteotomies secured by miniplates and position screws. Journal of oral and maxillofacial surgery. 1996 Nov1;54(11):1317-24.
7. You ZH, Bell WH, Finn RA. Location of the nasolacrimal canal in relation to the high Le Fort I osteotomy. Journal of oral and maxillofacial surgery. 1992 Oct1;50(10):1075-80.

8. Bell WH, Creekmore TD, Alexander RG. Surgical correction of the long face syndrome. American Journal of Orthodontics and Dentofacial Orthopedics. 1977 Jan1;71(1):40-67.

9. Proffit WR, Turvey TA, Phillips C. The hierarchy of stability and predictability in orthognathic surgery with rigid fixation: an update and extension. Head & Face Medicine.2007;3:21.

10. Gerzanic L, Jagsch R, Watzke IM. Psychologic implications of orthognathic surgery in patients with skeletal Class II or Class ill malocclusion. Int J Adult OrthodonOrthognath Surg.2002;17(2):75—81.

11. Mucedero M, Coviello A, Baccetti T, Franchi L, Cozza P. Stability factors after double-jaw surgery in Class III malocclusion: a systematic review. The Angle Orthodontist. 2008Nov;78(6):1141-52.

12. Graber LW, Vanarsdall RL, Vig KW, Huang GJ. Orthodontics-E-Book: Current Principles and Techniques. Elsevier Health Sciences; 2016 Jul15.

13. Hirjak D, Beno M, Kupcova I, Branislav G. The position of the condyles and functional results after bilateral sagittal split osteotomy. International Journal of Oral and Maxillofacial Surgery 2017 Mar 1;46:159.

A Study on Development of Processes for Verification and Validation in Medical Device Domain

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ABSTRACT

Medical device producers are discovering an enhancing demand to integrate the research ideas and results from traditionally separated research study locations such as medicine, software and also system engineering, and also mechanical engineering. In 2006, we carried out a study with greater than 100 firms from Europe and also the US to the present condition of the combination of software engineering modern technologies right into the medical device domain. The first outcomes of this study exist in this paper. Both software designers, as well as the medical device sector, can make use of these searchings for to much better recognize present difficulties as well as future instructions, to attain a much better combination of the areas. This study is based upon an evaluation of readily available literary works in the area of confirmation and also recognition in common software advancement, safety-critical as well as medical device software domains.

Keywords: *Medical device software, Medical device standards, verification, validation*

Introduction

Today, several medical gadgets cannot accomplish their planned usage without the software ingrained within them, which carries out a selection of features and also attributes. Studies of fads in the medical device market suggest that software is just one of one of the most definitive elements for creating cutting-edge items with brand-new capacities, as well as anticipate that the significance of software will just additionally enhance in the future [4] Research studies likewise anticipate that the r & d (R&D) financial investment in software in this market will certainly boost to 33% of the general budget plan by 2015 [2]

As the duty of software in the medical device domain enhances in value, so do the failings as a result of software problems. An evaluation of medical device remembers by the FDA in 1996 [5] discovered that software was significantly in charge of item remembers: In 1996, 10% of item remembers were triggered by software-related problems. This was up from 6% in the years 1983-- 1991. A German study on medical device remembers in the medical field shows that software is the leading reason for threats associated with building and construction as well as layout flaws of medical device items. This evaluation, from June 2006, reveals that 21% of the medical device style failings are triggered by software problems [6]. This is a boosting fad, because of the very same numbers from November 2005 program software in charge of 17% of building and construction as well as layout problems.

Provided this context, and also the basic absence of empirical understanding concerning the state of the technique relating to medical device software advancement, we made a global study. Our goal was to recognize the present objectives as well as problems of business in this market as well as exactly how they pick software methods to resolve the problems that they see. We had an interest in recognizing the level to which the requirements that have actually been created have actually been identified as well as instantiated by sector. In addition, we had an interest in evoking one of the most crucial difficulties relative to creating ingrained software for medical functions. These outcomes can be made use of by scientists as well as specialists to obtain an introduction of the degree of use of different procedures as well as devices in the domain in addition to recognizing beneficial targets for establishing brand-new methods as well as techniques targeted at more boosting software top quality in the medical industry.

The primary tasks of confirmation and also recognition are testimonials and also screening. Software screening cannot be performed up until the software is developed. Given that mistakes require to be discovered early, software examinations are performed prior to the item has actually been executed[6]. The distinction in between recognition as well as confirmation can be discussed by considering the function of the examinations executed. Making use of models to evaluate if demands can be resolved is an instance of a confirmation technique. The examination of a model by the individuals to check if the item meets their demands is an instance of a recognition technique. Simply put, we can state that the confirmation should ask-- Are you satisfying the specific demands? as well as-- Are you constructing the item right? Similarly we can state that the recognition should ask-- Are you satisfying the functional demand? -- Does this item satisfy its designated usage in the designated atmosphere? Are you constructing the best item? [8] ANSI/IEEE Sexually transmitted disease 1012 [9], Criterion for Software Confirmation as well as Recognition Program supplies a collection of minimal V&V jobs for every of the lifecycle stages in a software project.

Verification and Validation in Generic Software Development: 2 crucial referral versions which are extensively made use of in the context of software procedure renovation are the Ability Maturation Version ® Integrated (CMMI ®) as well as ISO/IEC 15504-5. They resolve the software confirmation as well as recognition procedures in the complying with means: CMMI ® according to ANSI/IEEE Sexually transmitted disease 1012-1986 suggests a lifecycle sight for confirmation as well as recognition tasks. It specifies confirmation as-- Verification that function items effectively mirror the demands defined for them. To put it simply, confirmation makes sure that _ you constructed it right' and also recognition as-- Verification that the item, as supplied (or as it will certainly be given), will certainly accomplish its designated usage ‖. As a result, recognition makes sure that you developed the appropriate item'. The confirmation and also recognition procedures become part of the engineering refines group, as well as both, are level 3 procedure locations in the organized version.

The confirmation procedure location in CMMI ® is utilized by a number of the various other procedure locations regardless of the classification they fall under. These procedures consist of Project Preparation, Dimension & Evaluation and also various other assistance procedure locations. The confirmation procedure is made use of to confirm the job items produced from the efficiency of these procedures. Confirmation is additionally made use of thoroughly in the context of the engineering procedure locations that includes Needs Monitoring, Needs Growth, Technical Option and also Item Combination. The version likewise offers assistance in regards to instances of approaches like peer evaluations, declaration protection screening, and also branch insurance coverage screening that might be made use of in this context.

The recognition procedure location incrementally verifies items versus the consumer's requirements. Recognition might be executed in the functional setting or substitute functional setting. Control with the client on the recognition demands is a crucial component of this procedure location. The range of the recognition procedure location consists of recognition of items, item elements, picked intermediate job items, and also procedures. These verified aspects might usually call for re-verification and also revalidation.

Several of the essential distinctions in between safety-critical criteria and also generic-software growth standards/models highlighted in our study were as adheres to.

Recognition tasks can be related to all elements of the item in any one of its desired settings, such as procedure, training, production, upkeep, and also assistance solutions. Like the confirmation procedure location, recognition is additionally executed throughout the training course of the item growth as it relocates from each stage of the lifecycle. As an example in the needs stage, the version recommends an evaluation, simulations, prototyping and also demos as feasible strategies for recognition. Both recognition and also confirmation tasks frequently run simultaneously and also might make use of sections of the exact same setting.

In ISO/IEC 15504-5, the objective of the confirmation procedure is to verify that each software job item and/or solution of a procedure or project correctly mirrors the given demands. The jobs concerning confirmation consist of the growth of a confirmation method, advancement of requirements for confirmation,

doing the task of confirmation, the decision of activities based upon confirmation outcomes and also making the outcomes readily available to the stakeholders.

Risk Management: Risk Management entails the recognition as well as administration of threat. Threat analysis is a feature of influence and also the chance of an event. A danger based strategy to security enables the dangers related to a system to be recognized and also focused on. The danger evaluation entails estimation of degree of threat connected with a danger.

Independence in Verification and Validation: The IEEE Criteria for Software Confirmation and also Recognition state that classic Independent Confirmation and also Recognition (IV&V) is typically needed for the advancement of software systems considered-- important ‖ in nature, i.e., those which can lead to death, objective or considerable social or economic loss. The outcomes of a research [7] highlight the distinction in mistake discovery abilities in between 2 techniques-- non-independent V&V as well as Independent V&V (IV&V). The outcomes suggest that IV&V supplied a considerable value-added element to the software advancement procedure. Self-reliance is a crucial aspect attended to by DO- 178B as well as provides certain support on the topic.

ISO/IEC15504 -5 and also Automotive SEASONING state that-- levels of freedom ‖ is something each project needs to prepare as a component of its confirmation as well as recognition technique. The FDA GPSV addresses freedom in Area 4.9, however, leaves it to the discernment of device producers on just how this is to be accomplished. ISO/IEC 62304 does not mandate self-reliance. Freedom is attended to in ISO 13485 in area 5.5.1 - Obligation as well as Authority, where it mentions:-- Leading monitoring will develop the connection of all workers that handle, execute as well as validate job influencing high quality, and also will make sure the self-reliance as well as authority essential to do these jobs.

Characterizing software development in the organization: Individuals were asked to define the academic history of most of the participants of their software advancement group. These programmers originate from techniques such as electronic devices, medical scientific researches, or electric systems engineering. Just in 36% of the instances in the medical device software developed primarily by computer system researchers. It appears that software is an integral part in several medical gadgets: 98% of the business price software as either an extremely crucial (84%) or essential (14%) element of their items. The number additionally shows that software is security- important aspect of the item in over 75% of the instances. On the other hand, for just 16% of the firms does the software plainly understand non-safety-critical capabilities.

Inquired about several of the viewed difficulties, 64% of our individuals kept in mind that discovering enough software programmers (i.e., personnel with a computer technology history) is an obstacle. At the exact same time, a lot of problems relating to software top quality originate from tasks associated with preparing the software, the capability it ought to achieve, and also exactly how it will certainly achieve it. That is, many obstacles come from needs tasks (63%) as well as style and also layout tasks (16%). In fact, executing the software code is viewed as one of the most difficult tasks by just 10% of the participants. This suggests that financial investments in demands engineering tasks appear to be most appealing to acquire considerable enhancements in the software growth procedure.

Searching in even more information moot that creates troubles for every kind of task, for requirements-related tasks 86% of the business view transforming requirements as the main problem. Missing demands (33%), as well as misunderstanding needs (39%), are likewise viewed as vital.

Connected to style as well as layout, the major obstacle is missing out on details in the layouts (53%) and also incongruities in between the intended style as well as the software (39%). Missing out on possibilities to recycle software code in an organized method (33%) as well as problems in preserving the software code (29%) are regarded as the major concerns throughout an application.

Figure 1 programs that around 50% of the business adhere to a specified procedure to execute the tasks pointed out over often, that is, they stated that they constantly or often adhere to such a procedure. (If the requirements are loosened up to consist of firms that comply with specified procedures in regarding fifty percent of their tasks after that 78% of the participants had actually a specified procedure for execution, 71% had one for style, as well as 69% had one for needs)..

Characterizing the challenges of using notations and tools: For design as well as layout, architectural layouts are one of the most often used symbols for modeling the software. These representation kinds (e.g., course layouts, bundle representations, practical block layouts) are made use of by 64% of the business often (constantly or regularly used). Series and also information circulation representations appear to have a reduced value. These layouts are regularly utilized by 40% and also 36% of the business, specifically. Extra official symbols such as state graphs and/or Time Petri Nets appear to be of reduced relevance in the medical device domain. State graphs are made use of regularly by 23% of the business, while Time Petri Webs are not used on a regular basis by any kind of participant. Just 6% of the firms periodically (i.e., much less after that half the moment) utilize these symbols

In order to record the outcomes of the different tasks associated with creating software, various symbols, as well as languages, can be used. The majority of our participants were utilizing reasonably casual symbols as well as strategies to do so. Official languages (e.g., temporal reasoning, style summary languages) defining software needs or designs were hardly ever used. For instance, for defining software demands in addition to design as well as layout, just 2% of the firms make use of official languages in all of their jobs. In 22% of the firms, official languages are utilized regularly in the demands stage and also in 14% of official languages are utilized regularly for design as well as style.

Subsequently, much less official symbols and also languages are most preferred for usage in all kinds of tasks. Figure 2 reveals the outcomes for needs engineering. There, all-natural language (e.g., English or German) is made use of in nearly all business in all tasks. In 92% of the business, this type of symbols is utilized constantly or regularly.

A comprehensive evaluation of the responses discloses that for 46% of the business all-natural language is the only symbols to define demands. Structured symbols such as usage instances are utilized by 40% of the business often (i.e., constantly or regularly utilized).

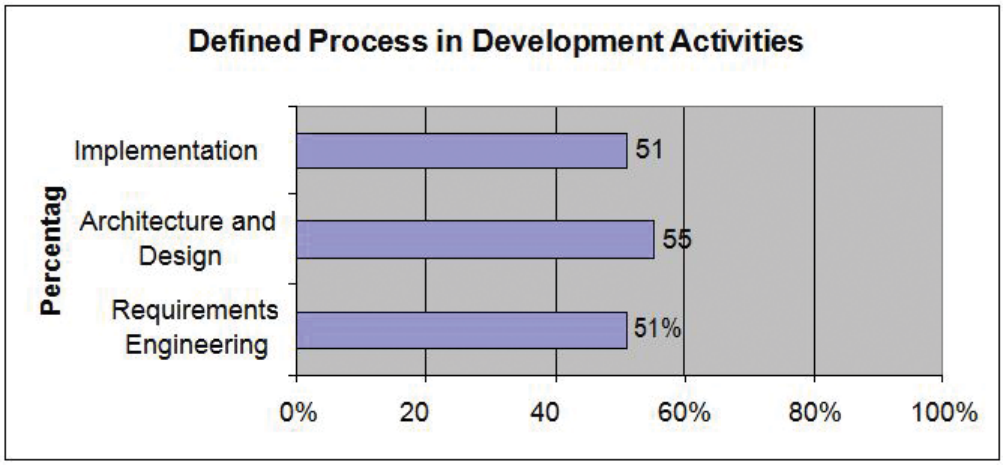


Figure 1: Defined processes for development activities

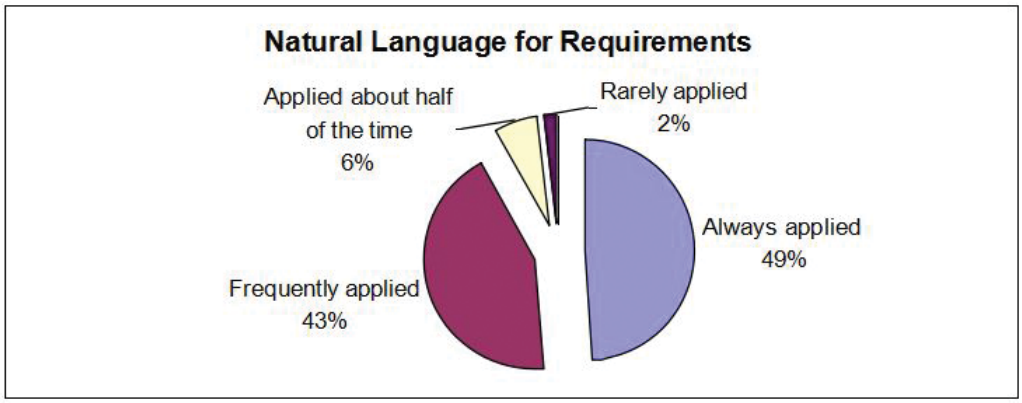


Figure 2: The usage of natural language in the requirements phase

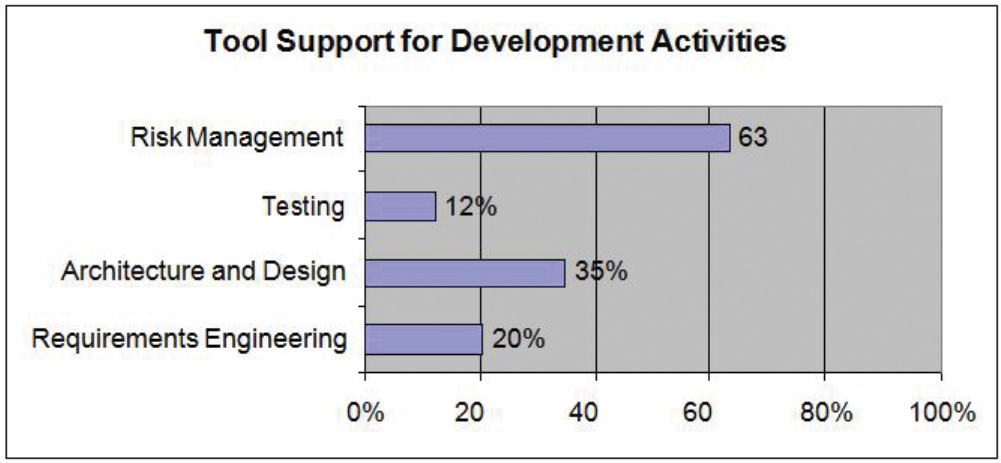


Figure 3: Usage of tools for different activities

Conclusion

Research studies like the study explained in this paper can assist to recognize concentrates for enhancements as well as enable ambitious activities to even more incorporate software engineering techniques, methods, devices, as well as criteria right into the medical device domain. The locations we have actually recognized for enhancement will certainly give advice for the meaning of the V&V procedures in Medi FLAVOR. Better to the meaning of a collection of procedures and also the linked techniques pertaining to V&V, the procedures need to be piloted in companies within the medical device software growth market.

Ethical Clearance: Not Required

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. *ISO 14971:2007 Medical devices – Application of risk management to medical devices, International Organization for Standardization Std., (2007).*
2. IEC 60601-1:2005 Medical electrical equipment – Part 1: General requirements for basic safety and essential performance, International Electrotechnical Commission Std., (2005).
3. EU, "Directive 2007/47/EC of the European Parliament and of the Council," Official Journal of the European Union, September 2007. [Online]. Available: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:(2007):247:0021:0055:en:PDF
4. IEC 62304 - Medical device software - Software lifecycle processes, International Electrotechnical Commission Std., (2006).
5. U.S. Food and Drug Administration (FDA), "General principles of soft- ware validation; final guidance for industry and fda staff, version 2.0," (Jan. 2002). [Online]. Available: http://www.fda.gov/MedicalDevices/Device Regulationand Guidance/Guidance Documents/ucm085281.htm
6. R. Jetley, S. Purushothaman Iyer, and P. Jones, "A formal methods approach to medical device review," Computer, (April 2006).vol. 39, no. 4, pp. 61–67,
7. *E. B örger and R. F. Stark, Abstract State Machines: A Method for High- Level System Design and Analysis. Secaucus, NJ, USA: Springer-Verlag New York, Inc.,(2003).*
8. P. Arcaini, A. Gargantini, and E. Riccobene, "Rigorous development process of a safety-critical system," ASM models to Java code : International Journal on Software Tools for Technology Transfer, (2015). vol. 9, no. 3, pp.1–23,
9. P. Arcaini, A. Gargantini, E. Riccobene, and P. Scandurra, "A model-driven process for engineering a toolset for a formal method," Softw Pract. Exper, (2011). vol. 41, no. 2, pp. 155–166,

A Technique for Network Design and Requirements for Medical Sensors

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ABSTRACT

In recent days, a large component of people relies on readily available material in social networks in their choices (e.g. testimonials and also comments on a subject or item). The opportunity that anyone can leave a testimonial supply a gold possibility for spammers to create spam testimonials concerning product or services for a variable rate of interests. Determining these spammers and also the spam web content is a warm subject of research study and also although a substantial variety of research studies have actually been done just recently towards this end, however up until now the approaches presented still hardly find spam evaluations, and also none reveal the relevance of each drawn out function kind. In this research, we suggest a unique structure, called NetSpam, which uses spam attributes for modeling testimonial datasets as heterogeneous information networks to map spam detection treatment right into a classification trouble in such networks. Utilizing the significance of spam attributes aid us to acquire much better cause regards to various metrics explored on real-world testimonial datasets from Yelp as well as Amazon.com internet sites. The outcomes reveal that NetSpam outshines the existing approaches and also amongst 4 groups of functions; consisting of review-behavioral, user-behavioral, evaluation etymological, individual- etymological, the remainder kind of attributes does much better than the various other classifications. It additionally concentrates on providing the current improvements in both wearable and also implantable innovations. In addition, this paper deals with the challenges that exist in the different Open Solutions Affiliation (OSI) layers and also shows future research study locations worrying about the usage of cordless sensors in healthcare applications.

Keywords: *Network, NetSpam, sensors, healthcare.*

Introduction

Online Social network sites play an influential duty in information proliferation which is thought about as a crucial resource for manufacturers in their ad campaign along with for clients in choosing services and products. In the previous years, individuals count a great deal on the composed evaluations in their decision-making procedures, and also positive/negative testimonials encouraging/discouraging them in their option of product or services. Furthermore, composed testimonials additionally assist the company to boost the high quality of their product or services. These evaluations hence have actually come to be a vital consider success of an organization while favorable testimonials can bring benefits for a firm, adverse testimonials can possibly influence integrity as well as create financial losses. The truth that any individual with any type of identification can leave remarks as a testimonial, gives an alluring possibility for spammers to create phony testimonials developed to misguide customers' point of view. These deceptive testimonials are after that increased by the sharing feature of social networks and also proliferation over the internet. The evaluations contacted alter customers' assumption of just how excellent an item or a solution are taken into consideration as spam [10], as well as are typically created in exchange for loan.

Existing System: In Existing work, the job just relies on the discover the spam testimonials and also spammers. None reveal the relevance of each removed function kind. On the various other hands, a substantial quantity of literary works has actually been released on the strategies made use of to determine spam as well as spammers along with various sort of evaluation on this subject. These strategies can be identified right into various groups; some making use of etymological patterns in message which are primarily based upon

bigram, and also unigram, others are based upon behavior patterns that count on attributes removed from patterns in individuals' habits which are mainly metadata based.

Proposed System: We suggest NetSpam framework that is a unique network-based technique which versions evaluate networks as heterogeneous information networks. The basic principle of our recommended structure is to design a provided evaluation dataset as a Heterogeneous Information Network (HIN) and also to map the trouble of spam detection right into a HIN category trouble. Specifically, we design evaluation dataset as a HIN in which testimonials are linked with various node kinds (such as attributes as well as individuals). A weighting idea is after that used to determine each attribute's value (or weight). These weights are made use of to compute the last tags for evaluations making use of both not being watched and also monitored strategies.

Literature Survey: According to RAYMOND Y. K. LAU, S. Y. LIAO, as well as RON CHI-WAI KWOK, ANQUAN XU, YUEQING XIA, YUEFENG LI, Online Social network sites, play an influential duty in information proliferation which is taken into consideration as a crucial resource for manufacturers in their ad campaign along with for consumers in picking services and products. In the previous years, individuals count a whole lot on the created testimonials in their decision-making procedures, and also positive/negative evaluations encouraging/discouraging them in their option of services and products. Furthermore, created evaluations likewise assist the company to boost the high quality of their product or services.

According to Paulo Cortez, Clotilde Lopes, Pedro Sousa, Miguel Rocha, Miguel Rio, In this Mark removal arrange isolates each HTML tag, modifications overall location names to <mytext> and also triggers an academic e-mail representation. Call reordering phase administers early setting to all marks and also determinately signing up with phase sets up the catch established names to create the perfect e-mail factor to consider. The standard emphasis of adding phase is to minimize the possibility that pork is prosperously arranged with exposed spams when the mark size of an e-mail idea is brief.

According to M. Bellare, S. Keelveedhi, as well as T. Ristenpart, Initially, utilizer gets in the location of the motion picture for obtaining the evaluations provided by the apparent detectives or, on the various other hand clients.

1. After going into the job of the movie, API obtains the website of movie testimonial as well as obtain every one of the reviews of the motion pictures providing by the locations.
2. Afterward, packaging figuring is implemented for loading the testimonials in the parties.
3. After coming to cycle the course towards clustering, the ARFF document is created, this ARFF record has the attributes needed for identifying the perfect evaluations and also circumstances of the above top qualities. This ARFF has variety of residential or commercial properties like is enigma show up in the evaluation, Resources word in research study, restriction, signs up with, evaluation, and so on.

Requirements for Wireless Medical Sensors: In order to feel organic information from the body and also send it wirelessly over a brief range, wearable and also implantable sensors are used. These sensors connect the obtained information to a control gadget endured the body or put in an obtainable area. After that, the information constructed from the control tools are communicated to remote locations in a cordless body-area network for analysis and also healing functions by including various other cordless networks for long-range transmissions[5]. Particularly, sensors made use of in cordless networks for healthcare applications need to please the list below demands:

Interoperability: Interoperability in healthcare is the level to which numerous systems and also gadgets can analyze information as well as present it in a user-friendly means. This involves that information exchange techniques will certainly permit information to be shared throughout medical facilities, drug stores, laboratories, medical professionals as well as people, no matter which supplier is made use of. The major purpose behind interoperability is to change the disorderly and also sometimes useless nature of information exchange amongst healthcare facilities. Via interoperability, information ends up being extremely mobile. Individual health and wellness information became part of a system as soon as, appears to clients anywhere they are and also whenever they require it[10].

Dependable Interaction: For medical applications that count on WBANs, the integrity of the interaction web link is of vital value. The interaction restriction ranges nodes given that the tasting prices called for by each

sensing unit are various. For instance, as opposed to sending out raw electrocardiogram (ECG) information from sensors, we can execute attribute removal on the sensing unit, as well as transfer just information concerning the specific occasion. Along with lowering the high needs on the interaction network, the minimized interaction demands conserve complete power expenses, and also subsequently boost battery life. A cautious compromise in between interaction and also calculation is essential for optimum system style [9].

Implementation

Admin Module: Admin is the primary individual of our application after login admin can add/delete items for individual purchasing and also gather the individual's testimonials. After admin can carry out spam detection for utilizing not being watched designs. In not being watched versions admin will certainly do Customer Based, Evaluation Based spam detection designs. Utilizing monitored methods admin will certainly do weight estimations.

User Module: User is the end user of our application, and we can also consider e-commerce user. User can perform search products, buy products, and submit rating and review for products. This data will deliver to admin, and this data will be our dataset to our application.

Heterogeneous Information Network (HIN): This is mapping the issue of spam detection right into a HIN category trouble. Specifically, we design testimonial dataset as a HIN in which evaluations are attached via various node kinds (such as Individual-Based, Testimonial Based). A weighting formula is after that utilized to compute each attribute's value (or weight). These weights are made use of to compute the last tags for evaluations utilizing both without supervision as well as monitored strategies.

Results



Figure 1: Home Page

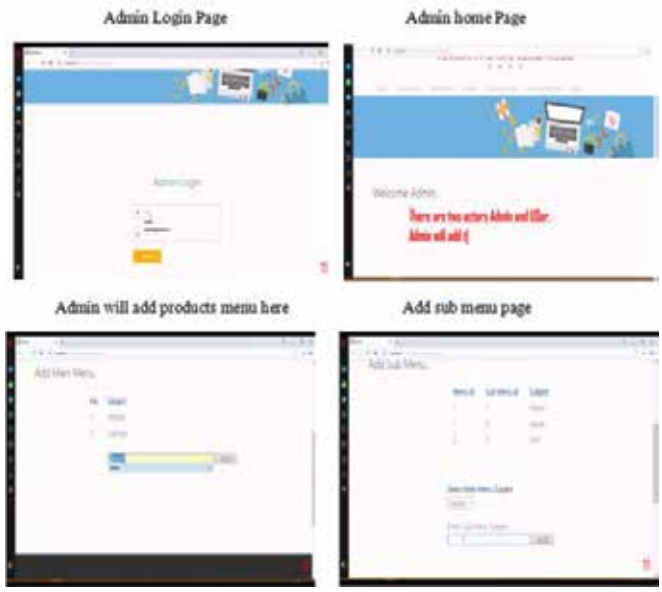


Figure 2: Admin Pages

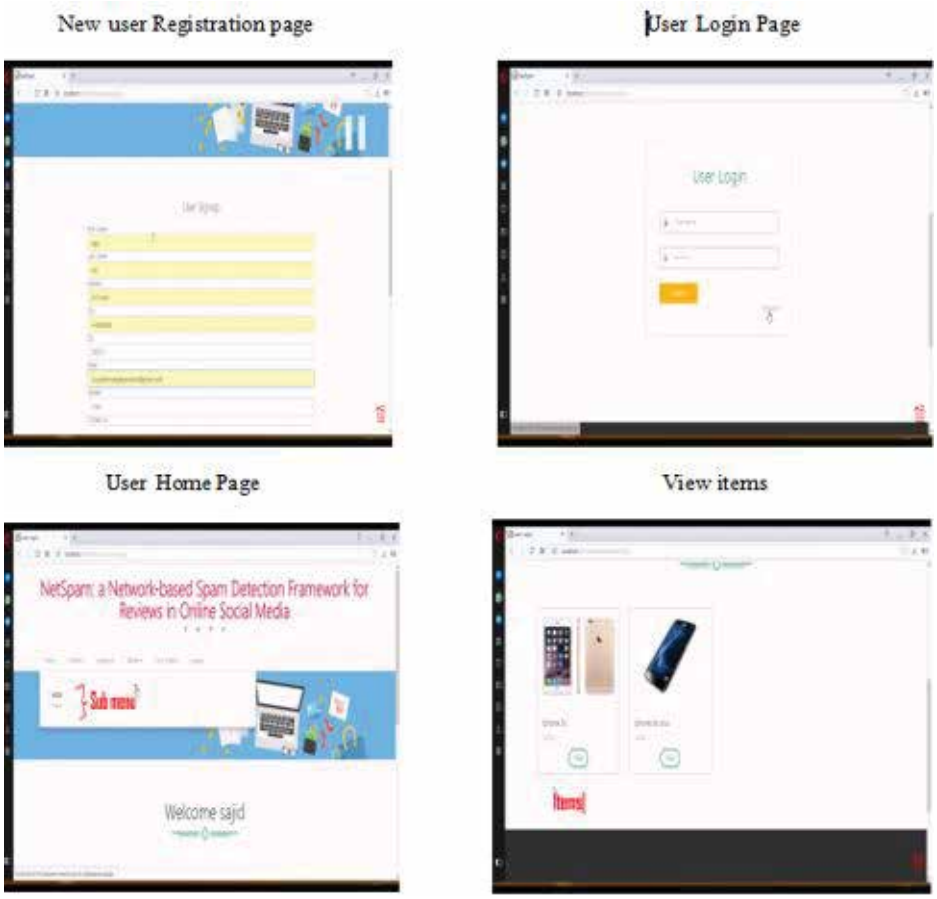


Figure 3: User Pages



Figure 4: Payment Page

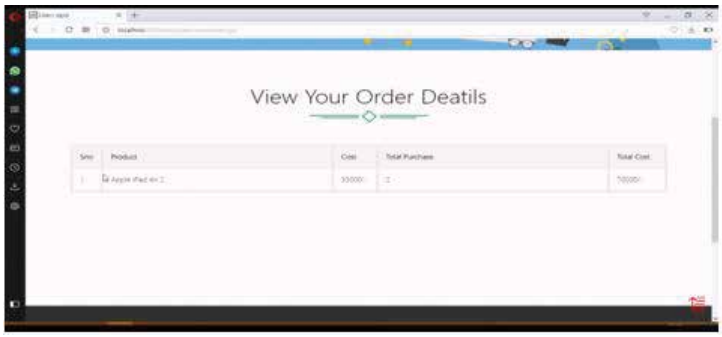


Figure 5: User orders

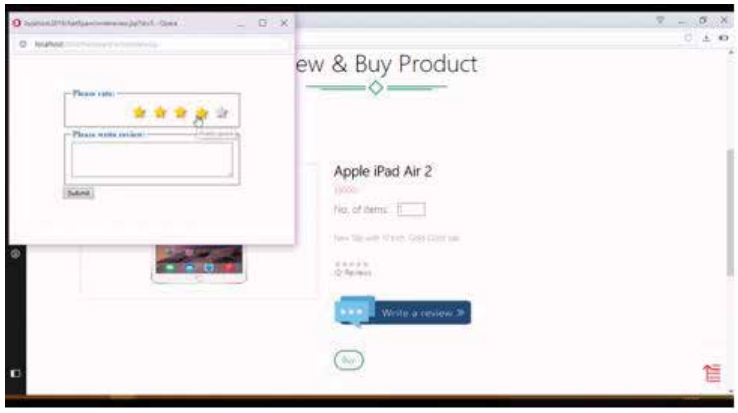


Figure 6: Rating & Reviews page

Conclusions

This research study presents a unique spam detection structure particularly NetSpam based upon a meta path principle along with a brand-new graph-based approach to identify testimonials depending on a rank-based labeling technique. The efficiency of the recommended structure is examined by utilizing 2 real-world identified datasets of Yelp and also Amazon.com web sites. Our monitorings reveal that determined weights by utilizing this meta path idea can be extremely reliable in determining spam evaluations and also brings about a far better efficiency. Furthermore, we located that also without a train collection, NetSpam can determine the relevance of each function and also it generates much better efficiency in the attributes' enhancement procedure, as well as executes much better than previous jobs, with just a handful of attributes. Furthermore, after defining 4 primary groups for functions our monitorings reveal that the testimonials behavior classification carries out much better than various other groups, in regards to AP, AUC along within the computed weights. The outcomes likewise confirm that making use of various guidance, comparable to the semi-supervised approach, have no visible impact on establishing a lot of the heavy attributes, equally as in various datasets. For a future job, meta path principle can be put on various other issues in this field As an example, a comparable structure can be made use of to find spammer areas. For the finding neighborhood, testimonials can be linked with team spammer functions and also evaluations with the greatest resemblance based upon metapth idea are referred to as neighborhoods. Additionally, using the item attributes is an intriguing future deal with this research as we utilized functions much more pertaining to identifying spammers and also spam evaluations. Additionally, while solitary networks have actually gotten substantial interest from numerous techniques for over a year, information diffusion and also web content sharing in multilayer networks is still a young study. Dealing with the trouble of spam detection in such networks can be taken into consideration as a brand-new study line in this field.

Ethical Clearence: Not Required

Source of Funding: Self

Conflict of Interest: Nil

References

1. J. Donfro, A whopping 20 % of yelp reviews are fake. http://www.businessinsider.com/20-percent-of-yelp-reviews-fake-2013-9. Accessed: 2015-07-30.
2. M. Ott, C. Cardie, and J. T. Hancock. Estimating the prevalence of deception in online review communities. In ACM WWW, 2012.
3. M. Ott, Y. Choi, C. Cardie, and J. T. Hancock. Finding deceptive opinion spam by any stretch of the imagination.In ACL, 2011.
4. Ch. Xu and J. Zhang. Combating product review spam campaigns via multiple heterogeneous pairwise features. In SIAM International Conference on Data Mining, 2014.
5. N. Jindal and B. Liu. Opinion spam and analysis. In WSDM, 2008.
6. F. Li, M. Huang, Y. Yang, and X. Zhu. Learning to identify review spam.Proceedings of the 22nd International Joint Conferenceon Artificial Intelligence; IJCAI, 2011.

7. G. Fei, A. Mukherjee, B. Liu, M. Hsu, M. Castellanos, and R. Ghosh. Exploiting burstiness in reviews for review spammer detection. In ICWSM, 2013.

8. A. j. Minnich, N. Chavoshi, A. Mueen, S. Luan, and M. Faloutsos. Trueview: Harnessing the power of multiple review sites. In ACM WWW, 2015.

9. B. Viswanath, M. Ahmad Bashir, M. Crovella, S. Guah, K. P. Gummadi, B. Krishnamurthy, and A. Mislove. Towards detecting anomalous user behavior in online social networks. In USENIX, 2014.

10. H. Li, Z. Chen, B. Liu, X. Wei, and J. Shao. Spotting fake reviews via collective PU learning. In ICDM, 2014.

Breast Self-Examination and Clinical Breast Examination: Knowledge, Practice, and Awareness Towards Breast Cancer among Females in and Around Mangaluru

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ABSTRACT

Introduction: Among the Indian women, the second highest cause for cancer related vulnerability is due to breast cancer development. According to the literature survey, though there are several contributing factors underlying the development of Breast Cancer, one of the important causes is lack of knowledge towards the identification.

Materials & Method: The present study was to reveal the level of knowledge towards Self- breast examination and clinical breast examination, among 214 females belonging to the age group from 18 to 65 years, in around mangaluru, with different levels of literacy, economic status, social exposure and field of occupation using questionnair. Study report shows that the extent of knowledge is around 36% and shows no relation with the extent of literacy levels.

Results: The results of the study showed that 97% of the participants said that they had heard about breast cancer and their sources of information were mainly health professionals/workers (98.2%), friends/ neighbors (83.5%), TV/Radio (76.0%) and printed materials (60.2%). Of the participants, 12% reported positive family history of breast cancer. 35.68% said that they have heard about BSE, among these, 72.2% were regular performers with complete knowledge of BSE, 27.80% knew the procedure but were irregular in practice. Moreover, 85.5% does not whohas to do Clinical Breast Examination and 71.5% of the participants were unaware of mammogram.

Conclusions: The study points to the insufficient knowledge of the study population about breast cancer and identified the negative influence of low knowledge on the practice of BSE.

Keywords: *Breast cancer, Clinical breast examination, Breast Self Examination*

Introduction

Breast Cancer is the most sensitive and extended issue affecting women globally with expanded rootlets. Researchers are attempting to unravel the causes and consequences of Breast Cancer to reduce the sufferings and mortality rate. Study data shows that the occurrence of breast cancer varies among countries with highest rates in the United States and Canada and the lowest in Asia. Even though it is said that prevalence of BC is more in developed countries, around 50% of breast cancer patients and 58% of deaths seen in less developed countries.[1]

There is a burning need to educate the society to know the risk factors, signs and symptoms of the disease. Because of the diversity in socio-demographic, economic, educational, lifestyle, etc. the exposure towards the knowledge remains divergent. The risk factors includes genetic Consensus document for management of breast cancer. Indian Council of Medical Research 2016. background -family history/genetic mutations, life style,

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age, pregnancy/lactation.[2] Along with other pathological/ physiological risk factors, lack of knowledge also one of the important causes to increase the rate of sufferings. Several measures to promote BC control and decrease mortality rate includes programs to develop awareness and knowledge, early detection/diagnosis, treatment ant and palliative care. Long term preventive actions may be the lifestyle modifications. Although many preventive and risk reducing measurements are in action [3], still low and middle income countries have majority of the breast cancer cases.

Education and screening are the major preventive measures under action to control the disease in most developed countries. Earlier the detection, better and effective measures can be taken and which will improve the survival rate also. The early detection includes some screening methods such as performing/practicing BSE regularly. Though mammography is the most reliable method people hesitate because of its high cost. Even in developing countries BSE is recommended [4]. According to the several earlier studies, the % of regular BSE performers is very less [5, 6] which could elevate the burden.

Thus, this project is aimed to work with society, to identify the extent of knowledge towards breast cancer with the help of questionnaire including the risk factors, self-breast examination, clinical breast examination and its significance. Questionnaire was derived from other published studies dealing with the same topic.[7-9] Early detection leads to higher probability of getting treated effectively at the earliest. This study aims at taking the women out of their veils and pay attention to the risk factors and perform screening tests regularly.

OBJECTIVE: To gather information about the knowledge of Breast Cancer, Self breast examination and clinical breast examination among women in and around Mangaluru.

Methodology

A predesigned questionnaire will be used to check the knowledge, awareness, risk factors, screening methods towards breast cancer and other screening methods. A semi-structured questionnaire covering socio-demographic information, knowledge and attitude of the respondent.

A pilot study is carried out with small group (n=20) to improve the clarity, validity and applicability of the questionnaire to improve the outcomes to facilitate the data collection. All information about the individual kept confidential.

Subjects of the Study: Total number of participants were 214.Women between 18-60yrs. with different background including staff and students from educational institutions, Bank employees, house wives and housekeeping staff in and around Mangaluru. Information is collected by distributing the questionnaire after obtaining the informed consent for willingness to participate in the study.

Exclusion Criteria: Those who are diagnosed with breast cancer

All the necessary ethical approvals carrying out the study is obtained from institutional ethical committee, Ref No. IEC KMCMLR 03-18/46.

Statistical Analysis: Data analysis was done by ELR software. Variables were categorized by percentage distribution.

Result

Socio-demographic status of participants showed in the Fig.1& 2.Among the participants, 12% of females were homemakers, all other participants were in different working category, including bank employees, technical workers, teachers and house- keeping staff.

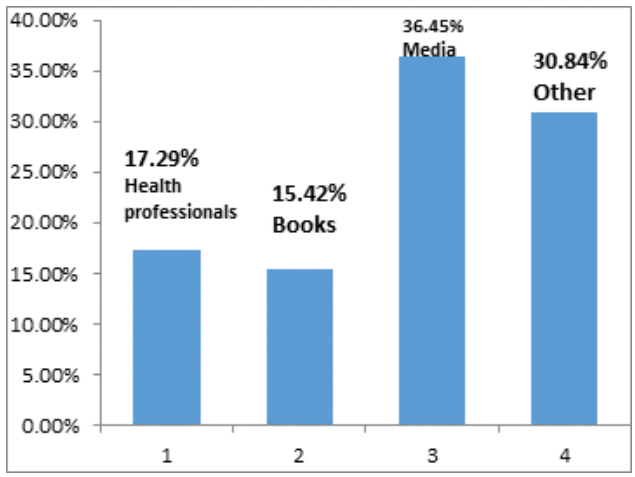


Fig. 1: Source of knowledge

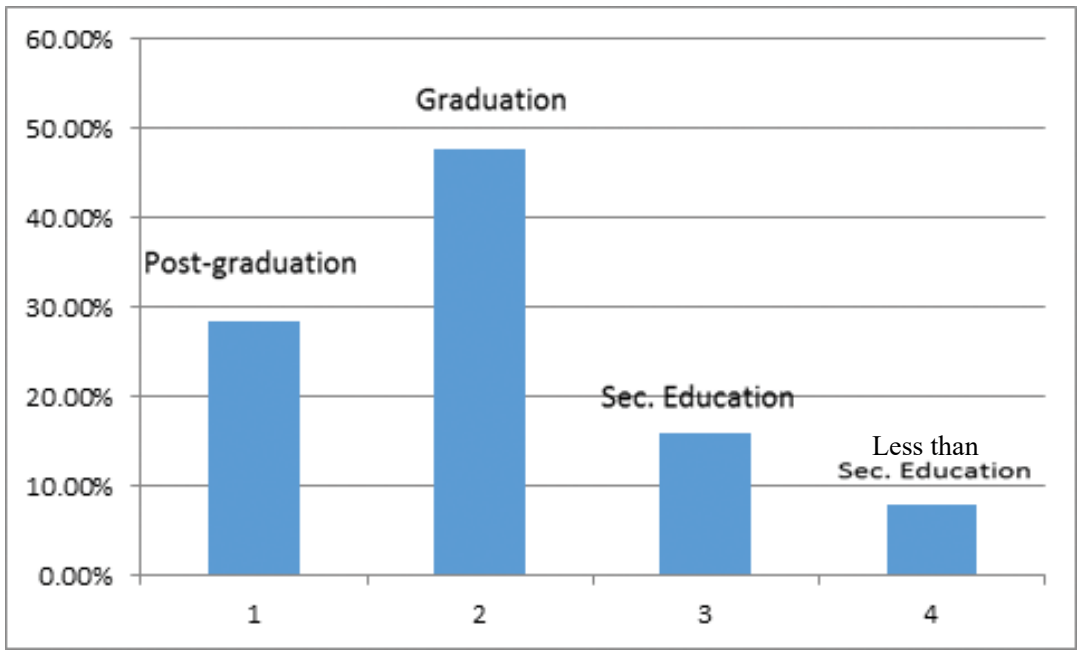


Fig. 2: Educational level

7% had reported the BC cases in their family (2%) & friend circle (5%). Rest of the study results are as follows in Table No.1 & 2

Table No. 1: Awareness, practice and importance of breast self-examination among participants

Knowledge/Practice	Response	Frequency	Percentage (%)
Heard of BSE	Yes	76	35.68
	No	137	64.32
Known it is useful in the detection of BC	Yes	48	22.54
	No	176	77.46
How often BSE to be done	Weekly	4	1.8
	Monthly	17	7.98
	Yearly	14	6.57
	Don't Know	178	83.57
Best time to do BSE	During menstruation	4	1.8
	Few days after menstruation	10	4.69
	Breast feeding	3	1.41
	No idea	196	92.02
Know how to do BSE	Yes	36	16.98
	No	176	83.4
BSE performers	Yes	36	16.9
	Regular	26	72.2
	Irregular	10	27.8
	Not	177	83.1
Knowledge about the changes can be observed in the breast cancer	New all	14	6.54
	Partially known	59	27.57
	Don't Know	141	65.89

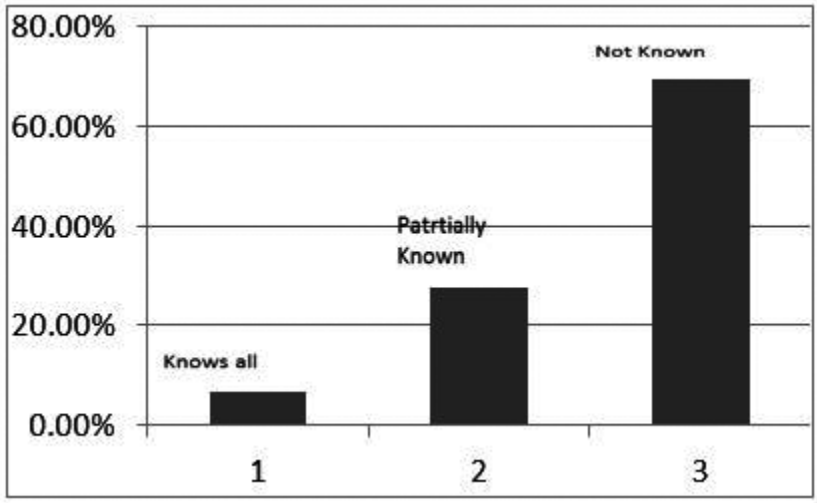


Fig. No.3: Knowledge towards the changes in the breast during cancer development

In the present study, among the participants, 14 had good knowledge about the changes, 59 had partial knowledge (one/multiple symptoms) and141 did not had any knowledge about the changes which may lead to breast cancer.

Table No. 2: Awareness, knowledge and importance of Clinical breast examination among participants

Knowledge/Practice	Response	Frequency	Percentage (%)
CBE is useful in BC detection	Yes	59	27.7
	No	154	72.3
Who has to do CBE	Doctor	43	20.19
	Trained nurse	1	0.47
	Individual	4	0.94
	Don't Know	167	78.4
How often should CBE done	Weakly	1	0.47
	Monthly	8	3.76
	yearly	19	8.92
	When abnormality found	4	1.88
	No idea	181	84.98
Heard of mammogram	Yes	58	27.23
	No	153	72.27
From which Age mammogram should be started	Puberty	3	1.41
	20yrs	44	10.33
	Yes	18	8.45
	After menopause	3	1.41
	No idea	167	78.4

Discussion

Education and screening are the major preventive measures under action to control the disease in most developed countries. Earlier the detection, better and effective measures can be taken and which will improve the survival rate also. The early detection includes some screening methods such as performing/practicing BSE regularly and is of no cost, non-invasive method. Though mammography is the most reliable method people hesitate because of its high cost. Earlier studies[10] have identified several barriers which will hinder the early detection of BC.

One of the review of literature tells that literacy status the of Indian women regarding breast cancer risk factors is low and is irrespective of socioeconomic and educational status[11].This is one of the outcome of the present study also. Though, BSE is non-invasive, inexpensive method for early detection of breast cancer, earlier study reports support the view that majority of the study population has insignificant level of awareness of BSE and practice [12,13]. It also has been reported that one of the limitations which can lead to increased suffering is lack/limited access to treatment and limited knowledge of health professionals to train the society about cancer prevention and detection in developing countries [14]. In India, elevation in the mortality rate due to breast cancer is attributed to lack of awareness, and is par with recent studies, so it is necessary to explore the drivers of awareness deficits and stigma surrounding breast cancer, both in the general population and among health care professionals, which leads to delayed diagnosis and higher stage of disease during presentation. Several study reports revealed that among the primary health care providers about risk factors, right procedure and precise time to perform the screening. There is a serious need to educate the society to enhance awareness about breast cancer, including health care professionals, as there is increased incidence and mortality rates. [15-16]

Conclusion

The current study reports low levels of knowledge of BSE and clinical breast examination in the study population. Hence, we emphasize the urgent requirement of awareness programs at all health care levels to improve knowledge about BC. Though BSE is not accepted as an early detection method for BC, this technique, if used persistently and skillfully, can serve as a useful adjunct in India since the availability of testing resource is limited. There is awful need for suitable training for health care professionals to enable them to convey the skills for proper performance of BSE to the women in community so that early detection of BC is made possible, especially in resource-constrained settings.

Ethical Clearance: Taken from from institutional ethical committee, Ref No. IEC KMCMLR 03-18/46.

Source of Funding: Manipal Academy of Higher educationE….

Conflict of Interest: Nil

REFERENCES

1. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. Estimated Cancer Incidence, Mortality and Prevalance Worldwide in 2012. 2012. v1.0 (IARC Cancer Base No. 11).
2. Consensus document for management of breast cancer. Indian Council of Medical Research 2016.
3. World Health Organisation. Breast cancer: prevention and control. Geneva, Switzerland: WHO; 2013.
4. The American Cancer Society. Breast Cancer Prevention and Early Detection. 2014. Available: http://www.cancer.org/cancer/breastcancer/moreinformation/breastcancerearlydetection/breast-cancer-early-detection-acs-recs-bse. Last accessed 27 February, 2015
5. Godfrey K, Agatha T, Nankumbi J. Breast cancer knowledge and breast self-examination practices among female university students in Kampala, Uganda: a descriptive study. Oman Medical Journal. 2016;31(2):129-34.
6. Akhtari-Zavare M, Juni MH, Ismail IZ, Said SM, Latiff LA. Barriers to breast self examination practice among Malaysian female students: a cross sectional study. SpringerPlus. 2015;4(692):1-6.
7. Naif AA, Malik S A, Barjas M A, Gamal M, Medhat KE. Knowledge, awareness, and practices concerning breast cancer among Kuwaiti female school teachers. Alexandria Journal of Medicine. 2012: 48, 75–82.
8. Rabia L. Knowledge and attitude of Saudi female students towards breast cancer: A cross-sectional study. Journal of Taibah University Medical Sciences. 2014: 9(4), 328-334.
9. Nwaneri A, Osuala EO, Okpala PU, Emesowum AC, Iheanacho P. Knowledge and awareness of breast cancer among rural women in Umuowa Orlu Local Government Area Imo State, South East, Nigeria. Nigerian J Clin Pract. 2017: 20(4), 489-494.
10. Kadam YR, Quraishi SR, Dhoble RV, Sawant MR,Gore AD. Barriers for early detection of cancer amongst urban Indian women: a cross sectional study. Iranian jour-nal of cancer prevention. 2016;9(1):e3900.

11. Gupta A, Shridhar K, Dhillon PK. A review of breast cancer awareness among women in India: Cancer literate or awareness deficit? European Journal of Cancer.2015: 51, 2058– 2066.

12. Pujar TV, Linganagouda G, Benakanakondi S. Assessing the importance of breast self examination and breast cancer awareness among health care professionals.J Evid Based Med Healthc 2015;2: 4201–8.

13. Neha T, Yugantara R. Kadam, Randhir V. Dhobale, Alka DG. Barriers for early detection of cancer amongst Indian rural women. South Asian J Cancer 2014; 3(2): 122–7.

14. The global summit on international breast health: Optimizing healthcare delivery. 7. Seattle, WA: Breast Health Global Initiative; 2010. [Last accessed on 2015 Nov 06]. Breast Health Global Initiative. Available from: http:\\www.bhgi.info)

15. Babu G., Lakshmi S.B., Thiyagarajan J.A. Epidemiological correlates of breast cancer in South India. Asian Pac J Cancer Prev 2013;14(9):5077–5083

16. Arif S, Baloch Q, Zaheer F, Agheem R, Ariff M, Ahmed M. The adequate breast cancer knowledge assessment: A cross-sectional study done among nonmedical women of Karachi. J Educ Health Promot. 2018;7:169. Published 2018 Dec 28. doi:10.4103/jehp.jehp_177_18. Published online 2018 Dec 28. doi: 10.4103/jehp.jehp_177_18

Emotional Intelligence Level of Students and Mental Ability Belonging to Rural and Urban Backgrounds

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ABSTRACT

The students originate from different histories such as rural as well as urban areas. The students undertake a great deal of stress to withstand today's competitors, primarily currently of their facility phase in occupation. In order to deal up with the tension as well as stress these days affordable globe, the students must have an equilibrium in their psychological security. Emotional Intelligence is a kind of intelligence that has actually been greatly researched in social scientific researches, psychology and also service field, yet not in the instructional field. The here and now research aids us to learn about the emotional intelligence degrees of students in the message college graduation particularly the students originating from rural and also urban areas. It is relative research of emotional intelligence degrees of students coming from rural and also urban histories, to ensure that it is practical to evaluate the student's emotionality, wellness, sociability as well as self-control.

Keywords: *emotionality, Mental Ability, Emotional Intelligence*

Introduction

The economic climate has actually ended up being international which is driven by advancements and also innovation and also Organizations need to change themselves to offer brand-new consumer assumptions. Today' economic climate is considerably really unsure with difficult chances. It is based upon ability expertise as well as efficiency driven. To be an effective leader the here and now circumstance needs regard, engagement, empowerment, synergy as well as self-administration. With the above difficulties, a brand-new type of leader is required to lead service via disturbance. Today's Supervisors in their companies do this job. It's being extensively thought by the public that psychological and also social capability is as essential, or perhaps more crucial, than typical measurement of intellectual capability and also individuality[3]. Emotional intelligence is specified as "the composite collection of abilities that make it possible for an individual to handle himself/ herself as well as others". The relevance of Emotional Intelligence is significantly being acknowledged and also examines throughout numerous occupations. Taking care of feelings in social contexts are plainly crucial for success in a range of social; in addition to career-related domain names.

An emotional intelligence quotient, or EQ, is the brand-new term which is being made use of a growing number of in the personnel's divisions and also it is additionally making its trip in the direction of the exec board areas. This post will certainly offer necessary info on what EQ is exactly how it is various from individuality, and also just how it has actually confirmed to affect the rural and also urban students in their scholastic efficiency.

Emotional Intelligence (EQ) is the arising principle. There is a debatable inquiry emerging from lots of scientists whether the EI can be found out as well as educated as well as whether this EI will certainly aid the students' to prosper in college and also in life.

EI is the idea which is extremely functional in nature as well as appears to be extremely vital for the growth of human life. The scientists still rely on the ideology that intelligence, as well as success, are symmetrical to each other now they are not seen similarly. The outcomes of the students are not due to the inconsistencies from the essentials. The here and now day concentrate on the success of the student not just on their thinking abilities too on the self-understanding, feelings, and also social abilities.

In the last 20 years, Numerous Knowledge concept was presented by Howard Gardner in 1983 as well as the Emotional Intelligence concept by Bar-On[5]. This concept of emotional intelligence provided a brand-new facet that the intelligence quotient (INTELLIGENCE) is not the only step for success. Emotional intelligence is the middle of estimates with the sight factor of education and learning which highlights the very best in students not only simply in scholastic success. It defines that the EQ proficiencies are required to improve the individual abilities resulting in success in academics. The students that are exceptional academically appear that the education and learning system has actually not supplied them based on lead their life gladly as well as to form them, efficient people. According to this concept finding out the abilities which are essential to operating efficiently in life are more crucial than attaining academically. A number of the EQ optimists think that the students that attain academically have actually not yet created their emotional intelligence and also are not most likely able to accomplish their complete ability The students do execute well unless as well as up until they are participated in creating their feelings, finding out designs, individuality, as well as inspiration concept finding out the abilities which are required to operate properly in life, are more crucial than attaining academically. A lot of the EQ optimists think that the students that accomplish academically have actually not yet established their emotional intelligence as well as are not most likely able to accomplish their complete ability.

Review of Literature

[5] examined the result of emotional intelligence on scholastic efficiency of 246 teenage students. His evaluation records disclose that the students with high degree of emotional intelligence do well fairly with that said of the students having reduced degree of emotional intelligence.

[8] checked out the connection between emotional intelligence as well as scholastic success in non-typical university student. As the students have various cognitive capabilities, the duty of emotional intelligence can be much better comprehended in their scholastic accomplishment His evaluated that emotional intelligence was dramatically relevant with the students Grade Point Average, cognitive capabilities as well as age.

[9] checked out the effect of emotional intelligence on the effective shift from senior high school degree to the college degree. The outcomes of their research disclosed that academically effective students had significantly greater degrees of numerous various psychological as well as social proficiencies. From this research, they determined the significance of emotional intelligence in the effective shift of students from secondary school to college.

Mestre[10] carried out a study on 127 Spanish teens, the capacity to comprehend as well as handle feelings, evaluated by an efficiency action of emotional intelligence (the MSCEIT), and also associated favorably with educator scores of scholastic success and also adjustment for both men and also ladies. The research exposed that the psychological capacities are favorably associated amongst the ladies with peer relationship elections as well as likewise discovered that EI is favorably connected with instructor rankings of scholastic adjustment amongst children and also peer relationship elections amongst students. The example of students was arbitrarily selected. The outcome of the research was that emotional intelligence, self-idea as well as the esteem of the students was favorably related to their scholastic accomplishment.

[7] researched the connection in between the 5 measurements of emotional intelligence i.e., self understanding, psychological monitoring, self-motivation, compassion, social abilities and also scholastic efficiency. The record exposed that there is substantial connection in between self-awareness, psychological monitoring as well as compassion with scholastic efficiency.

[5] has actually carried out a research study as well as checked out that just how Emotional intelligence have crucial medical and also restorative ramifications as it is raised from a combinations of research study searchings for on just how individuals assess, interact and also utilize feelings.

[4] has actually mentioned that there hasn't sufficed research study to plainly recognize the influence of Emotional intelligence on the scholastic success.

[8] performed a study on 500 IX basic students of Kannada language to recognize the influence of emotional intelligence on the scholastic accomplishment.

Emotional Intelligence and Its Origins: The locations of the rate of interest which have actually been examined throughout the human background and also located to be recursive are Human intelligence as well as a sensible idea. There were numerous different analyses of these principles. Thinking about the altering nature of these 2 ideas, the present interpretation of intelligence is a brainpower (or established of brainpower) that allows the acknowledgment, finding out memory for, and also capability to factor concerning a specific type of details". There is no person solitary and also unitary kind of intelligence, yet a collection of them, as well as component of this knowledge, concentrates on the means people see feelings as well as just how they respond to them; this goes to the core rate of interest of EQ.

In 1920's the standard idea behind the EQ was established by Eduard Thorndike while he was collaborating with social knowledge; as a precursor to the detailed concept of intelligence. The social intelligence meaning provided by [6] was as "the capacity to recognize males and females, young boys as well as ladies-- to act intelligently in human relationships".

These were the first actions which led the way for the development of EQ. Thorndike did not develop any kind of academic idea of social intelligence; he utilized this as a picture to expose that the intelligence can be revealed in various means. The suggestion of numerous knowledge was additionally established by [10]. from the instructional viewpoint, he determined 7 elements to intelligence:

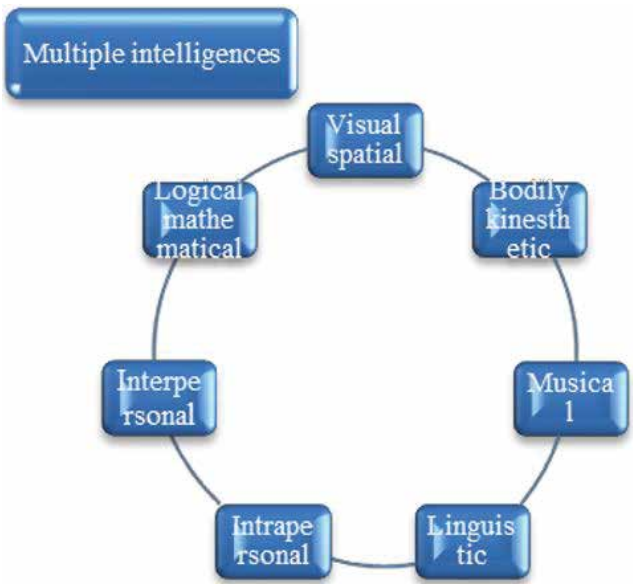


Figure 1: 7 Elements to Intelligence

What Is Emotional Intelligence?: Emotional intelligence is among one of the most extensively reviewed subjects in an instructional job and also business psychology. [9] compete that emotional intelligence is not a solitary quality or capacity instead, a compound of distinctive feeling thinking capabilities. Regarding feelings contain acknowledging as well as translating the definition of numerous moods, along with their connections to various other sensory experiences. Comprehending feelings entail an understanding of exactly how fundamental feelings are mixed to create complicated feelings. Managing feelings includes the control of feelings in oneself and also in others. A person's emotional intelligence is an indication of just how she or he regards, comprehends and also controls feelings. [5]has actually recommended various perception of intelligence, which he calls effective intelligence. Effective intelligence entails 3 unique sorts of brainpower: analytic, innovative and also useful. Emotional intelligence was specified as the capacity to view feeling, incorporate feeling to promote the idea, recognize feelings, as well as to manage feelings to advertise individual development.

EQ is specified as a collection of expertise showing the capability one needs to identify his/her behaviors, state of minds, and also impulses, and also to handle them finest according to the circumstance. Usually, "emotional intelligence" is taken into consideration to entail psychological compassion; interest to, as well as discrimination of one's feelings; precise acknowledgment of one's very own and also others' state of minds; state of mind administration or control over feelings; action with ideal (flexible) feelings as well as practices in different life circumstances (particularly to stress and anxiety as well as tight spots); as well as harmonizing of truthful expression of feelings versus politeness, factor to consider, and also regard (i.e., property of great social abilities as well as interaction abilities)..

Slf-Motivation: Individuals with a high level of emotional intelligence is normally inspired. They want to postpone prompt outcomes for long-lasting success. They're extremely effective, enjoy an obstacle, as well as are really efficient in whatever they do.

Self-Awareness: Individuals with high emotional intelligence are typically extremely independent. They recognize their feelings, and also due to this, they do not allow their sensations to rule them. They're positive-- due

to the fact that they trust their instinct as well as do not allow their feelings to leave control. They're additionally happy to take a straightforward consider themselves. They recognize their toughness, as well as weak points, as well as they, service these locations so they can execute far better. Lots of people think that this self-awareness is one of the most vital parts of emotional intelligence.

Compassion: This is possibly the second-most essential aspect of emotional intelligence. Compassion is the capability to relate to as well as recognize the desires, requires, as well as point of views of those around you. Individuals with compassion are proficient at identifying the sensations of others, also when those sensations might not be evident. Because of this, understanding individuals are normally superb at handling connections, paying attention, as well as connecting to others. They stay clear of stereotyping as well as evaluating as well swiftly, and also they live their lives in an extremely open, truthful means.

Social Abilities or taking care of connection: It's typically very easy to talk with and also like individuals with excellent social abilities, one more indicator of high emotional intelligence. Those with solid social abilities are generally group gamers. As opposed to concentrating on their very own success initially, they aid others to create as well as radiate. They can handle conflicts, are superb communicators, as well as are masters at the structure as well as preserving partnerships.

The today research study has actually utilized the concept of EI which is based upon the concept of EI as recommended by Goleman. The EI design taken on in this research study contains 10 elements. The 10 parts that make up EI are: (i) Self- understanding (ii) Compassion (iii) Self-motivation (iv) Psychological security (v) Taking care of relationships (vi) Worth alignment (vii) Dedication.

Conclusion

It can be evaluated that there is no influence of EI on the scholastic efficiency given that the EI degrees of urban students are high although their Grade Point Average is much less than the rural students Rural students were discovered to have actually obtained extra self- inspiration emotional intelligence as contrasted to urban lady's students. A statistically considerable distinction of psychological security psychological smart of rural and also urban lady's students was discovered. Rural students were discovered to have obtained even more psychological security emotional intelligence as contrasted to urban woman's students. A statistically substantial distinction of taking care of connection psychological smart of Rural and also urban students were located. Rural students were discovered to have actually obtained extra handling relationship emotional intelligence as contrasted to urban students.

Ethical Clearance: Not Required

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Xie TW. Using computers in Chinese language teaching. In: Chu M, eds. Mapping the course of the Chinese Language Field. Kalamazoo, MI: Chinese Language Teacher Association Monograph Series; 1999;3:104-119.
2. Zhang ZS. Language learning for Chinese-issues and practice. Journal of the Chinese Language Teachers Association. 1998;33:51-82.
3. Yu HJ, Michaels GH. Cyber Chinese: A multimedia aid for elementary Chinese language instruction: Overview and evaluation. Journal of the Chinese Language Teachers Association. 1998;33:39-49.
4. Zhang LH. Stepping carefully into designing computer-assisted learning activities. Journal of the Chinese Language Teachers Association. 2004;39:35-48.
5. Xu P, Jen T. Penless Chinese language learning: A computer-assisted approach. Journal of the Chinese Language Teachers Association. 2005;40:25-42.
6. Tao L, Bond Z. Speech recognition technology in the instruction of mandarin Chinese. Journal of the Chinese Language Teachers Association. 2006;41:57-88.
7. Xie TW. E-generation's Chinese language teachers: Meeting the new challenges. Journal of the Chinese Language Teachers Association. 2001;36:76-80.

8. Ihde WT, Jian M. Language learning and the on-line environment. Journal of the Chinese Language Teachers Association. 2003;38:25-50.
9. Codaty Jyostana. Understanding Emotional Intelligence. Pustak Mahal, Delhi, 2004.
10. Guilford JP. Fundamental statistics in Psychology and Education. New York, McGraw Hill, 1956.
11. Guilford JP. The nature of human intelligence. New York McGraw Hill, 1966.
12. James W. The principles of psychology, New York Smith 1890; 2.
13. Morgan CT. Introduction to Psychology, Tata McGraw Hill Publications, 2001.
14. Mundada Khalane. Fundamental of Psychology, 1st Ed, Atharv Publication, Jalgaon, 2013.

Caries Risk Profiles of Rural and Urban 12 Year Old School Children in Mangalore Using the Cariogram

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ABSTRACT

Objectives: This study aimed at determining caries risk profiles of rural and urban 12 years old school children in Mangalore using the Cariogram.

Method: A cross-sectional study was conducted on 100, 12 year old school children in Mangalore. Random sampling technique was employed for sample selection. Data collected from the participants comprised of demographic details, oral hygiene practices, medical history and a 3-day diet diary. Clinical examination was done to determine dental caries experience using the WHO Oral Health Assessment proforma 1997.

Results: In the permanent dentition 60% of the participants had dental caries, whereas 40% of the participants were caries-free. Based on the Cariogram scores, students were classified into four groups High risk (0-40%), Moderate risk (40-60%), low risk (60-80%) and very low risk (80-100%). Mean scores obtained for each category were 33.75 ± 5.82, 52.44 ± 4.69, 68.11 ± 3.818, 86.03 ± 1.81. None of the participants from urban area were in high-risk group, whereas 12% of the rural participants were in the high-risk group. Mean score obtained for urban and rural area were 73.48 ± 15.39 and 58.08 ± 18.94 respectively. The difference in the mean was statistically significant ($p < 0.001$).

Conclusion: The rural population had a higher risk of developing dental caries as compared to the urban population.

Keywords: *Caries risk assessment, Cariogram, Dental Caries, Risk factors.*

Introduction

Dental caries is the most prevalent condition in the world today. Global burden of untreated caries in permanent teeth in 2010 was estimated to be affecting 2.4 billion. In children it is the tenth most prevalent condition, affecting about 621 million children across the globe. The global burden of caries has remained unchanged between 1990 to 2010, but tooth loss due to caries has declined significantly in the past two decades. The peaks of caries burden are observed at 6 years, 25 years and 70 years[1].

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In India, caries prevalence in children aged 5, 12 and 15 years is reported to be 48.11%, 43.34% and 62.02% respectively and mean significant caries index score was 3.30, 2.73 and 3.75[2]. Untreated caries, can progress to severe infection and pain, leading to impaired performance in schools and decreased productivity at work[3].

Various methods have been devised to predict risk of development of caries, and one of them is the Cariogram, developed by Bratthall D[4] in 1996, WHO collaborating centre Malmö University, Sweden. The process of evaluating the risk using Cariogram is called Cariography. Cariogram uses the multifactorial cause of dental caries. It gives the result as "Percent chance to Avoid Caries" by taking into account the interaction of diet, bacteria, host factors and the fluoride availability[4].

Although caries risk assessment has been done in different parts of the world, very few of them have been done in India, with no literature found in this part

of the country. Keeping this in mind, this study was conceptualised to determine the Caries Risk Profiles of Rural and Urban 12 Year Old School Children in Mangalore using the Cariogram.

Materials and Method

This was a cross-sectional descriptive type of study. The present study was conducted among 12 year old school children in Mangalore. Data collection included an interview schedule, clinical examination and salivary analysis. Dental caries was assessed using the DMFT Index[5]. Children were asked to chew a modeling wax made into a form of pellet (0.5 x0.5 centimeters) for 3 minutes to obtain stimulated saliva, which was collected in a sterile bottle and then subjected to analysis.

The various factors/variables were given a score according to a predetermined scale and entered in the Cariogram computer program[4]. A trained recorder accompanied the investigator and helped in recording the data.

Results

A cross-sectional study was conducted on 100, 12 year old school children in Mangalore. There were 50 participants from urban schools and 50 from rural schools. Among the rural participants 58% were males and 42% were females, whereas in urban population 56% were males and 44% were females. In the permanent dentition 60% of the participants had dental caries, whereas 40% of the participants were caries-free. The caries prevalence in rural and urban children was 74% and 46%. The dental caries experience was found to be higher in rural population as compared to the urban population and this was found to be statistically significant ($p<0.001$).

Caries risk assessment was done by using the Cariogram model. Variables involved in the Cariogram were fed into the software and result was recorded as "Chance to avoid new caries". Based on the scored obtained from the Cariogram children were categorized as High risk (0-40%), Medium risk (41-60%), Low risk (61-80%) and very low risk (81-100%). In this study there were no children with 0-20% chance of avoiding caries, so we combined the groups, very high risk and high risk, and reported them together as 0-40% chances of avoiding caries[6].

Distribution of the study subjects based on the risk categories and caries risk factors revealed that none of the participants in the high-risk group had DMFT=0, whereas 37 in the very low risk category had no past caries experience. Eight participants in the high-risk and moderate risk groups had caries experience ≥ 3 versus zero participants in the low-risk and very low-risk groups. The caries experience increased with the likelihood of developing new caries in the near future.

The Lactobacilli count and the *Streptococcus mutans* count was found to decrease as the chance of avoiding new caries increased. About half of them had negligible *Lactobacilli* count, 25% of them belonged to very low risk category, whereas only 3% were from the high-risk category. Only one from the high-risk group had *Lactobacilli* count of over $>10^5$ CFU/ml. The *Streptococcus mutans* count was negligible in one-third of the participants. Of the thirty-three percent *Streptococcus mutans* free, 22% were in the low-risk category versus only one from the high-risk.

Salivary analysis of the participants revealed High buffering capacity of 31% among participants in the low-risk group, whereas only 7% had high buffering capacity (pH>6.0) in the high-risk group. In the high and moderate-risk category 3 participants each had low buffering capacity (pH<4.0). Salivary flow rate obtained was found to have no association with the Cariogram scores.

Chi-square test was applied to test the association between the chance of avoiding new caries and the contributing factors. It was found that statistically significant negative association was seen between the chance of avoiding new caries and past caries experience, *Lactobacilli* count, Diet frequency, *Streptococcus mutans* count and salivary buffering capacity. No statistically significant association was seen between Fluoride programme and amount of saliva secretion.

Among the 100 students selected, there were 12, 32, 18 and 38 in the high risk, medium risk, low risk and very low risk categories respectively. Mean score in each category was calculated to be 33.75 ± 5.82, 52.44 ± 4.69, 68.11 ± 3.818 and 86.03 ± 1.81 respectively. Total mean score of the children was found to be 65.78 ± 18.83. Based on the area of residence, it was found that in the urban area no participant had high risk of developing caries, whereas in the rural area 24% students were classified as belonging to the high-risk group.

The mean Cariogram score calculated for urban and rural children were 73.48 (15.39) and 58.08 (18.94) respectively. For all the categories among urban and rural students mean scores were calculated for the different risk categories. Based on the area of residence the difference between the means of urban and rural areas was found to be statistically significant in low-risk and very low risk categories (p= 0.013 and <0.001 respectively) (Table 1).

Table 1: Cariogram scores of each risk group

	Number	Mean ± S.D
High risk	12	33.75 ± 5.82
Moderate risk	32	52.44 ± 4.69
Low risk	18	68.11 ± 3.818
Very low risk	38	86.03* ± 1.81
Total	100	65.78* ± 18.83

* Comparison is significant at the 0.05 level

There are five sectors in the Cariogram model. Each is affected by a combination of risk factors. The outcomes of these sectors were separately analyzed for both urban and rural study subjects. The means obtained for Chance of avoiding caries, circumstance, susceptibility, bacteria and diet for rural population was found to be 58.08 ± 18.94, 5.08 ± 3.52, 14.80 ± 8.12, 14.54 ± 6.43 and 7.60 ± 4.91 respectively. For urban population means obtained for Chance of avoiding caries, circumstance, susceptibility, bacteria and diet were 73.48 ± 15.39, 2.54 ± 2.25, 10.72 ± 5.51. 9.12 ± 5.69 and 4.56 ± 3.45 respectively. The total means of all the sectors were found to be statistically significant (Table 2).

Table 2: The mean Score of the participants based on the five sectors of the Cariogram

	Total	
	Mean	S.D
Chance to avoid caries	65.78*	18.83
Circumstance	3.81*	3.20
Susceptibility	12.76*	7.19
Bacteria	11.83*	6.63
Diet	6.08*	4.49

*Comparison is significant at the 0.05 level

A statistically significant correlation was found between the risk factors and chance of avoiding new caries (p<0.001), *Lactobacilli* count (p=0.017), Diet frequency (p<0.001), *Streptococcus mutans* count (p<0.001), and salivary buffering capacity (p<0.001). No statistically significant correlation was seen between Fluoride programme and amount of saliva secretion (Table 3).

Table 3: Correlation between Cariogram Sector – Chance to avoid new caries and caries related factors

	Cariogram score	P value
Decayed missing and filled teeth (DMFT)	-0.851	<0.001*
Lactobacilli counts	-0.311	0.002*
Diet frequency	-0.534	<0.001*
Streptococcus mutans counts	-0.738	<0.001*
Fluoride programme	-0.176	0.080
Salivary secretion rate	-0.025	0.804
Salivary buffering capacity	-0.314	<0.001*

*Correlation is significant at the 0.05 level

Discussion

Children of age group 12 years was selected since it is considered as the global monitoring age for dental caries by the WHO[5]. The dental caries prevalence was found to be 60%, but caries expressed as mean DMFT was relatively low. This is in accordance with the study conducted by Hebbal et al[6] and Mascarenhas et al[7]. In the present study prevalence of the decayed and missing teeth in urban children was less as compared to those residing in the rural areas, this finding was in accordance with that reported by John et al[8]. Of the 100 children selected only 38% were classified into very low risk caries. This could be due to low utilization of dental services for prevention, unless they are in pain in India as reported by Harikiran et al[9] and Poudyal et al[10] .The study findings are similar to the findings reported by Hänsel Petersson et al[11], where about 40% belonged to the very low risk category. The risk of the students in the present study was in contrast to the results reported by Campus et al. [12] and Hebbal et al[6] where about 20% and 21% of the students were in the very high-risk group respectively The caries risk factors included in the

evaluation of risk prediction using the Cariogram model patients in high caries risk group had high scores in past caries experience, *Lactobacilli count, Streptococcus mutans* count and diet frequency. Sonbul et al[13] and Campus et al[12] reported similar results in addition to other factors like use of fluoride and plaque amounts.

Mean DMFT increased in the groups as the chances of avoiding new carious lesion reduced (from lowest to the highest groups). This finding was similar to those reported by Tayanin et al[14], and Campus et al[12], who reported increment in DMFT/dmft and DMFS/dmfs with decrease in the chances of avoidance of new caries. Past caries experience is considered to be the most reliable predictor for assessing the caries risk than other risk factors. Studies have been conducted which confirmed the strong prognostic role of past caries experience in predicting dental caries [15,16,17,] but the study conducted by Hausen et al[18] concluded that providing any additional preventive measure to control risk factors does not affect the dental caries formation in the near future.

Among the different sectors of the Cariogram model, the dominant sector was susceptibility (12.76%) followed by bacteria (11.83%), diet (6.08%) and circumstance (3.81%). This indicates that the leading risk factor among the participants is fluoride use, saliva secretion and saliva buffer capacity, followed by mutans streptococci. But, the study done on Swedish children by Petersson et al[19] reported the dominant sectors to be diet, followed by bacteria, susceptibility and circumstances.

In the present study, in saliva samples analysis, significant correlation was seen between chance to avoid new caries and past dental caries experience, *Lactobacilli* count*, Streptococcus mutans* count, Salivary buffering capacity but not for Salivary flow rate. Study conducted by Petersson et al[19] reported caries risk to be significantly associated with *Lactobacilli* counts; *Streptococci mutans*, diet frequency and DMFS. Whereas Hebbal et al[6] reported caries risk to be associated significantly with *Streptococcus mutans* or *Lactobacilli* count but not with salivary flow rate and buffering capacity.

Conclusion

This study showed that the rural population had a higher risk of developing dental caries as compared to the urban population. Educating parents regarding good oral hygiene practices and dietary habits is of utmost importance. In addition to that, co-operation from the school authorities could help in developing school oral health programmes to aid in imparting oral health education to all the children from an early age. Thus, to reduce the caries burden of the population, emphasis should be laid on the prevention of the disease. Spreading awareness about oral hygiene practices, dietary modifications and importance of maintaining oral health among the general population and the children will go a long way in preventing oral diseases and promoting oral health.

Source of Funding: Self

Ethical Clearance: Permission to conduct the study was obtained from the Institutional Ethics Committee of MCODS, Mangalore.

Conflict of Interest: None

REFERENCES

1. Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJ, Marcenes W. Global Burden of Untreated Caries A Systematic Review and Meta regression. Journal of Dental research. 2015 May;94(5):650-8.
2. Kundu H, Patthi B, Singla A, Jankiram C, Jain S, Singh K. Dental Caries Scenario Among 5, 12 and 15-Year-old Children in India-A Retrospective Analysis. J Clin Diagn Res. 2015 Jul;9(7):ZE 01-ZE 05
3. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bull World Health Organ. 2005; 83(9):661–669.
4. Bratthall D, Hänsel-Petersson G, Stjernsvard JR. Cariogram manual. Cariogram; 2004 Apr;2. Available from: http://www.mau.se/upload/FAKULTETER/OD/cariogram%20program%20caries/cariogmanual201net.pdf. [Last accessed on 26.11.2017].
5. World Health Organization (WHO). Oral Health Surveys–Basic Methods. 4th Edition. Geneva: WHO. 1997.
6. Hebbal M, Ankola A, Metgud S. Caries risk profile of 12 year old school children in an Indian city using Cariogram. Med Oral Patol Oral Cir Bucal. 2012 Nov; 17(6): e1054–e1061.

7. Mascarenhas AK. Determinants of caries prevalence and severity in higher SES Indian children. Community Dent Health. 1999;16:107-13

8. John JB, Asokan S, Aswanth KP, Priya PG, Shanmugaavel AK. Dental caries and the associated factors influencing it in tribal, suburban and urban school children of Tamil Nadu, India: a cross sectional study. Journal of public health research. 2015 Feb;4(1):361

9. Harikiran AG, Pallavi SK, Hariprakash S, Ashuthosh, Nagesh KS. Oral health- related KAP among 11- to 12-year-old school children in a government - aided missionary school of Bangalore city. Indian J Dent Res. 2008;19:236-42.

10. Poudyal S, Rao A, Shenoy R, Priya H. Utilization of Dental Services in a Field Practice Area in Mangalore, Karnataka. Indian J Community Med. 2010;35(3):424-5.

11. Hänsel Petersson G, Twetman S, Bratthall D. Evaluation of a computer program for caries risk assessment in schoolchildren. Caries res. 2002 Oct 23;36(5):327-40.

12. Campus G, Cagetti MG, Sacco G, Benedetti G, Strohmenger L, Lingström P. Caries risk profiles in Sardinian schoolchildren using Cariogram. Acta Odontologica Scandinavica. 2009 Jan; 67(3):146-52.

13. Sonbul H, Al-Otaibi M, Birkhed D. Risk profile of adults with several dental restorations using the Cariogram model. Acta Odontologica Scandinavica. 2008 Jan; 66(6):351-7.

14. Tayanin GL, Hänsel Petersson G, Bratthall D. Caries risk pro les of 12-13-year-old children in Laos and Sweden. Oral Health Prev Dent. 2005;3:15-23.

15. Powell LV. Caries Prediction: a review of the literature. Community Dent Oral Epidemiol. 1998; 26:361-71.

16. Zero D, Fontana M, Lennon AM. Clinical applications and outcomes of using indicators of risk in caries management. J Dent Educ. 2001; 65:1126-32

17. Petersson GH, Fure S, Twetman S, Bratthall D. Comparing caries risk factors and risk profiles between children and elderly. Swedish dental journal. 2003 Dec; 28(3):119-28.

18. Hausen H, Karkkainen S, Seppä L.Application of the high-risk strategy to control dental caries. Community Dent Oral Epidemiol. 2000;28: 26-34.

19. Hänsel Petersson G, Twetman S, Bratthall D. Evaluation of a computer program for caries risk assessment in schoolchildren. Caries Res. 2002;36:327-40

Role of Trust and Privacy Concerns towards Usage of E-Health Services—An Extension of Expectation-Confirmation Model

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ABSTRACT

Electronic health services is extensively employed to build an online platform for healthcare providers and patients. However, there are few studies that have investigated the intention behind why e-Health services are rejected by some of the end-users after their initial experience. There exists a considerable gap between the usage of e-Health services and our understanding of these technologies. Therefore, this study was carried out on the aim to better understand the factors leading hospital consumers' continued usage of e-Health services based on expectation-confirmation model (ECM). To explore the process of continuance usage intention of e-Health services, the study has integrated ECM model with technology acceptance model and two post adoption expectation beliefs (i.e., perceived privacy and security, and perceived trust). With 253 e-Health services users' responses, the proposed research model was empirically tested within the context of e-Health services by applying partial least squares (PLS) method. The main finding from the path analysis indicates that along with perceptual (confirmation, perceived ease-of-use, perceived usefulness), and emotional factor (satisfaction), post adoption expectation beliefs (perceived trust, perceived privacy and security) – also shown a significant association towards continuance intention of e-Health services. The study concludes by discussing theoretical and practical implications, limitations and future scope.

Keywords: *expectation-confirmation model, technology acceptance model, perceived trust, perceived privacy and security.*

Introduction

E-Health refers to application of software that includes the process, tools, and communication systems to support the practices of electronic healthcare. E-Health services helps in transmission and administration of information in healthcare and as an outcome, assist in enhancement of medical practitioner's performance and patients' health. Varshney[15] defines electronic Health as an application of ICT across the various activities involved in practice and delivery of healthcare. These applications accounts in the entire range of information like hospital and employees information, billing and payment information, and patient's medical records. In today's viewpoint of e-Health, it also includes the use of internet for storing, modifying, and accessing the health-related information. Nevertheless, the term e-Health is much broader, that covers digitalization of several tasks and processes of healthcare from basic to advanced level of services that results in innovative terms such as e-appointments, e-records, e-supply, e-payments, and e-billing. Though the application of ICT are numerous in healthcare sector, this research precisely refers to basic e-Health services provided by the private hospitals like e-appointment, e-billing, and e-payments as they are feasible and not much complicated to the end-users (i.e., patients). These basic services helps in saving the end-users time and offers a rapid communication between patients and healthcare professionals[4].

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Prior researches have reported that patients' use these e-Health services barely for a short span of time as it is a contemporary experience to them and have less knowledge in it[11], which clearly highlights the lesser understanding of post-adoption behaviours of end-users by the institutions. This recommends a demand to delve intensively into post-adoption behaviour (i.e., continuance usage intention - CUI) of e-Health services usage. With a focus of Indian healthcare customers, this study predicts how a comprehensive set of factors may influence the continuance intention of e-Health services.

To identify the essential factors, this study further integrates ECM with TAM (Technology Acceptance Model) and also incorporates perceived trust (PT) and perceived privacy and security (PPS) to hypothesize a new model. The reason behind the integration is as follows- First, though ECM was proved to be the robust model to study the continuance intention of information system by several studies[4], it employs only three predictors, specifically, confirmation (CNF), perceived usefulness (PU), and satisfaction (SAT) to measure continuance usage intention (CUI). Nevertheless, the users' behavioural intention towards usage of any technology may be influenced by other factors. Second, TAM offers a significant factor perceived ease-of-use (PEOU) to measure the usage intention that affects perceived usefulness, and it act as a precedent factor for PU for ECM. And finally, adding PT and PPS to the integrated model allows to capture the possible element of barriers to the e-Health services CUI.

The existent literature on the viewpoint of ECM has mostly concentrated on PU as the only continuance usage expectation belief[14]. In most cases, incorporating the other beliefs with the existing factor – PU is predominately based on the nature of the specified technology in specified context to enhance the explanatory power of the model. With the background of this tradition, this study focus on integrating perceived privacy and security as a significant post adoption expectation belief to understand the CUI of e-Health services[13]. Prior studies have included PPS as an antecedents to study the post adoption behaviour of consumers in adoption of various e-services likes e-banking and e-government that demonstrates the linkage between satisfaction, PPS, and CUI[2]. Similarly, this study also considers perceived trust that has an exceptional influence on CUI linked through SAT. Although the relationship between PT, PPS, and usage intention is not precisely been modelled in information technology, the association is explicitly inferred in certain studies. Therefore, this study anticipates that it will be significant to examine the role of these two additional variables to predict the post adoption behaviour of e-Health services.

Research framework and Hypotheses

In conceptualizing a continuance model for e-Health services, this study has integrated ECM with TAM factor – PEOU, and two external variables - PT and PPS to predict SAT and CUI. As explained in Fig. I, the research framework has extended ECM viewpoint by including the influence of perceptual factor and two post adoption expectation beliefs in the background of electronic Health services.

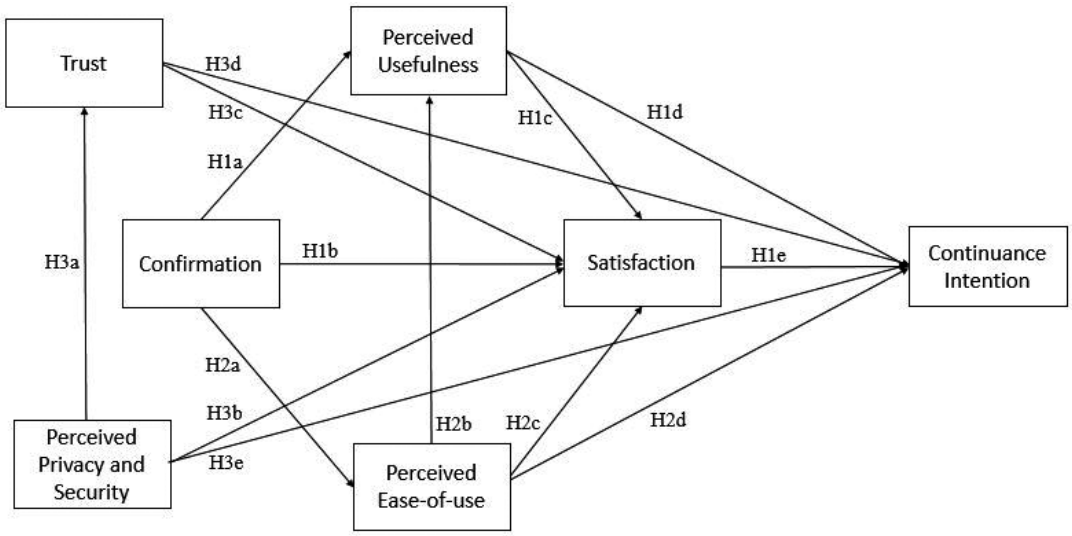


Fig. I: Proposed Model

Hypotheses based on base ECM: The original ECM that was proposed by Bhattacherjee[3] majorly focused on the factor PU of any technology. The concept of ECM states that when the initial expectation of individuals get confirmed with the usage of any technology, then they perceive the technology to be useful for performing any specified task[11]. That is, when the technology allows the user to accomplish the chosen goal in the anticipated way, then their experience towards perceived usefulness is increased. Thus with the base of original ECM, the following hypotheses were proposed:

H1a: CNF of expectation has a significant association with PU of e-Health services

H1b: CNF of expectation has a significant association with SAT of e-Health services

H1c: PU has a significant association with SAT of e-Health services

H1d: PU has a significant association with CUI of e-Health services

H1e: SAT has a significant association with CUI of e-Health services

Integrating ECM and TAM: The base TAM model highlighted the positive association between PU and PEOU on attitude towards technology and finally measuring the behavioural intention to use it. According to Akter[1], satisfaction is a positive and pleasurable state of attitude and emotion. And therefore it is reasonable to hypothesize that perceptual factors like PEOU and PU has a significant effect on individuals' satisfaction with usage of any technology. Prior studies have also highlighted the significant association among PEOU and PU towards SAT and behavioural intention to use e-services[3,12.]. Thus the subsequent hypotheses were proposed:

H2a: CNF of expectation has a significant association with PEOU of e-Health services

H2b: PEOU has a significant association with PU of e-Health services

H2c: PEOU has a significant association with SAT of e-Health services

H2d: PEOU has a significant association with CUI of e-Health services

Perceived Trust and Perceived Privacy and Security: The role of 'trust' and 'privacy and security' in the context of electronic services are robust. The prior study has shown that CNF of expectation has a positive influence with the execution of certain guidelines guided by trusting beliefs[6,14]. Further, extant literature has proven that degree of users' trust has a positive effect towards degree of CUI. Earlier studies have claimed that, in healthcare, higher privacy and security drives the increased satisfaction level of patients' and as a outcome[11], results in repeated usage of electronic Health services[8]. Thus the following hypotheses are posited:

H3a: PPS has a significant association with PT of e-Health services

H3b: PPS has a significant association with SAT of e-Health services

H3c: PT has a significant association with SAT of e-Health services

H3d: PT has a significant association with CUI of e-Health services

H3e: PPS has a significant association with CUI of e-Health services

Data Collection

As the study focuses on the customer perspective of the hospitals, the sample unit opted for this study are patients' and care-givers, who are considered as the major customers of hospitals. The data was collected from the multi-speciality hospitals those are providing basic e-Health services to its customers. The geographical location chosen for data collection of the study is Chennai. The sampling method used for this study is purposive sampling method, as it is a challenging task to precisely estimate the population size of patients' acquiring the treatment or the care-givers who are using the basic e-Health services for the sake of patients' in India. The final sample size of the study resulted in 253. The data was collected through the well-structured closed ended questionnaire.

Data Analysis and Results

The research model was accomplished through two steps: measurement model and structural model. The outer model was executed to establish the reliability and validity, whereas, inner model was carried out to test the study hypotheses.

Table I: Confirmatory factor analysis results

Construct	Item	Standard loading*	AVE	CR	Cronbach's α
Perceived usefulness	PU1	.794	0.783	0.904	0.918
	PU2	.859			
	PU3	.847			
	PU4	.849			
Confirmation	CON1	.890	0.800	0.851	0.929
	CON2	.899			
	CON3	.920			
	CON4	.880			
Perceived ease-of-use	PEOU1	.824	0.768	0.912	0.889
	PEOU2	.848			
	PEOU3	.847			
	PEOU4	.832			
Perceived privacy and security	PPS1	.867	0.841	0.935	0.911
	PPS2	.881			
	PPS3	.900			
	PPS4	.863			
	PPS5	.799			
	PPS6	.782			
Trust	TR1	.832	0.827	0.924	0.896
	TR2	.933			
	TR3	.822			
	TR4	.789			
Satisfaction	STF1	.884	0.790	0.938	0.915
	STF2	.896			
	STF3	.879			
Continuance usage intention	CUI1	.897	0.774	0.912	0.893
	CUI2	.884			
	CUI3	.853			
	CUI4	.819			

Assessment of Measurement Model: The research model was established in two phases. First, the outer model (i.e., measurement model) was analysed to validate the properties of measurement scale, for which confirmatory factor analysis was estimated. This helps in accessing the reliability, discriminant validity, and convergent validity of the scale (Table-I). Secondly, structural model was analysed to validate the path relationship. According to Hair et al, the cut off values for composite reliability (CR) and average variance extracted (AVE) should be equal to or exceed 0.80 and 0.50 respectively. Here, the minimum value of CR is 0.851 for CNF and highest value is 0.938 for SAT; and for AVE, minimum value is 0.768 for PEOU and highest value is 0.841 for PPS which signifies the adequacy of criteria. Further, the value of Cronbach's alpha lies between the range 0.889 and 0.929, which satisfies the recommended threshold value of 0.7.

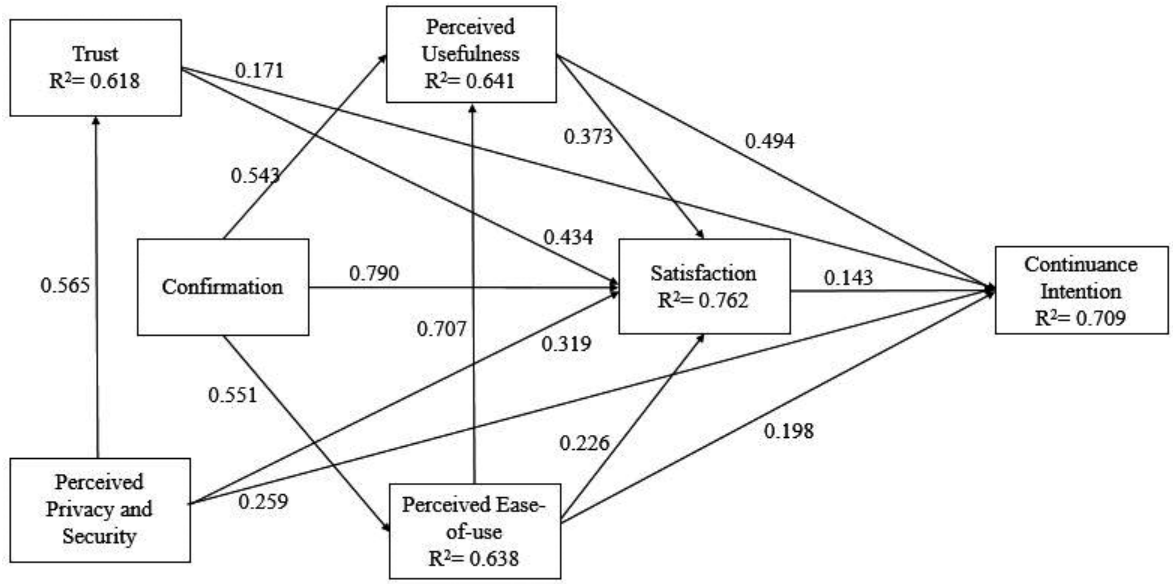


Fig. II: Inner Model results

Assessment of Structural Model: The results of inner model (Fig. II) are summarized in Table- II, which shows the indirect, direct and total effect of the variables. The proposed model is claimed to have the strong prediction power, where R^2 of all the endogenous variables are higher than 0.60 along with CUI (0.709). The outcome of the model shows that all the proposed hypotheses were accepted including the base ECM hypotheses (H1a – H1e) which is considered valid in healthcare context. For example, the association between CNF towards SAT was found to be strongest (t-value-16.814). Further the extended model hypotheses (H2a - H2d and H3a – H3e) has also shown significant. The variables like trust (t-value-8.698), PPS (t-value-4.503), and PEOU (t-value-4.277) are positively associated towards satisfaction. Also the path from PT (t-value-3.015), PPS (t-value-4.721), and PEOU (t-value: 3.541) are significantly associated towards CUI.

Table II: Direct, Indirect and Total Effect

		PPS	Trust	CNF	PU	PEOU	STF
PPS	DE						
	IE						
	TE						
Trust	DE		0.565				
	IE		0.137				
	TE		0.702				
CNF	DE						
	IE						
	TE						
PU	DE			0.543	0.707		
	IE			0.196			
	TE			0.739	0.707		
PEOU	DE			0.551			
	IE						
	TE			0.551			
STF	DE	0.319	0.434	0.790	0.373	0.226	

Conted…

	IE	0.182	0.146	0.188	0.086		
	TE	0.501	0.580	0.978	0.459	0.226	
CUI	DE	0.259	0.171		0.494	0.198	0.143
	IE			0.674	0.198	0.063	
	TE	0.259	0.171	0.674	0.692	0.261	0.143

Discussion

The main aim of this study is to examine the post-adoption behaviour of users' using the e-Health services. In an attempt to this, the study has developed a research model in the context of healthcare by integrating ECM, which is theoretically reliant on ECT with technology acceptance model. Further the study has incorporated the constructs like PT and PPS to the research model. The main findings of the path analysis has supported all the proposed hypotheses. Along with the theoretical model factors, the additional variables like PT and PPS has shown significant association towards SAT and CUI, and also shown an important role in enhancing the predictive power of the research model. Further, conceptualising and validating their impact on usage intention (via SAT) is a significant contribution of this study. Altogether, this study contributes to the information technology CUI literature by integrating TAM with ECM and confirming the effect of PT and PPS into the perspective of ECM to explain the end-users' post-adoption behaviour in healthcare context.

In terms of practice, the constructs PEOU and PU have statistically shown positive association towards SAT and CUI of e-Health services. But PU has shown greater effect than PEOU. This signifies that PU has a crucial part in defining users' attitude towards any new technology. Though usefulness have a greater influence, PEOU also determines the users' emotional state. This finding states that future research can emphasize on the ways in which the effects of PEOU and PU on emotional states are contextually bounded in healthcare context[11]. However, service providers' needs to focus on making the e-Health services easier and useful. Though e-Health includes several services, it has become clear that an efficient and simple operating system is one of the major factor that determines the marketability of any e-Health services[5]. Perceived trust is an important element in e-services exchange, as the lack of proper rules and regulations in electronic services are not immediately verifiable[7]. Therefore it is essential for the service providers to improve the overall trusting beliefs in order to increase the trusting belief and attitude (i.e., CUI). Further, loss of privacy and security results in loss of trust[10]. If the service provider focus on improving the security concerns, then it directly results in increasing trust which finally influence SAT and CUI[8].

Limitations and Future Scope: First, this research was carried out within the particular field of e-Health services in a single country. As an outcome, applicability of the findings more broadly remains uncertain. It is vital for practitioners and researchers to take a more holistic, learning oriented method to determine the performance of such e-Health services. Second, follow-up research on longitudinal data is required for this study. As the cross-sectional data does not permit for the analysis of post-acceptance model's predictive power in gaining knowledge of continuance intention.

In other words, to examine the fundamental effect of perceptual factors on actual behaviours, it is crucial to conduct longitudinal study as the exogenous variable must precede endogenous variable in order to deliberate as having a causal influence[9]. Specifically, for better understanding, it is recommended for future study to conduct a panel study by gathering longitudinal data from a specific set of e-Health service users' at multiple temporal points. Finally, the study believes that along with TAM and ECM factors, there exists a role of other external variables. For instance, the study of Davis [5] emphasize that the role of social influence significantly influences the perceptual factors like PEOU and PU. Henceforth, future study can investigate the role of social influence towards continuance intention of electronic Health services.

Ethical Clearance: Ethical approval was taken from the respective hospital authorities and from Vellore institute of technology.

Conflict of Interest: The authors declared no potential conflicts of interests with respect to the research, authorship, and/or publication of this article.

Source of Funding: None

REFERENCES

1. Akter S, D'Ambra J, Ray P. Development and validation of an instrument to measure user perceived service quality of mHealth. Information & Management. 2013 Jun 1;50(4):181-95.
2. Appari A, Johnson ME. Information security and privacy in healthcare: current state of research. International journal of Internet and enterprise management. 2010 Jan 1;6(4):279-314.
3. Bhattacherjee A. Understanding information systems continuance: an expectation-confirmation model. MIS quarterly. 2001 Sep 1:351-70.
4. Cho J. The impact of post-adoption beliefs on the continued use of health apps. International journal of medical informatics. 2016 Mar 1;87:75-83.
5. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS quarterly. 1989 Sep 1:319-40.
6. Dimitrov DV. Medical internet of things and big data in healthcare. Healthcare informatics research. 2016 Jul 1;22(3):156-63.
7. Hoehle H, Huff S, Goode S. The role of continuous trust in information systems continuance. Journal of Computer Information Systems. 2012 Jun 1;52(4):1-9.
8. Iranmanesh M, Zailani S, Nikbin D. RFID continuance usage intention in health care industry. Quality management in health care. 2017 Apr 1;26(2):116-23.
9. Kluge EH. Secure e-health: managing risks to patient health data. International journal of medical informatics. 2007 May 1;76(5-6):402-6.
10. Lee MC. Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation–confirmation model. Computers & Education. 2010 Feb 1;54(2):506-16.
11. Martínez-Caro E, Cegarra-Navarro JG, Solano-Lorente M. Understanding patient e-loyalty toward online health care services. Health Care Management Review. 2013 Jan 1;38(1):61-70.
12. Morgan RM, Hunt SD. The commitment-trust theory of relationship marketing. Journal of marketing. 1994 Jul;58(3):20-38.
13. Mou J, Shin DH, Cohen JF. Trust and risk in consumer acceptance of e-services. Electronic Commerce Research. 2017 Jun 1;17(2):255-88.
14. Oliveira T, Alhinho M, Rita P, Dhillon G. Modelling and testing consumer trust dimensions in e-commerce. Computers in Human Behavior. 2017 Jun 1;71:153-64..
15. Varshney U. E-Health and IT in Healthcare. In Pervasive Healthcare Computing 2009 (pp. 17-38). Springer, Boston, MA.

Risk Factors Associated with Onset of Neck Pain: A Review

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ABSTRACT

Objectives: The current review intended to summarize the risk factors responsible for onset of neck pain.

Method: An electronic and hand search along with cross referencing was done on five online databases (Cochrane Library, PEDro, Scopus, PubMed (Medline) and Google Scholar) using the following key words, "neck pain", "nonspecific neck pain", "prevalence of neck pain" and "risk factors associated with neck pain".

Results: Out of 715 papers identified 77 full text papers were reviewed. 12 studies meeting the inclusion criteria were included and were scored for methodological quality (MQ) on the New Castle Ottawa Scale modified for cross-sectional studies. Conclusion the identified risk factors for onset of neck pain include being of female gender, poor working conditions, presence of stress and depression, work overload both for students and professionals.

Keywords: *neck pain, risk factors, prevalence, musculoskeletal disorders.*

Introduction

Neck pain is influencing 14-71% of adults and eventually sooner or later 19-37% of patients will develop a chronic neck pain[1,2]. It is a commonly reported health hazard[3] and is seen in different occupations, in various countries[4,5], becoming an economic burden for a country's urban population responsible for non-attendance from school, college and work[6,7]. Neck pain is encountered by all age groups including children, adolescents, adults and the geriatric population, also its incidence and prevalence is amplifying every year. Numerous studies conducted over the years have identified the exposure variables in different population subgroups and occupations[3,8,9,10]. But still with the changing lifestyle and work habits new studies are required to identify the modernistic up to date associations with the risk factors. The augmenting use of innovative technology which includes the multiplying use of computers, mobile phones, internet for both work and recreation is making our life more convenient but at the same time are jeopardizing the musculoskeletal integrity[11,12]. Further the increasing stress levels at the work place are exposing individuals to the development of neck pain[9].

The current review tries to encapsulate the risk factors identified by recent studies, responsible for onset of neck pain. This review can be useful to healthcare providers, researchers, ergonomists and employers to design interventions reducing the incidence and prevalence of neck pain.

Methodology

The study is approved by the ethical committee of Amity University. To get a thorough search we followed the PRISMA guideline (Fig 1).

Search Strategy: An electronic and hand search along with cross referencing was done on five online databases (Cochrane Library, PEDro, Scopus, PubMed (Medline) and Google Scholar) using the following key words, "neck pain", "nonspecific neck pain", "prevalence of neck pain" and "risk factors associated with neck pain". The period of the search was 1970 to 2018.

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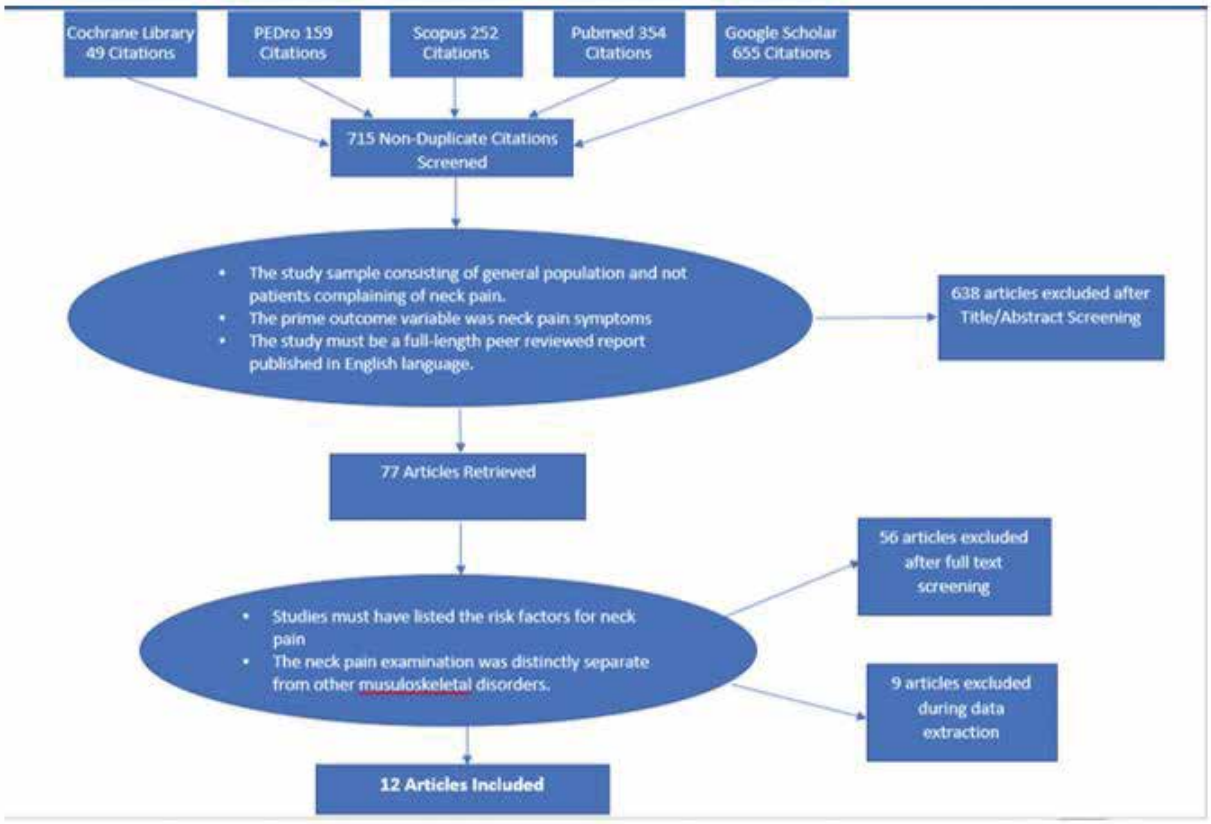


Fig. 1: The Prisma Flow Chart for Selection of Studies

Study Selection: After a meticulous screening of the titles picked by the search strategy, all the papers related to neck pain and non-specific neck pain were listed by the first reviewer. Next the abstracts of the articles having the potential to be included in the study were identified and read by two individual reviewers. Finally, if the abstract connoted that the paper could provide relevant data regarding the risk factors for onset of neck pain, the full text of screened articles were diligently read by both the reviewers individually to be assessed for the inclusion criteria. In case of disagreement, a meeting was held and consensus was obtained for the same.

A study had to meet the following criteria, for it to be eligible to be included in the current review.

- The study sample consisting of general population and not patients complaining of neck pain.
- The prime outcome variable was neck pain symptoms
- Studies must have listed the risk factors for neck pain
- The neck pain examination was distinctly separate from other musculoskeletal disorders.
- The study must be a full-length peer reviewed report published in English language.

Quality Assessment Scoring: The selected papers were scored for methodological quality by the Modified Newcastle Ottawa scale by two independent reviewers. The Newcastle-Ottawa scale consisted of three sections namely selection, where a study can score a maximum of 5 stars next comparability where a study can score a maximum of 2 stars and finally outcome where a study can score a maximum of 3 stars. If the scores of the two reviewers did not meet for an item, then consensus was obtained after a thorough discussion.

Results

Out of 958 studies identified 12 studies [13,14,15,16,17,18,19,20,21,22,23,23] were included in the current review (Fig1).

Methodological Quality: The percentage of agreement between the two independent reviewers was 89.9%. Most of the studies lost a star in the sample size category, as the formula or the methodology for the number of responses was not mentioned. Out of 12 only one study scored 9 stars[19].

The Annual prevalence was evaluated in 8 studies [13,15,16,18,19,20,21,23]. The prevalence percentages ranged from 20.3% to 66.7%.

Discussion

The prevalence for neck pain were found to be inconsistent for different countries. The reason for this could be various like disparity in the study methodology, definition of cervical and neck pain[15,16]. Population differences like socioeconomic status including the family income and education of the people, work culture, practices and lifestyle, human health cognizance, health care standards, exposure time factor[13,15,16].

All the studies included in the current review have collected the data by self-report method via filling of questionnaires. For this review the exposure variables were broadly divided into three categories. First the personal second work related/ergonomic and third psychosocial factors.

Personal: Being of female gender was identified as a risk factor by 9[13,14,17,18,19, 20,21,22,23] out of 12 studies included in the current review. A possible rationalization of the same could be that females are more exposed to home care tasks[18], child and elderly care at home which could be more taxing on the neck musculature. It has been pointed that females have comparatively less muscle mass and they should engage in more physical activity to increase the muscle mass for prevention and treatment of neck pain[14,25,26]. Trogen[27] in his study reported that pain threshold increased with muscle strength[27,18] and Chiu[28] demonstrated that isometric strength was more in men than women[28,18]. In a study[17] it was speculated that reasons for higher prevalence of neck pain in girls could be that they have a lesser pain threshold than boys, hormonal changes during puberty, greater tendency for stress, heritability of neck pain is more in girls[17,18].

Four studies reported age to be significantly associated with neck pain[13,20,21,23]. The possible explanation of which could be degenerative changes in the in the ageing musculoskeletal system[13,18]. Cagnie[20] demonstrated that the neck pain risk intensified till the age of 50 but diminished thereafter. One explanation given for this was that after the age of fifty other chronic diseases were more prominent[20].

As accounted by Ehsani[13] and Cagnie[20] and Chiu[21] in their studies involvement in regular physical activity and sports was an effective deterrent strategy for neck pain, which was contrary to the studies by De Vitta[16], Shan[17] and Diepenmaat[22]. Shan[17] in his study explained that it was difficult to quantify the effect of short duration exercises and long duration exercises are more associated with injuries, he suggested that involvement in regular physical activity predisposes participants to injuries and muscle soreness and later thus more neck pain[17]. One explanation given for the disparity in findings could be differences in objective definition of the physical activity[22].

Genebra[15] in his study has demonstrated that being separated or widowed was related with neck pain. A probable explanation could be that they may be more exposed to house hold and professional work and have less social support in the absence of partner[15]. Inferior grade education and income may deprive people from quality health facilities and prevention strategies. Also, these people are typically more engaged physically demanding tasks exposing them to a greater risk of musculoskeletal system injuries[15].

Work Related and Ergonomics: Ehsani[13] reported in his study that teachers with a longer duration of employment had a higher risk of developing neck pain. Dry air, temperature fluctuations and thermal discomfort were also significantly associated with neck pain[20]. Deficiency of personnel was another factor associated with neck pain[20]. Poor working conditions were reported by 8 studies[13,15,18,19,20,21,23,24]. Research proves that maintenance of prolonged sitting with continuous tiresome neck postures while using computers, correction of examination papers and leaning activities were related with neck pain[13,15,18]. A potential justification could be an increase in neck extensor muscles and sternocleidomastoid muscles activity, simultaneously intensifying the load on the intervertebral disc, neck ligaments joint capsules etc leading to inflammation and pain in the cervical spine structures[15,16]. Neck holding in forward flexed position and working in consistent positions for elongated hours is significantly associated with neck pain as was doing the same motions every minute[20]. When distal upper extremity is at work like at the keyboard, mouse etc. the proximal musculature of neck and shoulders should perform as stabilizers, this activity is heightened when neck movements like rotation and flexion of neck is also added[20].

However, it is denoted that compared to laptop users, desktop users presented with significantly less

neck pain[17]. For which the authors theorised that a more adjustable positioning of the monitor and keyboard separately gave a more congenial posture and thus reduced the occurrence of neck pain[17]. Variation in computer usage could also explain the differences in the observations such as adolescents used computers more for entertainment rather than work and they experienced more of a discomfort than pain, also if they had pain they restricted the computer use as probably the pupils were aware that excessive computer usage could aggravate their problem[22]. But the fact that self-assessed computer usage can be inaccurate at times cannot neglected.

Yeun[14] has postulated that neck pain is significantly associated with mobile phone usage hours. The static neck positions maintained during mobile phone use may lead to muscle soreness[18.]

In an interesting finding it was shown that people using mobile phones had comparatively less neck pain than those using fixed land lines as mobile phones allowed more adjustable positioning of neck and there is no need to stand in fixed positions which might have led to more neck pain[17]. Adolescents may have different mobile phone using habits than the traditional users leading to altered observations[17].

There was only one study which investigated the effects of I pads/Tablet[17], with the changing technology and in this era of automation the effect of new innovations must be studied. Entertainment and work on I pads/ tablets has become more interesting and manageable. It was shown that while using I pads/tablets a person has to maintain a similar posture as adopted in reading, however it might be more of a distorted incorrect reading posture[17,20]. Thus, it has been shown that tablet usage might increase the incidence of neck pain to some extent.

Psychosocial: It is reported that teachers with a lower level of job satisfaction had a higher risk of developing neck pain[13]. Also neck pain was high in those participants who perceived their health as poor[14].

Stress, depression, mental tiredness and anxiety were other factors found to be associated with neck pain[14,17,20,22,23]. Shan[17] showed in his study that students contended with their everyday learning had less neck pain. Poor social and colleague support were other psychosocial factors found to be associated with neck pain.

Findings of our review support the earlier findings and in addition include maintenance of prolong tiring postures may be due to poor ergonomically designed workstations or work demands as in case of nursery teachers, existence of stress and depression, work overload both for students and professionals. For professionals it could be due to shortage of personnel at work place along with poor social and colleague support, for students it could academic pressure of clearing college entrance exams, as risk factors for increasing prevalence of neck pain.

Conclusion

Maximum number of studies identified being of female gender, poor working conditions such as demands for awkward and prolong exhausting postures, presence of stress and depression, work overload both for students and professionals, as risk factors for increasing prevalence of neck pain.

Conflict of Interest: Nil

Source of Funding: The study was funded and supported by the authors.

REFRENCES

1. Fejer R, Kyvik KO, Hartvigsen J. The prevalence of neck pain in the world population: a systematic critical review of the literature. *European spine journal*. 2006 Jun 1;15(6):834-48.

2. Bot SD, Van der Waal JM, Terwee CB, Van der Windt DA, Schellevis FG, Bouter LM, Dekker J. Incidence and prevalence of complaints of the neck and upper extremity in general practice. *Annals of the rheumatic diseases*. 2005 Jan 1;64(1):118-23.

3. Hogg-Johnson S, Van Der Velde G, Carroll LJ, Holm LW, Cassidy JD, Guzman J, Côté P, Haldeman S, Ammendolia C, Carragee E, Hurwitz E. The burden and determinants of neck pain in the general population. *European Spine Journal*. 2008 Apr 1;17(1):39-51.

4. Widanarko B, Legg S, Stevenson M, Devereux J, Eng A, Cheng S, Douwes J, Ellison-Loschmann L, McLean D, Pearce N. Prevalence of musculoskeletal symptoms in relation to gender, age, and occupational/industrial group. *International Journal of Industrial Ergonomics*. 2011 Sep 1;41(5):561-72.

5. Fernández-de-las-Peñas C, Hernández-Barrera V, Alonso-Blanco C, Palacios-Ceña D, Carrasco-Garrido P, Jiménez-Sánchez S, Jiménez-García R. Prevalence of neck and low back pain in community-dwelling adults in Spain: a population-based national study. *Spine*. 2011 Feb 1;36(3):E213-9.

6. Kleinman N, Patel AA, Benson C, Macario A, Kim M, Biondi DM. Economic burden of back and neck pain: effect of a neuropathic component. *Population health management*. 2014 Aug 1;17(4):224-32.

7. Morse TF, Dillon C, Warren N, Levenstein C, Warren A. The economic and social consequences of work-related musculoskeletal disorders: the Connecticut Upper-Extremity Surveillance Project (CUSP). *International Journal of Occupational and Environmental Health*. 1998 Oct 1;4(4):209-16.

8. McLean SM, May S, Klaber-Moffett J, Sharp DM, Gardiner E. Risk factors for the onset of non-specific neck pain: a systematic review. *Journal of Epidemiology & Community Health*. 2010 Jul 1;64(7):565-72.

9. Ariëns GA, Mechelen WV, Bongers PM, Bouter LM, Wal GV. Psychosocial risk factors for neck pain: a systematic review. *Am J Ind Med*. 2001 39:180e93.

10. da Costa BR, Vieira ER. Risk factors for work-related musculoskeletal disorders: a systematic review of recent longitudinal studies. *American journal of industrial medicine*. 2010 Mar 1;53(3):285-323.

11. Green BN. A literature review of neck pain associated with computer use: public health implications. *The Journal of the Canadian Chiropractic Association*. 2008 Aug;52(3):161.

12. Peraman R, Parasuraman S. Mobile phone mania: Arising global threat in public health. *Journal of natural science, biology, and medicine.* 2016 Jul;7(2):198.

13. Ehsani F, Mohseni-Bandpei MA, Fernández-De-Las-Peñas C, Javanshir K. Neck pain in Iranian school teachers: Prevalence and risk factors. *Journal of bodywork and movement therapies*. 2018 Jan 1;22(1):64-8.

14. Yeun YR, Han SJ. Factors associated with neck/shoulder pain in young adults. *Biomedical Research*. 2017;28(16).

15. Genebra CV, Maciel NM, Bento TP, Simeão SF, De Vitta A. Prevalence and factors associated with neck pain: a population-based study. *Brazilian journal of physical therapy*. 2017 Jul 1;21(4):274-80.

16. De Vitta A, Trize DD, Fiorelli A, Carnaz L, De Conti MH, Simeão SF. Neck/shoulders pain and its relation to the use of tv/computer/videogame and physical activity in school students from Bauru. *Fisioterapia em Movimento*. 2014 Mar;27(1):111-8.

17. Shan Z, Deng G, Li J, Li Y, Zhang Y, Zhao Q. Correlational analysis of neck/shoulder pain and low back pain with the use of digital products, physical activity and psychological status among adolescents in Shanghai. *Plos one*. 2013 Oct 11;8(10):e78109.

18. Yue P, Liu F, Li L. Neck/shoulder pain and low back pain among school teachers in China, prevalence and risk factors. *BMC public health*. 2012 Dec;12(1):789.

19. Ranasinghe P, Perera YS, Lamabadusuriya DA, Kulatunga S, Jayawardana N, Rajapakse S, Katulanda P. Work related complaints of neck, shoulder and arm among computer office workers: a cross-sectional evaluation of prevalence and risk factors in a developing country. *Environmental Health*. 2011 Dec;10(1):70.

20. Cagnie B, Danneels L, Van Tiggelen D, De Loose V, Cambier D. Individual and work related risk factors for neck pain among office workers: a cross sectional study. *European Spine Journal*. 2007 May 1;16(5):679-86.

21. Chiu TT, Lam PK. The prevalence of and risk factors for neck pain and upper limb pain among secondary school teachers in Hong Kong. *Journal of occupational rehabilitation*. 2007 Mar 1;17(1):19-32.

22. Diepenmaat AC, Van der Wal MF, De Vet HC, Hirasing RA. Neck/shoulder, low back, and arm pain in relation to computer use, physical activity, stress, and depression among Dutch adolescents. *Pediatrics*. 2006 Feb 1;117(2):412-6.

23. Chiu TW, Lau KT, Ho CW, Ma MC, Yeung TF, Cheung PM. A study on the prevalence of and risk factors for neck pain in secondary school teachers. *Public Health*. 2006 Jun 1;120(6):563-5.

24. Ono Y, Imaeda T, Shimaoka M, Hiruta S, Hattori Y, Ando S, Hori F, Tatsumi A. Associations of length of employment and working conditions with neck, shoulder and arm pain among nursery school teachers. *Industrial health*. 2002;40(2):149-58.

25. Palmlöf L, Holm LW, Alfredsson L, Magnusson C, Vingård E, Skillgate E. The impact of work related physical activity and leisure physical activity on the risk and prognosis of neck pain–a population based cohort study on workers. *BMC musculoskeletal disorders*. 2016 Dec;17(1):219.

26. Auvinen J, Tammelin T, Taimela S, Zitting P, Karppinen J. Neck and shoulder pains in relation to physical activity and sedentary activities in adolescence. *Spine*. 2007 Apr 20;32(9):1038-44.

27. Torgén M, Swerup C. Individual factors and physical work load in relation to sensory thresholds in a middle-aged general population sample. *European journal of applied physiology*. 2002 Mar 1;86(5):418-27.

28. Chiu TT, Lam TH, Hedley AJ. Maximal isometric muscle strength of the cervical spine in healthy volunteers. *Clinical rehabilitation*. 2002 Nov;16(7):772-9.

Prediction of COPD Using CT Measurements of Pulmonary Artery and Aortic Diameter

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) is group of progressive lung disease which commonly includes emphysema and chronic bronchitis. Among non-communicable disease, COPD is estimated to be second largest cause of death in India. Computed Tomography (CT) of chest and measurements of arteries could be simple and effective modality for diagnostic evaluation of COPD.

Aim: To determine whether CT measurements such as Pulmonary artery and aortic artery diameters are useful in predicting COPD.

Materials and Method: A total of 291 patients was included in this retrospective study who had underwent CT thorax from April 2016 to April 2018. 194 patients with COPD were taken as cases and 97 patients without any history of COPD were taken as controls. Diameters such as Main pulmonary artery (MPA), right pulmonary artery (RPA), left pulmonary artery (LPA), ascending aorta (AAo) and descending aorta (DAo) was measured on an axial CT thorax image. Ratios of MPA/AAo and MPA/DAo were also calculated. Mann Whitney U test was used to compare CT measurements between two groups. Receiver operating characteristic (ROC) curve was used to find sensitivity and specificity of CT measurements in predicting COPD.

Results: The sensitivity and specificity for MPA, RPA, LPA, AAo, DAo, MPA/AAo and MPA/DAo was 77.3% & 83%, 74.8% & 79.5%, 71.8 & 78.8, 56.7% & 42.6%, 30.1 & 60.3, 17.3% & 33.8%, 18.9% & 33.8% respectively. There was significant difference in diameters such as MPA, RPA, LPA, AAo and DAo among two groups (p value <0.001). Whereas no significant difference was found in MPA/AAo and MPA/DAo ratios between two groups (p value >0.001).

Conclusion: In present study, we found significant increase in MPA, RPA and LPA diameters in COPD patients compared to controls. Henceforth, our study concludes that MPA, RPA and LPA diameters could be useful as reliable indicators in predicting COPD.

Keywords: *Computed Tomography (CT), Chronic Obstructive Pulmonary Disease (COPD), Main Pulmonary Artery diameter, Right Pulmonary Artery Diameter, Left Pulmonary Artery Diameter, Aortic Diameter*

Introduction

COPD is characterized by chronic obstruction of lung airflow that interferes with normal breathing and not fully reversible [1]. COPD is leading cause of morbidity and mortality worldwide. It is estimated to be second largest cause of death in India and fifth leading cause of deaths in worldwide [2, 3]. Patients with higher smoking index and exposure to biomass fuels are found to have more likelihood of developing COPD [4].

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COPD includes chronic bronchitis and emphysema [5]. Chest computed tomography (CT) is widely performed in patients with respiratory symptoms because of its simplicity and accessibility, although radiation exposure is a concern. In addition, Chest CT is a useful tool for thoracic vascular assessment. It could detect changes of small vessels, enlargements of the vessel and these anomalies are important for clinical implications[6]. The Mean diameter of Pulmonary Artery and Ascending Aorta ratio measured using CT was found to be one. However, the ratio in some COPD patients was not greater than one. Fewer studies have evaluated the role of measurements such as pulmonary diameters, aortic diameters and its ratios measured using CT to predict the COPD. Hence, study was aimed to find sensitivity and specificity of pulmonary artery diameters, aortic diameter and its ratio's in predicting COPD.

Materials and Method

This was a retrospective study conducted in Department of Radio diagnosis and Imaging on subjects who had undergone CT chest from April 2016 to April 2018. The study approval was obtained from Institutional Research Committee and Institutional Ethics Committee (IEC No. - 133/2018). A total of 291 patients with age ranging from 18- 80 years was included in the study. 194 patients (120 males and 74 females) with history of COPD were selected as cases and 97 patients (58 males, 39 males) without any history of COPD were selected as controls. Patients with congenital heart disease, valvular heart disease, aortic aneurysm, pulmonary arterial hypertension were excluded from the study.

The CT Chest was performed by using Philips 64 slice Brilliance CT scanner with the routine protocol. Patients were positioned on the CT couch in supine position, with the area coverage from the apex of the lung to domes of the diaphragm. The scanning protocol was the following: collimation of 64×0.625, rotation time 0.75 seconds, FOV 350 mm, tube voltage of 120 kVp, tube current of 250 mAs, pitch of 1.078, scan time 4.9 seconds, slice thickness of 5 mm, slice increment of 5 mm, a filter of sharp C and resolution standard. The scan of the required area of interest was performed on the acquired scannogram. The images were reformatted in to axial, coronal and sagittal planes and was sent to PACS. The main pulmonary artery, right pulmonary artery, ascending aorta and descending aorta was measured at the level of pulmonary artery bifurcation (Fig. 1). The left pulmonary artery (LPA) diameters was measured at the widest part after main pulmonary artery bifurcation (Fig. 2). All the diameters were measured by using measuring tools in DICOM Imaging software of Mediff technology and were noted in millimeter (mm). The ratio of main pulmonary artery/ascending aorta and main pulmonary artery/descending aorta was also calculated. The measurements were taken by two readers who were blinded to the diagnosis and measured at different time periods. The inter and intra observer variability was calculated.

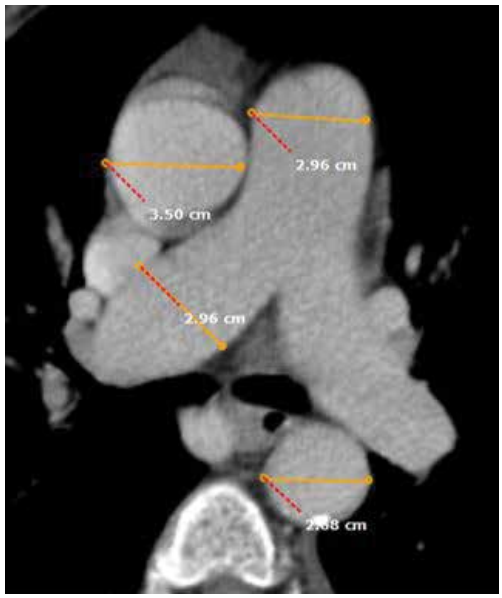


Fig. 1: Axial CT Thorax image showing measurement of main pulmonary artery (MPA), right pulmonary artery (RPA), ascending aorta (AAo) and descending aorta (DAo)

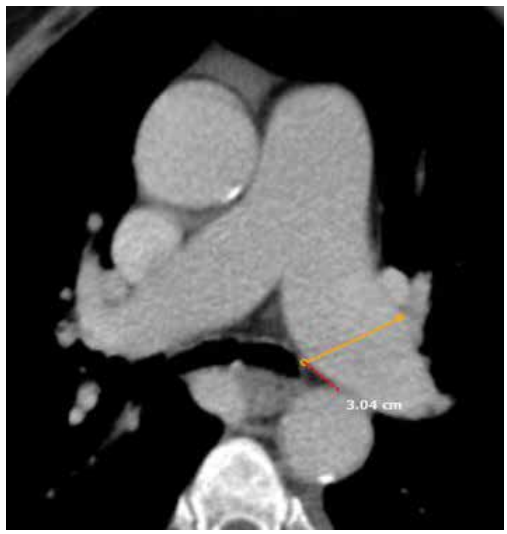


Fig. 2: Axial CT thorax image showing measurement of left pulmonary artery (LPA) diameter

Data Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences version (SPSS version 22.0). Data were presented by mean ± standard deviation. ROC curve was used to find sensitivity and specificity of pulmonary artery, aortic diameters and its ratio in predicting COPD. Mann Whitney U test was used to compare diameters and its ratio between two groups. Intra observer and Inter observer variability for measurements was using students t-test and kappa value

Findings: A total of 291 patients were included in this study which includes 194 cases and 97 controls. The descriptive statistics for the measured diameters were reported, which shows the mean and standard deviation of both groups (Table 1).

Table 1: Mean and standard deviation of the pulmonary artery, aortic diameter and its ratio for COPD and controls

Diameters (mm)	COPD (n=197)	Control (n= 94)	p value
MPA	26.8 ± 0.47	24.0 ± 0.29	< 0.001
RPA	22.5 ± 0.36	19.7 ± 0.31	< 0.001
LPA	21.4 ± 0.35	19.6 ± 0.27	< 0.001
AAo	32.3 ± 0.41	30.1 ± 0.41	< 0.001
Dao	24.8 ± 0.33	23.6 ± 0.32	0.006
MPA/AAo	0.8387 ± 0.16	0.8080 ± 0.11	0.371
MPA/Dao	1.0961 ± 0.22	1.0310 ± 0.15	0.062

MPA – Main Pulmoary Artery,RPA - Right Pulmonry Artery, LPA – Left Pulmonary Artery, AAo – Ascending Aorta, DAo – Descending Aorta, COPD – Chronic Obstructive Pulmonary Disease.

For Comparison of pulmonary artery, aortic diameter and ratios between two groups Mann Whitney U test was used. There was statistically significant difference in the diameters such as MPA, RPA, LPA, AAO and DAO ($p<0.001$) between COPD and controls. But there was no statistically significant difference in ratios such as MPA/AAO and MPA/DAO between COPD cases and controls ($p >0.001$). Main pulmonary artery, right pulmonary artery, left pulmonary artery diameter, Ascending Aorta, Descending Aorta were larger in COPD group compared to control group. (Fig. 3)

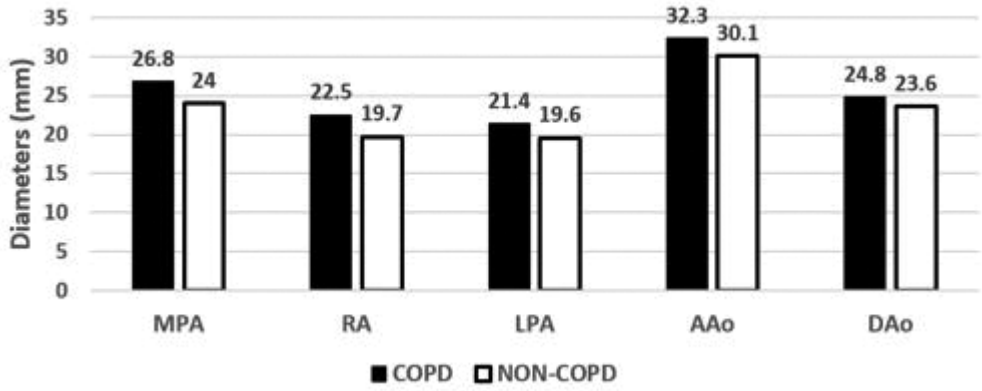


Fig. 3: Comparison of MPA, RPA, LPA, AAo and DAo diameters between COPD and non–COPD

Receiver operating characteristic (ROC) curve was used to find sensitivity and specificity of diameters measured using CT in predicting COPD (Fig. 4). Sensitivity and specificity of measured pulmonary artery, aortic diameters and ratio's for predicting COPD were evaluated (Table 2). MPA, RPA, LPA measured using CT were found to have greater accuracy in predicting COPD. Among the three measurements MPA has highest sensitivity and specificity in detecting COPD

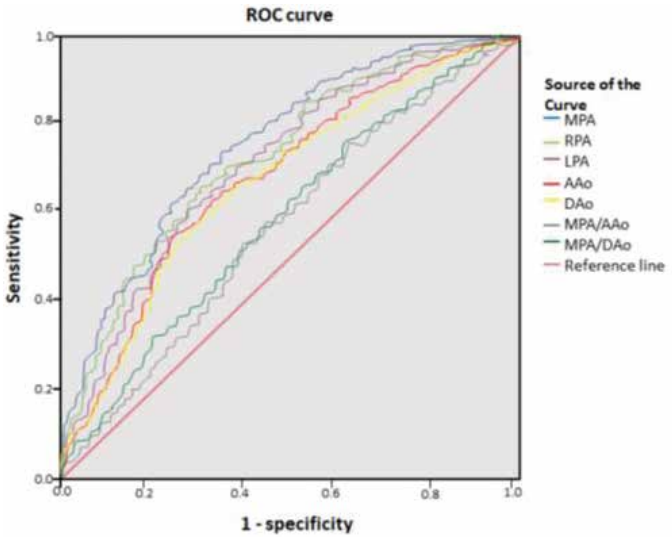


Fig. 4: Receiver operating characteristic (ROC) curves showing the diagnostic accuracy of different CT measurements for COPD

Table 2: Area under the curve, sensitivity and specificity of pulmonary artery, aortic diameters for predicting COPD

Diameters	AUC	Sensitivity(%)	Specificity(%)
MPA	0.681	77.3	83
RPA	0.737	74.8	79.5
LPA	0.682	71.8	78.8
AAo	0.646	56.7	42.6
Dao	0.599	30.1	60.3
MPA/AAo	0.532	17.3	33.8
MPA/DAo	0.568	18.9	33.8

MPA – Main Pulmoary Artery,RPA - Right Pulmonry Artery, LPA – Left Pulmonary Artery, AAo – Ascending Aorta, DAo – Descending Aorta

Intra- observer variability: There was no stastically significant difference between the measurements performed by Reader A and B at different time periods, according to paired student's t-test ($p<0.001$)

Inter-observer variability for the above measurements, the Kappa value was 0.97, suggesting good agreement and reproducibility.

Discussion

COPD is a chronic inflammatory disease which affects the structure and the function of the lung. CT is an important imaging tool to evaluate different characteristics and clinical outcomes in patients with COPD[7].

In our study we found that there was significant difference in pulmonary artery diameters and aortic diameters between case and controls with MPA, RPA, LPA diameters and width of AAo and DAo larger in COPD cases than those in the controls. The ratios of MPA/AAo and MPA/DAo was also calculated but there was no but there was no significant difference between two groups.

Madas et al, reported that the diameters of main pulmonary artery, right pulmonary artery and left pulmonary artery were significant higher in COPD group than the controls, but there was not much of difference in the ascending aorta and descending aorta diameters between the two sets of patients[8].

In a study conducted by Lee SH et al, Main pulmonary artery and Ascending aorta diameter was measured using CT in healthy Korean population. Mean MPA and Ao was 25.9mm and 30.0 mm respectively and the mean MPA/Ao ratio was 0.87 [9]. In our study

mean MPA and Ao was 24.0 and 30.1 respectively and the mean MPA/Ao ratio was 0.80 in healthy individual which is concordant with previous study.

Chen et al, reported that MPA could be used as best index for predicting COPD with threshold value 27.5mm, AUC 0.711, specificity 54% and sensitivity 80%. RPA was selected as best index for predicting COPD-PH with threshold value 23.4 mm, area under the curve 0.806, specificity 67% and sensitivity 76%[10]. However, in this present study MPA, RPA, LPA measured using CT were found to have greater accuracy in predicting COPD. Among the three measurements MPA has highest sensitivity71.3% and specificity 83% in predicting COPD.

Conclusion

Our study concludes that, there was a significant difference in pulmonary artery and aortic diameters between COPD patients and control group. Main Pulmonary Artery diameter measured using CT had highest sensitivity and specificity in predicting COPD. Therefore, Main Pulmonary artery, Right and left pulmonary artery diameter measured using CT could be useful as the indices for the diagnosis of COPD.

Ethical Clearance: The ethical approval for the study was obtained from Institutional Ethics Committee (IEC No. - 133/2018)

Source of Funding: Self

Conflict of Interest: nil

REFERENCES

1. Devine JF. Chronic obstructive pulmonary disease: an overview. American health & drug benefits. 2008 ;1(7):3
2. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. Available from: http://www.goldcopd.org
3. World Health Organization. Burden of COPD. Available from: http://www.who.int/repiratory/copd/burden/en/
4. Koul PA. Chronic obstructive pulmonary disease: Indian guidelines and the road ahead. Lung India: Official Organ of Indian Chest Society. 2013 Jul;30(3):175.
5. Berg K, Wright JL. The pathology of chronic obstructive pulmonary disease: progress in the 20th and 21st centuries. Archives of pathology & laboratory medicine. 2016;140(12):1423-8
6. Whiting P, Singatullina N, Rosser JH. Computed tomography of the chest: I. Basic principles. Bja Education. 2015;15(6):299-304.
7. Hahm CR, Lim MN, Kim HY, Hong SH, Han SS, Lee SJ, Kim WJ, Hong Y. Implications of the pulmonary artery to ascending aortic ratio in patients with relatively mild chronic obstructive pulmonary disease. Journal of thoracic disease. 2016;8(7):1524.
8. Madas S, Vittal DS. Estimation of measured pulmonary artery to aorta ratio for prognosis of pulmonary hypertension in chronic obstructive pulmonary disease patients. International Journal of Advances in Medicine. 2017;3(2):200-5.
9. Lee SH, Kim YJ, Lee HJ, Kim HY, Kang YA, Park MS, et al. Comparison of CT-determined pulmonary artery diameter, aortic diameter, and their ratio in healthy and diverse clinical conditions. PLoS One.2015;10(5):1–13.
10. Chen X, Liu K, Wang Z, Zhu Y, Zhao Y, Kong H, Xie W, Wang H. Computed tomography measurement of pulmonary artery for diagnosis of COPD and its comorbidity pulmonary hypertension. International journal of chronic obstructive pulmonary disease. 2015; 10:2525

Acute Anticonvulsant Activity of Diltiazem, Nimodipine and Flunarizine in Wistar Albino Rats by Maximum Electroshock-Induced Seizure

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ABSTRACT

Background and objectives: In spite of growing armamentarium of antiepileptic drugs, many patients continue to have seizures. This propels for search of novel and safe drugs for resistant and recurrent convulsions. Calcium channel blockers have been ascribed with anticonvulsant actions. The objective of the present study was to evaluate the anticonvulsant actions of diltiazem, nimodipine and flunarizine among Wistar albino rats in Maximum Electroshock-induced Seizure (MES) model.

Methodology: Thirty inbred Wistar rats weighing 150-200 grams of either sex, divided into five groups containing six rats in each. Group 3, 4 and 5 were pre-treated with diltiazem (20mg/kg), nimodipine (20mg/kg) and flunarizine (10mg/kg) respectively. Group 2 was standard group, received phenytoin (25mg/kg). The groups pre-treated with calcium channel blockers were compared with this standard. Group 1 was negative control and were given normal saline. All groups were subjected to MES. During and after the MES, the duration of flexion, duration of tonic hind limb extension and duration of clonus (in seconds) were noted. Abolition of hind limb extension and reduction (or absence) of the clonus duration after the drug administration were considered as anticonvulsant effect of the test drug.

Results: Rats pre-treated with diltiazem, nimodipine, flunarizine showed statistically significant reduction in duration of hind limb extension phase and clonic seizures. Total duration of the seizures was also significantly lower and comparable to phenytoin pre-treated rats. All rats in all groups survived the experiments indicating the doses used during the study were not lethal

Conclusions: Diltiazem (20mg/kg), nimodipine (20mg/kg) and flunarizine (10mg/kg) have anticonvulsant action among Wistar rats in MES model.

Keywords: *Calcium channel blockers; anticonvulsant; seizure; epilepsy; diltiazem; nimodipine; flunarizine; maximum electroshock model*

Introduction

In spite of availability of considerable number of anti-epileptic drugs, many patients continue to have seizures that are refractory to treatment defying our understanding and approaches of epilepsy[1]. In the search for a novel anticonvulsant drugs, many plant extracts and old drugs are evaluated for newer indications. With increasing understanding of epileptogenic molecular mechanisms, more avenues are opening.

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Many of the currently used anti-epileptic drugs are shown to inhibit calcium channel activity[2,3]. Theoretical considerations and few animal model studies have suggested that calcium channel antagonists may play a role as anticonvulsants[4]. These drugs are postulated to inhibit the positive inward burst firing activating wide range of neurons leading to seizures. To support such theoretical considerations, few animal model studies and clinical studies have shown that nimodipine has anticonvulsant property[5,6]. Combination of calcium channel blockers was shown to have mixed effects. Diltiazem enhances the nimodipine's antiseizure effects. Flunarizine inhibits nimodipine's effects[7]. During last decade of twentieth century, there was heightened interest in evaluation of calcium channel blockers for epilepsy at least in animal model. There were series of research reports pertinent to this area[8–12]. After the introduction of gabapentin, topiramate, tiagibine, levetiracetam and zonisamide, the evaluation of monotherapy for epilepsy has veined[13–15]. However, the evaluation continued as add on therapy both in animal model and in clinical trials[16–19].

There are many animal models have been developed over the previous two decades for evaluation of the novel anti-epileptic drugs. The maximal electroshock (MES) model remains as an important gatekeeper for such evaluation, in spite of the fact that it failed in levetiracetam efficacy[20]. MES model has been successfully used to prove the anticonvulsant action of plethora of plant extracts[21]. However, the evaluation of calcium channel blockers alone was done in limited number of studies. Sahadevan has shown the anticonvulsant action of nimodipine and flunarizine in mice MES model[22]. Diltiazem anticonvulsant effects were hitherto unevaluated in Indian set up in rat MES model.

The objective of the study was to evaluate the anticonvulsant effect of diltiazem, nimodipine and flunarizine in Wistar albino rats using MES model.

Methodology

Experiments were conducted with 36 inbred Wister rats, in 3–4 weeks old, weighing 150-200 grams, of either sex, were used in this study. All rats were obtained from animal house, BLDEU's Shri B M Patil Medical College, Vijayapura, Karnataka state. Animals were group housed in cages of six with water and food supplied ad libitum. The temperature was maintained at 25° ± 1 °C and relative humidity of 41.55%. A 12:12, light: dark cycle was following during the experiment. The experiment was carried out during 1200-1400 hr. Animals had free access to food and water. However, food but not water was withdrawn 8hr before and during the experiments.

Institutional animal ethics committee, BLDEU's Shri B M Patil Medical College, Vijayapura, Karnataka state, (with CPCSEA, India registered) (approval letter number: 32/16, dated-16.01.2016) and also Institutional animal ethics committee, KMCH College of Pharmacy, Coimbatore, Tamil Nadu, (approval letter number: KMCRET/PhD/05/16-17, dated-22.02.2016) approved the study before the start of the study

Evaluation of anticonvulsant activity-Maximum electroshock (MES) model: The rats were pretested prior to the drug administration for the electroshock sensitivity. Convulsions were induced by using electro-convulsiometer (Techno India Ltd). MES stimulation were given using trans-auricular (ear-clip) electrodes from the apparatus. Intensity of MES was at 150mA for 0.2 seconds, with constant voltage stimulators of 250 V. At this intensity and duration all the control group rats exhibited tonic hind limb extension. Only those rates that consistently exhibited the tonic hind lime extension in three trials on three separate days were used for the study[21].

Rats were divided onto five groups of six each. The division and administration of the drugs are tabulated in the Table 1. All groups were subjected to MES.

Table 1: Description of groups and drugs administered during the study (n = 30)

Group	Description	Drug administered
I	Control group	Normal saline equivalent (PO)
II	Standard group	Phenytoin sodium 25 mg/ kg body weight
III	Diltiazem group	Diltiazem 20mg/kg (PO)
IV	Nimodipine group	Nimodipine 20mg/kg (PO)
V	Flunarizine group	Flunarizine 10mg/kg (PO)

During and after the MES, the duration of flexion, duration of tonic hind limb extension and duration of clonus (in seconds) were noted.

Abolition of hind limb extension and reduction (or absence) of the clonus duration after the drug administration were considered as anticonvulsant effect of the test drug.

Statistical analysis: The data obtained was expressed as mean ± standard deviation. Comparison of the data was done by one-way ANOVA, followed by Dunnett comparison. P value of less than 0.05 was taken as significant.

Results

MES induced seizures: Following the ear electrode stimulus, an immediate tonic seizure with hind limb extension was observed in all animals of group I and group II. There were no signs of toxicity in the control groups. The positive control group administered with phenytoin did not show the phase of clonic seizures. The latency of onset of flexion, extension and clonic seizures is tabulated in Table 2.

Table 2: Tabulation of latency and duration of seizures (expressed as mean ± standard deviation in seconds) in all the groups of rats in MES model (n = 36)

Time in seconds					Recovery/ mortality
Group	Flexion	Extension	Clonus	Duration	
Only MES	8.167 ± 0.47	11.167 ± 3.75	20.667 ± 4.35**	107 ± 23.84	Recovery
MES+ Phenytion 25 mg/kg	1.2 ± 0.68	4.83 ± 1.66*	0	43 ± 9.33*	Recovery
MES + Diltiazem 20mg/kg	1.16 ± 0.47	1.5 ± 1.5†	4 ± 2.543*	67.16 ± 14.06†	Recovery
MES + Nimodipine 20mg/kg	1.5 ± 0.67	3.5 ± 2.21†	5.5 ± 3.86*	69 ± 14.66†	Recovery
MES + Flunarizine 10mg/kg	1.02 ± 0.68	3 ± 1.91†	13.6 ± 6.28†	75.66 ± 5.40†	Recovery

Rats pre-treated with diltiazem, nimodipine, flunarizine showed statistically significant reduction in duration of hind limb extension phase and clonic seizures. Total duration of the seizures was also significantly lower and comparable to phenytoin pre-treated rats. All rats in all groups survived the experiments indicating the doses used during the study were not lethal.

Discussion

Calcium channels, both L-type and T-type has been increasingly implicated in epileptogenesis[2–4,23]. It is postulated that calcium channel antagonists have anti-seizure and neuroprotective roles. Many previous studies have demonstrated such anti-seizure actions of calcium channel blockers in rat MES model. Nifedipine (in doses of 10mg/kg), amlodipine (in doses of 1-4mg/kg)[11,12,16], felodepine (in doses of 5-10 mg/kg)[10], verapamil (in doses of 5 mg/kg)[5,15,19], flunarizine(in doses of 5 mg/kg)[17,18], nicardipine (in doses of 5 mg/kg)[17], nimodipine (in doses of 5-10 mg/kg) [5,6,17,18] and diltiazem (in doses of 5-10 mg/kg) have been shown to have anti-seizure actions in animal models. In the present study as well, diltiazem, nimodipine and flunarizine were proven to have anti-seizure actions.

Contrary to our findings, diltiazem was shown to have no anticonvulsant action even with increasing doses among mice MES model[22]. However, diltiazem was shown to have anticonvulsant actions in many other studies in the past[15,19]. In addition, diltiazem has been shown to enhance the actions of oxcarbazepine[14] and topiramate[19]. In the similar way, amlodipine has been shown to be anticonvulsant when used singly[9,11,15]. Amlodipine also enhances the anticonvulsant actions of lamotrigine, gabapentin and topiramate[13,16,19].

With patients continuing to have recurrent episodes of convulsions while on anticonvulsant therapy, the search for novel and safe effective in such resistant individuals endures. In this study an attempt was made to show the anticonvulsant effects of three calcium channel blockers – diltiazem, nimodipine and flunarizine. The effects in MES model, however, need not necessarily translate to the clinical effects in epileptic individuals. Further tests, both animal model and pre-clinical tests, evaluating the neurotransmitter levels in the specific areas of the brain, pathological alterations in the neuronal cells structure and functions as proven at least by histological and immunohistopathological studies shall add to the findings of the present study. The handling of free radicals in the brain and consequent brain inflammation has been postulated as potential epileptogenic mechanism[24]. Studies evaluating the oxidative stress, both in animal model and preclinical set up using these drugs shall make calcium channel blockers potential drugs for epilepsy.

Limitations of the study: Use of multiple animal models nullifies short comings of each other and achieves better clinical correlations in humans. Dose variations during MES model would have provided minimum effective dose (ED50) of the drugs. Use of standard anti-epileptic drug in each group would have evaluated the additive role the calcium blockers. Currently only calcium channel blockers are used – that are rarely clinically used as standalone therapy for epilepsy.

Conclusions

Diltiazem (20mg/kg), nimodipine (20mg/kg) and flunarizine (10mg/kg) have anticonvulsant action among Wistar rats in MES model

Acknowledgements

The authors thank the animal house in-charge of BLDEU's Shri B M Patil Medical College, Vijayapura, Karnataka state and also the animal house, KMCH College of Pharmacy, Coimbatore,Tamil Nadu.

Conflict of Interest: Authors declare no conflict of interest

Source of Funding: Nil

Ethical Clearance: Institutional animal ethics committee, BLDEU's Shri B M Patil Medical College, Vijayapura, Karnataka state, (with CPCSEA, India registered) (approval letter number: 32/16, dated-16.01.2016) and also Institutional animal ethics committee, KMCH College of Pharmacy, Coimbatore, Tamil Nadu, (approval letter number: KMCRET/ PhD/05/16-17, dated-22.02.2016) approved the study before the start of the study

REFERENCES

1. Wilcox KS, Dixon-Salazar T, Sills GJ, Ben-Menachem E, White HS, Porter RJ, et al. Issues related to development of new anti-seizure treatments. Epilepsia. 2013 Aug;54(0 4):24–34.
2. Kopecky BJ, Liang R, Bao J. T-type Calcium Channel Blockers as Neuroprotective Agents. Pflugers Arch. 2014 Apr;466(4):757–65.
3. Cain SM, Snutch TP. Voltage-Gated Calcium Channels in Epilepsy. In: Noebels JL, Avoli M, Rogawski MA, Olsen RW, Delgado-Escueta AV, editors. Jasper's Basic Mechanisms of the Epilepsies [Internet]. 4th ed. Bethesda (MD): National Center for Biotechnology Information (US); 2012 [cited 2019 Jun 5]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK98147/
4. Kułak W, Sobaniec W, Wojtal K, Czuczwar SJ. Calcium modulation in epilepsy. Pol J Pharmacol. 2004 Feb;56(1):29–41.
5. Wurpel JN, Iyer SN. Calcium channel blockers verapamil and nimodipine inhibit kindling in adult and immature rats. Epilepsia. 1994 Apr;35(2):443–9.
6. Moreno LCG e AI, Cavalcanti IMF, Satyal P, Santos-Magalhães NS, Rolim HML, Freitas RM. Acute toxicity and anticonvulsant activity of liposomes containing nimodipine on pilocarpine-induced seizures in mice. Neurosci Lett. 2015 Jan 12;585:38–42.
7. Morón MA, Stevens CW, Yaksh TL. Diltiazen enhances and flunarizine inhibits nimodipine's antiseizure effects. Eur J Pharmacol. 1989 Apr 25;163(2):299–307.
8. El-Azab MF, Moustafa YM. Influence of calcium channel blockers on anticonvulsant and antinociceptive activities of valproic acid in pentylenetetrazole-kindled mice. Pharmacol Rep PR. 2012;64(2):305–14.
9. Sathyanarayana Rao KN, Subbalakshmi NK. An experimental study of the anticonvulsant effect of amlodipine in mice. Singapore Med J. 2010 May;51(5):424–8.
10. Kishore M S, Pushpa V H, Padmaja Shetty K, Kalabharathi H L, Satish A M. Evluation of the antiepileptic activity of felodepine in albino mice. Int J Pharm Pharm Sci. 2014;6(6):498–500.
11. B R, M J, Y VR. Evaluation of anticonvulsant activity of amlodipine in albino rats. Int J Basic Clin Pharmacol. 2017 Feb 24;6(3):664–8.
12. Jagathi Devi N, Prasanna V. Effect of amlodipine and indomethacin in electrical and picrotoxin induced convulsions in mice. Int J Med Res Health Sci 201433592-596.
13. Hassan M, Masoud A. Effect of amlodipine on the antiepileptic action of lamotrigine, gabapentin

and topiramate on maximal electroshock induced seizures in mice. Natl J Physiol Pharm Pharmacol. 2014;4(3):201.

14. Zadrożniak A, Trojnar M, Trojnar M, Kimber-Trojnar Ż, Dudra-Jastrzębska M, Andres-Mach M, et al. Diltiazem enhances the protective activity of oxcarbazepine against maximal electroshock-induced seizures in mice. J Pre-Clin Clin Res. 2008 Dec 9;2(2):147–52.
15. Luszczki JJ, Trojnar MK, Trojnar MP, Kimber-Trojnar Z, Szostakiewicz B, Zadrozniak A, et al. Effects of three calcium channel antagonists (amlodipine, diltiazem and verapamil) on the protective action of lamotrigine in the mouse maximal electroshock-induced seizure model. Pharmacol Rep PR. 2007 Dec;59(6):672–82.
16. Kamiński RM, Mazurek M, Turski WA, Kleinrok Z, Czuczwar SJ. Amlodipine enhances the activity of antiepileptic drugs against pentylenetetrazole-induced seizures. Pharmacol Biochem Behav. 2001 Apr 1;68(4):661–8.
17. Czuczwar SJ, Gasior M, Janusz W, Kleinrok Z. Influence of flunarizine, nicardipine and nimodipine on the anticonvulsant activity of different antiepileptic drugs in mice. Neuropharmacology. 1992 Nov;31(11):1179–83.
18. Gasior M, Kamiński R, Brudniak T, Kleinrok Z, Czuczwar SJ. Influence of nicardipine, nimodipine and flunarizine on the anticonvulsant efficacy of antiepileptics against pentylenetetrazol in mice. J Neural Transm Vienna Austria 1996. 1996;103(7):819–31.
19. Luszczki JJ, Trojnar MK, Trojnar MP, Kimber-Trojnar Z, Szostakiewicz B, Zadrozniak A, et al. Effects of amlodipine, diltiazem, and verapamil on the anticonvulsant action of topiramate against maximal electroshock-induced seizures in mice. Can J Physiol Pharmacol. 2008 Mar;86(3):113–21.
20. French JA, White HS, Klitgaard H, Holmes GL, Privitera MD, Cole AJ, et al. Development of new treatment approaches for epilepsy: unmet needs and opportunities. Epilepsia. 2013 Aug;54 Suppl 4:3–12.
21. Castel-Branco MM, Alves GL, Figueiredo IV, Falcão AC, Caramona MM. The maximal electroshock seizure (MES) model in the preclinical assessment of potential new antiepileptic drugs. Methods Find Exp Clin Pharmacol. 2009 Mar;31(2):101–6.
22. P. Sahadevan, M.N. Rema. A comparative experimental study of the anticonvulsant effect of three calcium channel blockers in albino mice. Indian J Pharmacol. 2002;34:52–5.
23. Köhling R, Straub H, Speckmann EJ. Differential involvement of L-type calcium channels in epileptogenesis of rat hippocampal slices during ontogenesis. Neurobiol Dis. 2000 Aug;7(4):471–82.
24. Aguiar CCT, Almeida AB, Araújo PVP, de Abreu RNDC, Chaves EMC, do Vale OC, et al. Oxidative Stress and Epilepsy: Literature Review. Oxid Med Cell Longev [Internet]. 2012 [cited 2019 Jun 5];2012. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3403512/

Isolated and Combined Effect of Plyometric and Weight Training on Selected Physical Fitness and Hematological Variables of Football Players

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ABSTRACT

In this research eighty football players were selected as samples from colleges under M.G University, Kottayam. And the variables selected were Physical fitness variables- speed and explosive power and Hematological variables-RBC count and Hemoglobin percentage. After employing 12 weeks of isolated and combined plyometrics and weight training for selected subjects who were divided into four groups, a significant difference was observed in all selected variables. There is also significant difference among the groups after applying Scheffe's post hoc test.

Keywords: *Physical fitness, Speed, Explosive power, Hematological variables, RBC count, Hemoglobin percentage*

Introduction

In ancient times, our ancestors showed extraordinary talent in terms of physical activity in olden days. Sports and games have turned into professional dimension due to the tough competitions in the fields.[1] People have started involving in various sports idea irrespective of their age to be creative and competitive. Participation and practice alone don't help in the success of an individual. The quality of a sports life has been affected through various factors such as physiology, sports training, sociology, computer technology.[2]

Sports training are now one of the most closely watched research streams of all time.[3] Aim to excel in maximum performance and achieving goals at desirable time is always the prime objective. In sports population resistance training has shown to impel a positive hypertrophic, neuromuscular and strength improvement everywhere around the world.[4] Plyometric training which is one of the most effective training to bring up explosive power. [5] Studies have found that resistance training is effective and safe training method to develop hypertrophic increase in youth athletes. Similarly, if done properly plyometric training exhibits greater increase performance variables of an athletes.[6] A combination of these two method training can improve performance to greater extent.

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Subjects' Selection: For the purpose of the study eighty football players was chosen as samples from colleges under M.G University, Kottayam.

Selection of Variables

Physical fitness variables: speed and explosive power and

Hematological variables: RBC count and Hemoglobin percentage

Selection of Test: The following standard test will be administrated to collect relevant data from the subjects. Speed-50m Dash, explosive power-standing broad jump,RBC count and hemoglobin percentage laboratory test.

Experimental Design

- The random group design will be experimental design. A random selection of 80 subjects 20 into 4 groups three experimental where combined and

isolated training were given. The last one was considered as control group and no training were given.

- Experimental Group 1 Combined Plyometrics + weight training
- Experimental Group 3 weight training - isolated training
- Experimental group 2 plyometrics training - isolated training
- Group D Control group

Training Protocol

No. of training weeks: 12 weeks

Group 1- Combined training- plyometric and circuit training

Group 2- Isolated training- weight training

Group 3- Isolated training –Plyometric training

Group 4- No workout

Isolated Plyometric training -3 days per week

Isolated Circuit training - 3 days per week

Combined training - 3 days per week

Statistical Technique: The data collected from the subjects after the **12 weeks** of training was analyzed statistically with the analysis of covariance **(ANCOVA)** to evaluate the differences, if occurring, between the groups on chosen dependent variables individually. If attained **'F' ratio** for the post test adjusted was significant, the **Scheffe's test** was used as post hoc test for finding out paired mean differences. The confident level was maintained at 0.05 to determine the significance to be appropriate. The results using Analysis of co-variance and post hoc value are listed in table I and II.

Result

Table I: Computation of Analysis of Covariance

Variable	Group	Pretest		Posttest		Df		F
		Mean	Sd	Mean	Sd	Between	Within	
Speed	Ex 1	7.07	0.15	6.92	0.14	3	76	21.79*
	Ex 2	7.10	0.22	6.55	0.28			
	Ex 3	7.06	0.35	6.93	0.25			
	Ctrl	7.10	0.18	7.09	0.16			
Explosive Power	Ex 1	2.46	0.10	2.67	0.14	3	76	14.70*
	Ex 2	2.35	0.22	2.45	0.21			
	Ex 3	2.31	0.15	2.48	0.12			
	Ctrl	2.29	0.17	2.32	0.16			
RBC count	Ex 1	4.94	0.37	5.85	0.17	3	76	70.43*
	Ex 2	5.16	0.30	5.90	0.09			
	Ex 3	4.90	0.30	5.53	0.28			
	Ctrl	4.86	0.27	4.97	0.30			
Haemoglobin Count	Ex 1	14.63	0.57	15.68	0.59	3	76	17.62*
	Ex 2	14.59	0.59	15.46	0.56			
	Ex 3	14.31	0.50	14.47	0.75			
	Ctrl	14.45	0.52	15.08	0.54			

Table value required for significance at 0.05 confident level for 3 and 76 is 2.728.

Table II: Post-hoc value

Variable	Ex1 & Ex2	Ex1 & Ex3	Ex1 & Ctrl	Ex2 & Ex3	Ex2 & Ctrl	Ex3 & Ctrl	CI value
Speed	0.38	0.02	0.15	0.4	0.53	0.13	**0.57**
Explosive Power	**0.25***	**0.19***	**0.35***	0.06	0.10	**0.16***	**0.15**
RBC count	0.03	0.32	0.87*	0.35	**0.90***	0.55	**0.47**
Hb Count	0.2	**0.78***	**0.73***	**0.58***	0.53	0.05	**0.56**

Significance at 0.05 confident level

Discussion and Conclusion

The results from table I indicated that 'F' value obtained for speed, explosive power, RBC count and haemoglobin count are significant as the values found greater than 2.72 which is the required table value for at 0.05 significant level. Scheffe's post-hoc test indicated the following results

- Speed: no significant difference between adjusted mean between the four group
- Explosive power: significant difference among Group 1 and 2, group 1 and 3, and group 1 and control group.
- RBC count: significant difference among Group 1 and control group; group 2 and control group.
- Hb count: significant difference between Group 1 and 3, group 1 and control group, and group 2 and 3.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Larson RW. Toward a psychology of positive youth development. American psychologist. 2000 Jan;55(1):170.
2. Helsen WF, Starkes JL, Hodges NJ. Team sports and the theory of deliberate practice. Journal of Sport and Exercise psychology. 1998 Mar;20(1):12-34.
3. De Bosscher V, De Knop P, Van Bottenburg M, Shibli S. A conceptual framework for analysing sports policy factors leading to international sporting success. European sport management quarterly. 2006 Jun 1;6(2):185-215.
4. Mistry AD. *Effects of Yoga on Low Back Stability, Strength and Endurance* (Doctoral dissertation, Virginia Tech).
5. Bruce-Low S, Smith D. EXPLOSIVE EXERCISES IN SPORTS TRAINING: A CRITICAL REVIEW. Journal of Exercise Physiology Online. 2007 Feb 1;10(1).
6. Lyttle AD, Wilson GJ, Ostrowski KJ. Enhancing performance: Maximal power versus combined weights and plyometrics training. Journal of Strength and Conditioning Research. 1996 Aug 1;10:173-9.

Effect of Game Specific Circuit Training and Plyometrics on Selected Physiologicaland Hematologica Variables of Handball Players

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ABSTRACT

To achieve the purpose of this study, 64 intercollegiate level handball players from M.G University, Kottayam were selected as subjects. The variables selected of this research were Physiological variables namely Vital capacity and respiratory rate and Hematological variables like RBC count and Hemoglobin count. After engaging twelve weeks of game specific circuit training and plyometrics for selected subjects, divided into four groups. The findings revealed that there was a difference significantly in all selected variables. After applying the test of Scheffe's post hoc, it was found that there is significant differences between groups were found.

Keywords: *Hand ball, Vital capacity, Respiratory rate, RBC count, Hemoglobin count*

Introduction

Sport is a form of physical activity which involves skills for a competition or entertainment by casual or organized involvement of participants.[1] It is an event that provides physical fitness through joyful activities. The modern civilization gives immense recognition to sports and physical fitness which leads to the good establishments of the organization of sports.[2] The sports play a significant role in contemporary society in terms of awareness about health and fitness, entertainment, profession, money etc.[3]

The present scenario of competitive sports is being portrayed by professionalism at the different levels of competitions. The desires of the athletes for earning fame and wealth is the contributing factor of the professionalism.[4] Scientific preparations of the sportspersons for the competitions play a vital role in the enhancement of the performances. To display the upper hand against the opponent the researchers and coaches develop their techniques and strategies.[5] The frequent breaking of national and international records was possible by these technological and tactical advancements in the sports field. The scientific examinations in the performance by the athletes are playing an imperative role in evaluating the success. The popularity and the place of prominence of sports and games are in fastest pace which it has gained from past decades by the hard works of sportspersons, coaches, researchers, media, organizers etc.[6]

Subjects and Variables Selection: To achieve the purpose of this study, sixty-four intercollegiate level handball players from M.G University, Kottayam were selected as subjects.

The variables selected of this research were Physiological variables namely Vital capacity and respiratory rate and Hematological variables like RBC count and Hemoglobin count.

Selection of test

Vital capacity	Spirometry (using wet spirometer)
Respiratory test	Chest-abdomen expansion monitoring test
RBC count	CBC test (Laboratory test)
Haemoglobin count	CBC test (Laboratory test)

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Experimental Design: The comparative group design was the design of the study of this research. The total number of chosen subjects was put to an equal division of four groups. Three experimental groups namely Game specific circuit training group, plyometric training group and a combined plyometric- game specific circuit training group and the fourth group was controlled group.

- Group A– Experimental : Plyometric and circuit training (Combined training)
- Group B – Experimental : Plyometric training (Isolated training)
- Group C– Experimental : Circuit training (Isolated training)
- Group D – Control : No training

Training Protocol

No. of training weeks:	12 weeks
Isolated Plyometric training	-3 days per week
Isolated Circuit training	-3 days per week
Combined training	-3 days per week

Statistical Technique: After the twelve-week training programme, the data were examined statistically by with the analysis of covariance **(ANCOVA)** to evaluate the significant differences. The test of **Scheffe's post-hoc** was used to determine the paired mean differences, if **'F' ratio** for the adjusted post test was found to be significant. The level of confidence will be fixed at 0.05 to evaluate the significance. The results obtained were present in the table I and table II.

Result

Table I: Descriptive statistics and Computation of Analysis of Covariance

Variable	Group	Pretest		Posttest		Df		F
		Mean	Sd	Mean	Sd	Between	Within	
Vital capacity	Ex 1	3356	292.61	4840	257.69	3	60	144.74*
	Ex 2	3378	280.45	4718	248.24			
	Ex 3	3381	292.04	3509	255.09			
	Ctrl	3331	269.49	3359	276.41			
Respiratory rate	Ex 1	15.50	1.46	12.06	1.23	3	60	35.14*
	Ex 2	15.31	1.30	11.68	0.60			
	Ex 3	15.31	1.74	14.87	1.14			
	Ctrl	15.56	2.03	15.00	1.59			
RBC count	Ex 1	4.95	0.21	5.65	0.36	3	60	26.90*
	Ex 2	4.96	0.25	5.85	0.18			
	Ex 3	5.03	0.25	5.51	0.28			
	Ctrl	4.95	0.26	4.94	0.38			
Haemoglobin Count	Ex 1	14.56	0.52	15.62	0.64	3	60	11.77*
	Ex 2	14.60	0.58	15.44	0.57			
	Ex 3	14.32	0.51	14.45	0.51			
	Ctrl	14.45	0.52	14.79	0.78			

Required table value for significance at 0.05 confident level for 3 and 60 is 2.76.

Table II: Post-hoc value

Variable	Ex1 & Ex2	Ex1 & Ex3	Ex1 & Ctrl	Ex2 & Ex3	Ex2 & Ctrl	Ex3 & Ctrl	CI value
Vital capacity	125.74	**1335.67***	**1476.84***	**1209.93***	**1351.1***	141.17	**261.30**
Respiratory rate	0.32	2.868	**2.92***	**3.18***	**3.24***	0.06	**1.15**
RBC count	0.2	0.14	**0.72***	**0.34***	**0.92***	**0.58***	**0.31**
Hb Count	0.19	**1.16***	**0.82***	**0.97***	0.63	0.34	**0.65**

Significance at 0.05 confident level

Discussion and Conclusion

From the able I it can be noted that 'F' value obtained for Vital capacity, respiratory rate, RBC count and haemoglobin count are significant as the values found greater than 2.76 which is the required table value required for significance at 0.05 significant levels. Scheffe's post-hoc test indicated the Vital capacity: significant difference between Group 1 and 3, group 1 and control group, group 2 and 3 and group 2 and control group. In Respiratory rate, significant difference was observed between Group 1 and control group, group 2 and 3, and group 2 and control group. Significant difference in RBC are between Group 1 and control group, and group 2 and 3, group 2 and control group, group 3 and control group. In Hb count the significant difference between Group 1 and 3, group 1 and control group, and group 2 and 3.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Chelladurai P. Managing organizations for sport and physical activity: A systems perspective. Taylor & Francis; 2014 Apr 15.
2. Guttmann A. From ritual to record: The nature of modern sports. Columbia University Press; 2004.
3. Maguire JS. Leisure and the obligation of self-work: An examination of the fitness field. Leisure studies. 2008 Jan 1;27(1):59-75.
4. Duda JL. Relationship between task and ego orientation and the perceived purpose of sport among high school athletes. Journal of sport and exercise psychology. 1989 Sep;11(3):318-35.
5. Kapp KM. The gamification of learning and instruction: game-based methods and strategies for training and education. John Wiley & Sons; 2012.
6. Siedentop DL, Hastie P, Van der Mars H. Complete guide to sport education. Human Kinetics; 2019 Feb 28.

"A Study to Assess Coping Stratergies among Parents of Mentally Challenged Children at Selected Special Schools of Miraj, Kupwad and Kolhapur Corporation Area"

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ABSTRACT

A quantitive study was conducted by Mr. Akshay. B. Pawar In partial fulfillment of the requirement for the award of Master of Science degree in nursing, Bharati Vidyapeeth (Deemed to be) University, Pune.

Aims:

1. To assess the coping strategies adopted by parents of mentally challenged children.
2. To find out association between the coping strategies with selected demographic variables

Materials and Method: Non-experimental descriptive research design was used to assess the coping strategies among parents of mentally challenged children at selected special schools of Miraj, kupwad and Kolhapur corporation area. The reliability coefficient "r" of the coping strategy rating scale was 0.9, hence it was found reliable. Total 100 samples were selected by Non- Probability purposive sampling method. A coping strategy rating scale of 25 items was administered to assess coping strategies among parents of mentally challenged children. The conceptual framework based on the Roy's Adaption theory, developed by Sister Callista Roy which consists of four major concepts i.e. Input, Control process, Effectors and Output through which the individual cope with the stressors

Results and Conclusion: The study revealed that the parents of mentally challenged children were using some coping strategies i.e. are watching TV or going for film with family members i.e.(54%); trying to found several alternatives i.e.(53%); reducing household budget i.e.(51%); sharing difficulties with friends and relatives i.e.(55%); doing meditation i.e.(54%) at the maximum level. The chi square computed between coping strategies with selected demographic variables and showed that coping strategy was dependent on, education, monthly income and type of family of parents. But it was not dependent on gender, religion, occupation, Number of family member and duration of child mental illness.

Keywords: *Coping Strategies, Parents, Mentally Challenged Children, Special School.*

Introduction

Background: A parent is a caregiver of the offspring in their own species. In humans, a parent is the caretaker of a child. Parenting is a challenging process. The crucial role of parents and family in caring, nurturing, protecting and socializing young children is well established across the cultures. Strong parent-child connectedness improves child academic outcomes, self esteem, mental health and has later protective effects of reducing the likelihood of alcohol and drug use in adolescence, high risk sexual behavior and involvements in interpersonal

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violence (Lezin et al., 2004)[1]. Parenting can influence children's social, emotion, and academic adjustment, efforts have been made to determine factors that affect parenting behavior. One such factor is parenting stress. Parenting stress can be defined as excess anxiety and tension specifically related to the role of a parent and to parent-child interactions (Abidin, 1995)[2].

Parenting is a highly stressful job, and becoming a parent of a child with a disability is one of the most stressful life events that can occur. According to the centers for disease control and prevention (CDC, 2015), approximately 1 in every 33 babies is born with a birth defect, and about 1 in 6 children is born with a developmental disability[3]. A child born into family is usually received with joy and considered a blessing but when the child is handicapped and blessing is clearly mixed. Acceptance of child with mental handicap becomes difficult to parents and the whole family particularly when competence and achievement are very much valued in modern world. A parent shows a series of reactions after knowing that their child is disabled. These included shock, denial, guilt, sorrow, rejection and acceptance. Questions like 'why me?' 'How can it be?' keep arising without answers[4].

Coping includes behavioral strategies that individuals use to reduce the effect or demands of stress (Khan &Humtsoe, 2016). According to Folk man and Lazarus (1984), coping efforts serves two main functions: management of the person-environment relationship and regulation of associated stressful emotions. Lazarus (1980) defined coping as "the cognitive and behavioral efforts made to master, tolerate, or reduce external and internal demands appraised as taxing or exceeding the resources of the individual"[5].

Coping, defined as action-oriented and intrapsychic efforts to manage the demands created by stressful events, is coming to be recognized both for its significant impact on stress-related mental and physical health outcomes and for its intervention potential. Stress is a negative experience, accompanied by predictable emotional, biochemical, physiological, cognitive, and behavioral accommodations (Baum 1999). Coping is the process of attempting to manage the demands created by stressful events that are appraised as taxing or exceeding a person's resources (Lazarus &Folkman 1984). Coping is an individual's continuous effort in thoughts and actions to manage specific external or internal demands appraised to be challenging and overwhelming to the individual. In addition, coping is considered highly contextual, in that its effectiveness is determined by the ability to change over time and across different conditions (Folkman& Lazarus, 1985)[6].

Material and Method

Non-Experimental Descriptive exploratory research design was used to assess the coping strategies among parents of mentally challenged children at selected special schools of Miraj, kupwad and Kolhapur corporation area. Sample size was 100 and sample was selected by Non-probability purposive sampling method. After clearance by the ethical review committee data collection was started a prior permission was taken from the respective authorities and informed and written consent was taken from the participant. Data collection was done by using coping strategy rating scale and the tool was divided into two sections, section-I consist of demographic variables and section-II consist of coping strategy questionnaire. Questions were related to psychological coping, physical coping, financial coping, social coping and spiritual coping and after each coping strategy one open ended question was kept. The scoring was done on the following points 1=Never, 2=Sometimes, 3=Always. The 25 questions carried maximum score of 75 and minimum score of 3.

Findings

Section I

Table-1, shows Frequency and Percentage distribution of Demographic variables like Age, Gender, Education and Occupation Monthly income of family, Type of family, Number of family members, Family history of mental illness and Duration of child mental illness of parents with mentally challenged children at selected special schools in terms of frequency and percentage.

Section II-Assessment of Coping Strategies among Parents

Table 2: Assessment of the psychological coping strategies among parents

(N = 100)

Sr. No.	Coping Strategies	Never		Sometimes		Always	
A.	Psychological Coping	N	Percent- Age	N	Percen T-Age	N	Percent-Age
1.	Seeking guidance From relatives.	29	29.00	48	48.00	23	23.00
2.	Watching TV or go for movie with the Family.	12	12.00	54	54.00	34	34.00
3.	Trying to see the Positive side of the situation.	4	4.00	48	48.00	48	48.00
4.	Seeking professional Counseling.	9	9.00	44	44.00	47	47.00
5.	Believe that I can Handle my own problem.	8	8.00	49	49.00	43	43.00

Interpretation: In psychological coping strategy, maximum number of parents are using watching TV or going for film with family members i.e. (54%).

Table 3: Assessment of the Physical coping strategies among parents

(N = 100)

Sr. No.	Coping Strategies	Never		Sometimes		Always	
B.	Physical Coping	N	Percent- Age	N	Percent- Age	N	Percent- Age
1.	Taking help from Somebody.	6	6.00	48	48.00	46	46.00
2.	Taking rest or Sleep intermittently.	1	1.00	49	49.00	50	50.00
3.	Eating healthy Diet.	4	4.00	52	52.00	44	44.00
4.	Making plan of Action.	7	7.00	48	48.00	45	45.00
5.	Trying to found Several alternatives.	3	3.00	44	44.00	53	53.00

Tinterpretation: In physical coping strategy, maximum number of parents were using, trying to found several alternatives i.e. (53%).

Table 4: Assessment of the financial coping strategies among parents

(N = 100)

Sr. No.	Coping Strategies	Never		Sometimes		Always	
C.	Financial Coping	N	Percentage	N	Percentage	N	Percentage
1	Working hard to Solve problem.	5	5.00	50	50.00	45	45.00
2	Reducing Household budget.	3	3.00	48	48.00	51	49.00
3	Talking with the Experts.	1	1.00	50	50.00	49	49.00
4	Taking help from Friends and relatives.	3	3.00	49	49.00	48	48.00
5	Taking help from NGO‟s.	0	0.00	49	49.00	49	51.00

Interpretation: In financial coping strategy, maximum number of parents where using reducing household budget i.e. (51%).

Table 5: Assessment of the Social coping strategies among parents

(N = 100)

Sr. No.	Coping Strategies	Never		Sometimes		Always	
D.	Social Coping	N	Percent-Age	N	Percent-Age	N	Percent- Age
1.	Sharing difficulties	1	1.00	49	49.00	55	50.00
2.	Seeking encouragement and support	6	6.00	49	49.00	40	45.00
3.	Seeking Information and advice.	3	3.00	50	50.00	47	47.00
4.	Seeking assistance from community Agencies.	0	0.00	48	48.00	52	52.00
5.	Involving in Social activities.	1	1.00	44	44.00	55	55.00

Interpretation: In social coping strategy, maximum numbers of parents were using sharing difficulties with friends and relatives i.e. (55%)

Table 6: Assessment of the Spiritual coping strategies among parents

(N = 100)

Sr. No.	Coping Strategies	Never		Sometimes		Always	
E.	Spiritual Coping	N	Percent- Age	N	Percent- Age	N	Percent- Age
1.	Participating in Religious Activities.	3	3.00	49	49.00	48	48.00
2.	Doing Meditation	2	2.00	46	46.00	54	52.00
3.	Hope That God Will Make Magic.	2	2.00	50	50.00	48	48.00
4.	Seeking Advice from a Spiritual Leader.	1	1.00	46	46.00	53	53.00
5.	Having Faith in God or Higher Power.	3	3.00	45	45.00	52	52.00

Interpretation: In spiritual coping strategy, maximum numbers of parents were using doing meditation i.e. (54%).

Section III: Table- 7: Deals with analysis of data related to the association between coping strategies with selected demographic variables.

Significant Association: Demographic variables like age, education, monthly income and type of family, the p value of the association test with coping strategies was less than 0.05. Concludes that, there was significant association of these demographic variables with the coping strategies among parents of mentally challenged children.

Not Significant Association: Demographic variables like gender, religion, occupation, Number of family members and Duration of child mental Illness the p value of the association test with coping strategies was more than 0.05. Concludes that, there was no significant association of these demographic variables with the coping strategies among parents of mentally challenged children.

Conclusion

The study concluded that the coping strategies used by the parents of mentally challenged children are watching TV or going for film with family members i.e. (54%); trying to found several alternatives i.e. (53%); reducing household budget i.e. (51%); sharing difficulties with friends and relatives i.e. (55%); doing meditation i.e. (54%) at the maximum level.

And the Association depicts that variables like age, education, monthly income and type of family was significant association of these demographic variables with the coping strategies among parents of mentally challenged children.

And variables like gender, religion, occupation, Number of family members and Duration of child mental Illness was no significant association of these demographic variables with the coping strategies among parents of mentally challenged children.

Conflict of Interest: The author declares that they have no any conflict of interest.

Source of Funding: The whole research funding was done by the researcher by self.

Ethical Clearance: A research proposal approved by Institutional Ethical Committee (IEC), meeting was held in Bharati Vidyapeeth (Deemed to be University) College of Nursing, Sangli. The permission for pilot and main study were obtained from selected special schools of Kupwad Kolhapur corporation area to conduct study after IEC.

REFERENCES

1. Narmada Hidangmyum and Pushpa B. Khadi, Parenting stress of normal and mentally challenged children, Karnataka J. Agric, May,2012, Sci.,25 (2). Page no-256-258.
2. Rishi Panday, Nazish Fatima, Quality of life among parents of mentally challenged children, The International Journal of Indian Psychology, April-June,2016; Volume 3, Issue 3, No. 11, Page no- 152-157. http://www.ijip.in
3. Mohd. Faijullah, Mohd. Ansar Alam, coping trends of parents having children with developmental disabilities: a literature review, European Journal of Special Education Research, 2016, Volume 1/ Issue 3, Page no- 39-45. www.oapub.org/edu
4. Bagher Ghobari Bonabet al; Effect of coping strategies on stress of parents with Intellectual Disabilities Children, Asian Education Studies, July 2017, Vol. 2, No.3; Page no- 11-12. https://doi.org/10.20849/aes.v2i3.187

5. Shelley E. Taylor and Annette L. Stanton Coping resources, Coping Processes, and Mental Health, Annual Review of Clinical Psychology, November 6, 2007, Volume 3, Page no- 337-401. http://clinpsy.annualreviews.org

6. Leonard Abbeduto et al; Psychological well-being and coping in mothers of youths with Autism, Down syndrome, or Fragile X Syndrome, American Journal on Mental Retardation, May 2004, Volume 109, Number 3, Page no 237-254.

7. Upadhyaya GR, Havalappanavar NB. Coping in parents of mentally challenged children. Journal of Indian Academy of applied Psychology, 2008 Jul; 34(2), Page no-221-225.

8. Narmada Hidangmayum and Pushpa.B. Khadi, Parenting stress of normal and mentally challenged children, Karnataka j. Agri Sci (2); May 2012, Page no-256-259.

9. Venkatesh Kumar G, Psychological Stress and Coping Strategies of parents of mentally challenged children, Journal of the Indian Academy of Applied Psychology, July 2018, vol-34, No-2, Page no-227-231.

10. Bhawani Shahi Thakuri, Stress and Coping Mechanism among parents of Intellectual Disabled children, Journal of Advance Academic Research (JAAR), July-2014, Vol-1, No- II, Page no-56-63. www.pndcenter.edu.np

11. Bager Ghobar Bonab et al; Effect of Coping Strategies on stress of parents with Intellectual disabled children, Asian Education Studies, September-29,2017; Vol-2, No-3, Page no-11-17. https://10.20849/aes.v2i3.187

12. Shahzadi Malhotra et al; Quality of life of parents having children with developmental disabilities, Delhi psychiatric journal, April 2012, Vol.15, No.1; Page no-171-177.

13. Ritu Raj Gogoi et al; Anxiety, depression, and Quality of life in mothers of children with intellectual disability, open journal of psychiatry & allied science, 20th November 2016. www.ojpas.com

14. M. B. Olsson and C. P. Hwang, Depression in mothers and fathers of children with intellectual disability, journal of intellectual Disability Research, December 2001, Volume 45, Part 6, Page no-535-543.

15. Nosheen Ramzan, Khaula Minhas, Anxiety and depression in mothers of disabled and non-disabled children, ANNALS, OCT-DEC 2014, Volume 20, Issue 4.

16. Ajit Deshpande, Sanjay Kubde et al; A study of stress in mothers of mentally challenged students, Biomedical and pharmacology journal, August 12, 2010; Volume 3 (2), Page no- 371-375.

Effectivness of Curry Leaves Powder on Blood Sugar Level among Diabetic Patients

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ABSTRACT

"A study to assess the effect of curry leaves powder on blood sugar level among diabetic patients in selected areas of Sangli Miraj Kupwad Corporation."

The Objectives of the Study:

1. To assess the fasting blood sugar level and post prandial blood sugar level before administration of curry leaves powder among diabetic patients.
2. To assess the fasting blood sugar level and post prandial blood sugar level after administration of curry leaves powder among diabetic patients.

Material and Method: An experimental Research Design was adopted for this study. The study was conducted in selected areas of Sangli Miraj kupwad Corporation. Windenbach's prescriptive theory is used in this study. Sample size was 60 where, 30 samples were included in control group and 30 samples were included in experimental group. Samples were selected using non probability convenient sampling technique.12 gm of Curry leaves powder was administered to the client per day for 20 days. The data collection was done using Glucometer which was noted down in blood level accessing chart. The data was analyzed using descriptive and inferential statistics

Result with Conclusion: In this study 56.67% of clients were between 51 and above age group in experimental group. There were equal no of male and female client in both the group. Experimental and control group revealed that average fasting blood sugar level was 157. 47 with SD 9.54 and in control group were 151.37 with SD 9.10. By using paired T test comparison of average fasting blood sugar and postprandial blood sugar level of first day and 20th day was done. The calculated P value was 0.00 which stated that there was significant difference in average fasting blood sugar level and postprandial blood sugar level at 5% level of significance.

As there was no significant difference in fasting blood sugar level of control group due to extraneous variables there is a significant reduction in blood sugar level in experimental group compared to control group. The P value is > 0.05 which indicate that there was significant difference after the administration of curry leaves powder among diabetic patient hence curry leaves powder is helpful for reducing blood sugar level among diabetic patients.

Keywords: *curry leave, diabetes, insulin, blood sugar, blood vessels*

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Introduction

Diabetes's metabolic disease and chronic disease that increase blood glucose level over a long period. If proper treatment is not provided to the diabetic client they may suffer from various complication like chronic foot ulcer heart disease stroke and serious long term complications[1].Diabetic mellitus is a chronic disease

caused due to lack of production of insulin to pancreas or unsuccessfulness of insulin produced so the increase blood sugar level in the body system particularly in nerves and blood vessels[2]. According to the data of International diabetes Federation atlas in India estimated 69.2 million are diabetic clients. WHO suggested that 30.3% people are diabetic patient Diabetes is rapid gaining the status of potential epidemic in India with high rate of 62 million diabetic individuals currently diagnosed with this disease[3].Day to day care of diabetic client like maintaining physical activity food management Keeping weight and tension under control, checking the blood Glucose level, Recording oral medication and insulin. Diabetic patient uses many alternative therapies to reduce the blood sugar level[4].Diabetes to curry leaves loaded with antioxidants like beta acetone and vitamin c curry leaves have the ability to keep most diseases at bay. Especially type 2 diabetes herbal remedies for manually diabetes and how to use it to stable blood sugar level.

Material and Method

A present study was conducted using Quantitative research approach. The research design selected was Pre test post test case control group design. The conceptual frame work was based on Ernestine Wiedenbach's prescriptive theory. Non probability, convenient sampling method was used. Validity was done from 20 experts. Type II diabetic clients were selected for the study from selected areas of Sangli, Miraj, and Kupwad Corporation. Sample size was 60, in which 30 were included in experimental group and 30 were included in control group. Proposal with tool presented in front of ethical committee for permission. Curry leaves in the form of powder was provided in sachets 6 gm each twice a day for 20 days. 6 gm before the lunch with sips of water and 6 gm before dinner with sips of water. Curry leaves powder was administered to the diabetic patients for 20 days. Fasting blood glucose level and post prandial glucose level was checked on 1st day with the help of Glucometer On 10th and 20th day fasting blood glucose level was checked in the morning on empty stomach and post prandial blood sugar level was checked 2 hrs after the lunch. Data was recorded on assessment chart.

Findings

Section I

Table 1: Frequency and percentage distribution of diabetic patients according to demographic variables

n = 60

Sr. No.	Variable	Groups	Experimental		Control	
			Frequency	Percentage	Frequency	Percentage
1.	Age	41-50	13	43.33	15	50.00
		51 & Above	17	56.67	15	50.00
2.	Sex	Male	15	50.00	15	50.00
		Female	15	50.00	15	50.00
3.	Duration of disease	0-5	14	46.67	20	66.67
		6-10	10	33.33	7	23.33
		11-15	6	20.00	3	10.00
4.	Any other illness	Yes	16	53.33	17	56.67
		No	14	46.67	13	43.33
5.	Illness	Arthritis	5	31.25	6	35.29
		Obesity	7	43.75	6	35.29
		Respiratory Disease	4	25.00	5	29.41

Section II: Deals with analysis of data related to assessment of blood sugar level among diabetic patients experimental and control groups.

n = 30 + n = 30

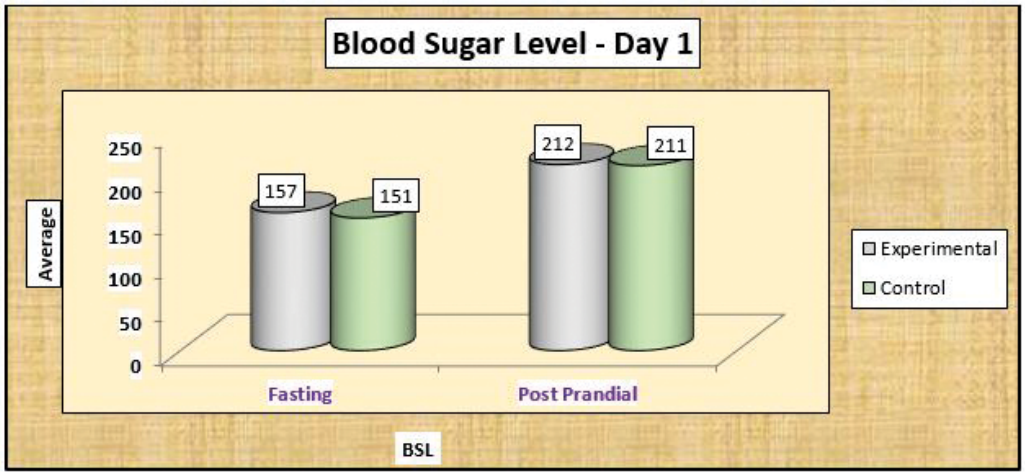
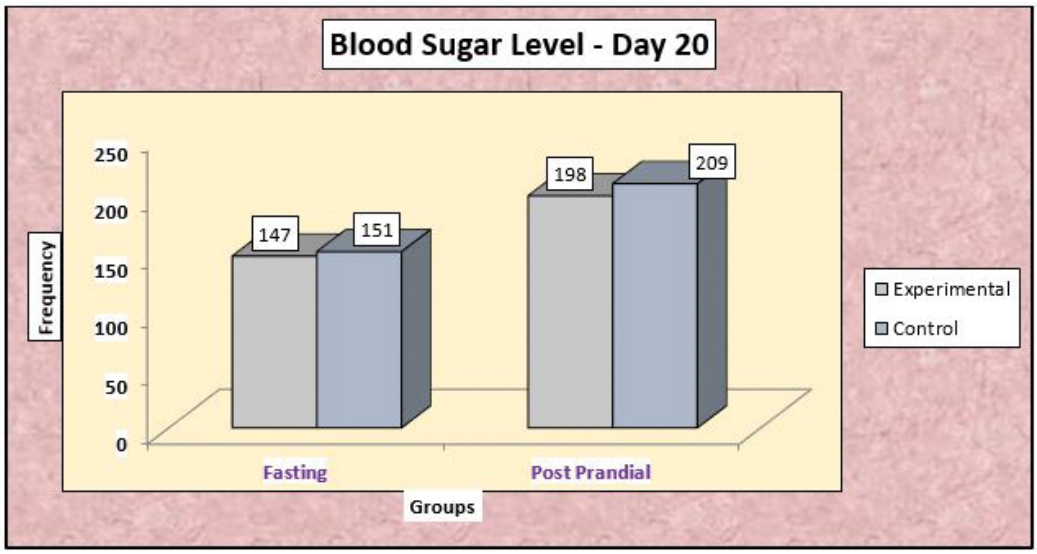


Figure 1: Assessment of blood sugar level in Experimental & Control Groups



n = 30 + n =30

Figure 2: Assessment of blood sugar level in Experimental & Control Groups

Section III: Deals with analysis of data related to the effectiveness of curry leaves powder on blood sugar level among diabetic patients in experimental and control groups.

Table 2: Comparison of blood sugar level among diabetic patients in experimental group

n = 30

Experimental - Paired t test					
BSL F	**Frequency**	**Mean**	**S.D.**	**t value**	**P value**
Day 1	30	157.47	9.54	5.32	0.00
Day 20	30	146.77	12.94		
BSL PP	Frequency	Mean	S.D.	t value	P value
Day 1	30	212.40	12.84	21.4	0.00
Day 20	30	198.27	14.22		

Table 3: Comparison of blood sugar level among diabetic patients in Control group

n = 30

Control-Paired t test					
BSL F	**Frequency**	**Mean**	**S.D.**	**t value**	**P value**
Day 1	30	151.37	9.10	1.37	0.18
Day 20	30	150.50	8.65		
BSL PP	**Frequency**	**Mean**	**S.D.**	**t value**	**P value**
Day 1	30	211.17	9.87	3.87	0.001
Day 20	30	208.63	9.72		

Discussion

SECTION I

1. **Age:** In experimental group, most of them 56.67% were between 51yrs and above

   In control group, 50% were between 51yrs and above

2. **Gender:** In experimental group, 50% were female patients and 50% male patients.

   In control group also, 50% were female patients and 50% male patients.

3. **Duration of disease:** In experimental group, most of them 46.67% had the diabetes in group 0-5 years.

   In control group, most of them 66.67% had the diabetes in group 0-5 years.

4. **Any other illness:** In experimental group, to the question have any other illness other than diabetes most of them 53.33% were answered yes. People had other illness like respiratory disease, arthritis and obesity.

Section II

Fig no 1: Assessment of blood sugar level in Experimental & Control Groups revealed that on day 1 average fasting blood sugar level of experimental group was 157.47 with SD 9.54. And in control group it was 151.37 with SD of 9.10.

Average post prandial blood sugar level of experimental group was 212.4 with SD 12.84. And in control group it was 211.17 with SD of 9.87.

Fig no 2: On day 20 average fasting blood sugar level of experimental group was 146.77 with SD 12.94 and in control group it was 150.5 with SD of 8.65.

Average post prandial blood sugar level of experimental group was 198.27 with SD 14.22 and in control group it was 208.63 with SD of 9.72.

Section III

Experimental Group

Fasting BSL: The comparison of the average fasting BSL of the day 1 and day 20 of experimental group was done by the paired t test. The day 1 average fasting BSL was 157.47 with standard deviation of 9.54 the day 20 averages fasting BSL was 146.77 with standard deviation of 12.94. The test statistics value of the paired t test was 5.32 with p value 0.00. Shows that there was significant difference in the average fasting BSL at 5% level of significance

Post Prandial BSL: The comparison of the Post Prandial BSL of the day 1 and day 20 of experimental group was done by the paired t test. The day 1 average Post Prandial BSL was 212.40 with standard deviation of 12.84. The day 20 average post Prandial BSL was 198.27 with standard deviation of 14.22. The test statistics value of the paired t test was 21.4 with p value 0.00. Shows that there was significant difference in the average post Prandial BSL at 5% level of significance

Control Group

Fasting BSL: The comparison of the average fasting BSL of the day 1 and day 20 of control group was done by the paired t test. The day 1 average fasting BSL was 151.37 with standard deviation of 9.10. The day 20 average fasting BSL was 150.50 with standard deviation of 8.65. The test statistics value of the paired t test was 1.37 with p value 0.18.The p value more than 0.05, concludes that there was no significant difference in the average fasting BSL at 5% level of significance.

Various extraneous variables were responsible for the findings to be not significant such as diet pattern, type of work, exercise etc.

Post Prandial BSL: The comparison of the Post Prandial BSL of the day 1 and day 20 of control group was done by the paired t test. The day 1 average Post Prandial BSL was 211.17 with standard deviation of 9.87. The day 20 average post Prandial BSL was 208.63 with standard deviation of 9.72. The test statistics value of the paired t test was 3.87 with p value 0.001. The p value > 0.05, stated that there was significant difference in the average post Prandial BSL at 5% level of significance.

Conclusion

The study revealed that the p value was > 0.05, stated that there was significant difference in the average fasting and post Prandial BSL at 5% level of significance. Effect of curry leaves powder was seen after administrating to client; it reduced blood sugar level after specific time span. Curry leaves powder is helpful for the diabetic clients to reduce blood sugar level without any side effects as curry leaves are easily available and are very cheaper to buy. It can be utilized for medicinal use as well as to reduce blood sugar level. Cardiac patients are not recommended to consume curry leaves powder.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Proposal of research with the data collection tool was presented in the front of research committee for approval. Prior permission from corporator of the area was taken. Informed written consent from each participant was taken, which included name, number, organization, time duration of participation, termination of participation, purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance is done with the committee members Dr. Sripriya and Dr. Nilima Bhore Mam.

REFERENCES

1. Silva JAD, Souza ECF, Echazú Böschemeier AG, Costa CCMD, Bezerra HS, Feitosa EELC. Diagnosis of diabetes mellitus and living with a chronic condition.BMC Public Health. Published 2018 Jun 5. 2018;18(1):699 doi:10.1186/s12889-018-5637-9
2. Sarwar N, Gao P, Seshasai SR, Gobin R, Kaptoge S, Di Angelantonio et al. Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease:Emerging Risk Factors Collaboration. Lancet. 2010; 26;375:2215-2222.
3. A Ramachandran, AK Das , SR Joshi , CS Yajnik , S Shah , KM Prasanna Kumar Current Status of Diabetes in India and Need for Novel Therapeutic Agents SUPPLEMENT TO JAPI • JUNE 2010 • VOL. 58
4. Ahmed AM History of diabetes mellitus Saudi Med J. 2002 Apr; 23(4):373-8.
5. Singh, Suman. CURRY LEAVES (Murraya koenigii Linn. Sprengal)- Indian J.Sci.Res. 4. 46-52. (2014).
6. RSSDI textbook of diabetes mellitus.Jaypee Brothers Medical Publishers. (Rev. 2nd ed.). 2012. p. 235. ISBN 978-9350254899.14 October 2015.
7. Paediatric publication article research support for studies related to diabetic mellitus and its complication. January 1979, VOLUME 63 / ISSUE 1
8. Jing-Xia Kong, Lin Zhu, Hong-Mei Wang, et al., "Effectiveness of the Chronic Care Model in Type 2 Diabetes Management in a Community Health Service Center in China: Journal of Diabetes Research, vol. 2019, Article ID 6516581, 12 pages, 2019.
9. Olokoba, A. B., Obateru, O. A., & Olokoba, L. B. Type 2 diabetes mellitus: a review of current trends. *Oman medical journal*, *27*(4), 269-73. (2012).
10. Kaveeshwar, Seema Abhijeet and Jon Cornwall. "The current state of diabetes mellitus in India" *Australasian medical journal* vol. 7,1 45-8. 31 Jan. 2014, doi:10.4066/AMJ.2013.1979
11. Khwaja S. Zafar, Tony Pious, Prem S. Singh, Rajesh K. Gautam, Sudhir K. Et. Al Prevalence of metabolic syndrome in a rural population-

Western Uttar Pradesh, India Int J Res Med Sci. 2017 May;5(5):2223-2228

12. Gomathi, K N Effectiveness of curry leaves in decreasing blood glucose among type II diabetes clients in selected rural areas at Medavakkam, Chennai. Masters thesis, College of Nursing, Madras Medical College, Chennai. (2016)
13. Chinn, P., & Jacobs, M. (Eds.). Theory and nursing (2nd ed.). St.Louis: C.V. Mosby. (1987).
14. George, J. (Ed.). Nursing theories: the base for professional nursing practice (3rd ed.). Norwalk, Connecticut: Appleton & Lange. (1985)
15. Abhijit Mandal, Study of prevalence of type 2 diabetes mellitus and hypertension in overweight and obese people Year : 2014 | Volume : 3 | Issue : 1 | Page : 25-28
16. Luisa Sorio Flor Monica Rodrigues Campos, The prevalence of diabetes mellitus and its associated factors in the Brazilian adult population, Rev. bras. epidemiol. vol.20 no.1 São Paulo Jan./Mar. 2017
17. Anjana RM, Deepa M, Pradeepa R, Mahanta J, Narain K, Das HK, Adhikari P, Rao PV, Saboo B, Kumar A et al., Prevalence of diabetes and prediabetes in 15 states of India, Lancet Diabetes Endocrinol. 2017 Aug; 5(8):585-596. Doi: 10.1016/ S2213-8587(17)30174-2. Epub 2017 Jun 7.
18. Maria Isabella Creatore, Rahim Moineddin, et al., Age- and sex-related prevalence of diabetes mellitus. CMAJ May 18, 2010 182 (8) 781-789
19. Deo, Sudha S.; Zantye, Avinash et al., identify the risk factors for high prevalence of diabetes. Jan-Mar2006, Vol. 26 Issue 1, p19-23. 5p.
20. Basavant Dhudum, Satish Salvi, pilot study in evaluate effect of planned teaching program on knowledge regarding foot care among diabetic patients, International journal of current advance research, (2018) 07(12),pp.16585 – 16586, DOI: http//dx.doi.org/10.24327/ijcar.2018.165.3070

A Framework Analysing Patient Adherence Level in Cardiovascular Disease in Delhi-NCR Region

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ABSTRACT

The deficit in the patient adherence level is considered to be the most problematic factor in chronic diseases. The cross-sectional study on cardiovascular disease related patients was conducted in hospitals of Delhi-NCR region in the month of July 2018- August 2018. The total respondents taken were about 144 and were selected from cardiovascular diseases such as coronary artery disease, heart attack, abnormal heart beat, heart valve disease, congenital heart disease, aortic disease, vascular disease etc. The respondents were from various age groups and the results were concluded on the basis of the treatment and medications. The reliability of Morisky Medication Adherence Scale-8 was upto 0.78 which is considered to be good and on the basis of adherence scale category, the widely held of patients were categorized under medium adherence level. The chief factors which seems to be responsible for low adherence level were- monotonous life schedule, long waiting times in hospitals, irregular visits, high cost of treatment, forgetfulness etc.

Keywords: *WHO, adherence, cardiovascular diseases, MMAS*

Introduction

The boom of chronic diseases in the previous years has totally changed the attribute in the field of medical science. It has been reported in one of the article in Times of India, 2016, that over 20% of Indian population is suffering from chronic diseases [1]. In the latest report of 2018 by WHO, the chronic diseases or non-communicable diseases enlisted as heart ailments, cancer, respiratory diseases, diabetes etc. kill about 41 million people globally every year [2]. Also, in this report it has been mentioned that the cardiovascular diseases accounted for the highest death rate among the patients that ranges up to 17.9 million people every year, chased by cancer patients up to 9 million, respiratory diseases up to 3.9 million and diabetes patients up to 1.6 million.

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The patients used to invest a good amount of cost for the chronic diseases for detection, screening and treatment. In between year 2008-2015 in India, about 1.3% of total GDP has invested in public health and that further increased up to 1.4% in 2016-2017 which is still less than the world average percentage that is 6% [3]. Also, the National Health Policy in 2017 proposed that this expenditure will increase up to 2.5% of GDP by 2025 [3].

The poor medication adherence level is one of the major causes that highly affect the patients in many ways. Poor medication adherence causes many complications towards treatment process, disease progression, disability in case of inappropriate treatment and in some cases death of the patient [4]. In various studies, it have shown that the non-adherence towards diseases like hypertension, diabetes and hyperlipidemia etc, the hospitalization rate increased, medical outcomes get worsened and also on the whole healthcare cost augmented [5,6].

Talking about the overall impact of medication adherence by the patients, it not only improves or reduces the cost of treatment but it also helps to improve the clinical outcomes for particular disease. In one of

the study, it has been proved that patient adherence in case of anti-hypertensive medications resulted in blood pressure control and also shown the long-term beneficial outcomes [6]. There are large numbers of factors that are indulged in the field of medical science to improve the patient adherence level. In the field of healthcare sector, the healthcare providers, government policies, third party players, online services and other related disease management programs helped out the patients to improve the adherence level on large scale [7,8].

For the successful treatment and desired results of any medication, the main thing is the patient's compliance i.e. the patient should follow their medications properly. According to WHO, in the meeting conducted on adherence in June 2001, adherence is defined as "the extent to which the patients follow medical instructions" [9]. It is very essential for the patients to take their medications, with proper diet including lifestyle changes and agreeing the recommendations of healthcare providers. The adherence includes three basic steps i.e. initiation of the treatment, implementation of the prescribed treatment and discontinuation of the pharmacotherapy [10]. The medication adherence level has its own benefit in the field of patient wellness to improve the diseased condition and course therapies and for implementing this it is important to follow the basic steps in adherence.

It is very well said that adherence helps to reduce the whole cost at the time of treatment. In a literature, it has been mentioned that if medication lessen with time then in future the hospitalization rate and total cost of care increases [11, 12]. Thus, it is very essential for the patients to stick with their treatment procedure so as to get desired results. Adherence is like the capability or eagerness of the patients to stick with the therapeutic course of therapy [13]. When the patient doesn't stick to their medications as prescribed by the healthcare provider then it is known as non-adherence or non-compliance. The non-adherence of medications can be due to many reasons such as- taking incorrect dose, delaying in treatment, not following doctor's instructions properly etc. In one of the research, the non-adherence is said to be multi factorial [14] as there are many reasons due to which the patients don't take their medications properly and some of the reasons are as follows-

- Psychological reasons
- Missed the upcoming appointments with physicians
- Intricacy of the treatment provided
- Cost of the medication is not affordable
- Patient and provider relationship is badly chosen
- Lack of belief in the benefit of the treatment
- Side-effects from the treatment taken
- Insufficient follow up by the healthcare provider

In such way, we can analyse that how the patient adherence level towards their medications and treatment is important for chronic type of diseases. This adherence level helps the patients to recover from disease in a better way.

Objectives

The study is done to understand the adherence level of cardiovascular patients and it focuses on following objectives-

1. To study the factors affecting patient adherence towards medications and treatment.
2. To understand the patient perspective towards low medication adherence
3. To develop a holistic framework for better adherence level.

Methodology

The sample size of about 144 patients were selected suffering from cardiovascular diseases such as- coronary artery disease, heart attack, abnormal heart beat, heart valve disease, congenital heart disease, aortic disease, vascular disease etc. The patients who were suffering from above cardiovascular diseases were included in the study and also the communication was done in hindi and english language. Face-to-face interview was conducted in various hospitals of Delhi-NCR region. The cross-sectional study was conducted out in various hospitals of Delhi-NCR region from the month of July 2018- Aug 2018 and the hospitals provided the OPD patients for the survey.

The respondents were taken from various age groups and also on the basis of the treatment and medications for the disease. The patients were asked for the level of agreement on statements of Morisky Medication adherence scale (MMAS-8). For each statement,

they had to anchor Yes or No with the score of 1 or 0 respectively. Also, some additional questions were asked about the type of hospitals, number of medicines in a day, family type, occupation etc.

Results and Discussion

Pre-testing of the questionnaire: The pre-testing of the questionnaire was done by taking 35 respondents erratically and they were requested to give the remarks related to language and clarity of the questionnaire. On the basis of the suggestions the changes were done accordingly for cleanness and specificity of the statements.

Reliability of the survey: The data collection also needed reliability analysis for assessing the accuracy in the survey process so for this Cronbach's alpha was the result showed the reliability of 0.78. Table 1 showed the value of Cronbach's alpha for the statements of Morisky Medication Adherence Scale to measure the medication adherence level of patients suffering from cardiovascular diseases. From the table 1, it is clear by the value 0.78 that the statements showed good reliability. Table 2 shows the total item statistics for each statement and which have also shown good reliability for the statements. Talking about the MMAS and its adherence level scale, the MMAS category of high adherence, medium adherence and low adherence was calculated in which the values were 21, 110 and 13 respectively. The score of 0 is categorized as high adherence, score 1-2 is categorized as medium adherence and score 3-8 is categorized as low adherence. The widely held of patients were under medium adherence level suggesting that patients should focus on improving this adherence level towards medications and treatments

The graph 1 below showed that the majority of the patients started their treatment after few days when they were diagnosed of disease which shows that patients are aware about their health. The patients are now emphasizing on their health issues and also they use to have regular discussions with their families or friends.

Table 1: Reliability Statistics

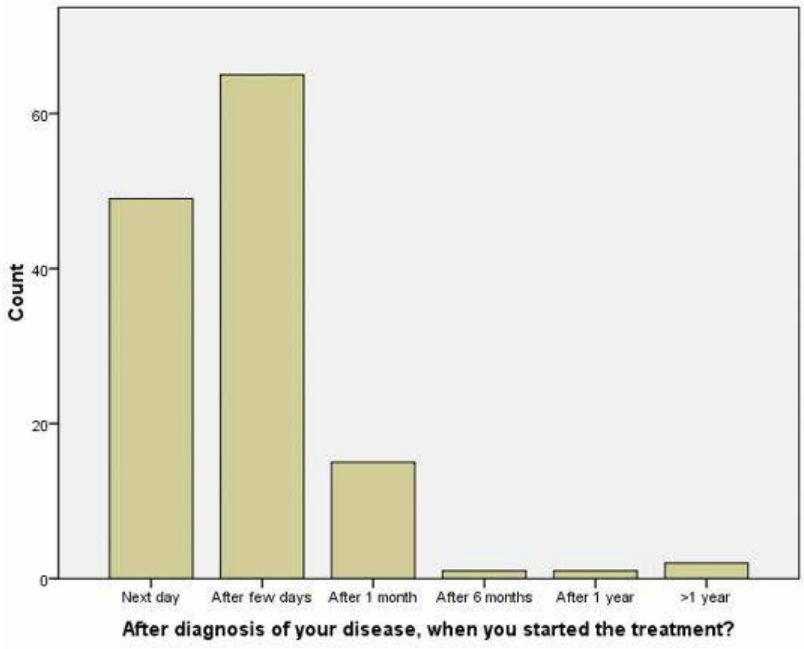
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.780	.821	8

Table 2: Frequency distribution showing demographics of respondents

	Category	No. of people	Percentage	Cumulative percentage
Age in years	20-30 years	30	20.8	20.8
	30-40 years	52	36.1	56.9
	40-50 years	29	20.1	77.1
	50-60 years	12	8.3	85.4
	>60 years	21	14.6	100.0
	Total	144	100.0	
Gender	Male	78	54.2	54.2
	Female	66	45.8	100.0
	Total	144	100.0	
Education	Illiterate	23	16.0	16.0
	Upto 12th standard	56	38.9	54.9
	Graduate	35	24.3	79.2
	Post graduate	28	19.4	98.6
	Others	2	1.4	100.0
	Total	144	100.0	
Occupation	Business	31	21.5	21.5
	Home maker	44	30.6	52.1
	Professional	60	41.7	93.8
	Retired	9	6.2	100.0
	Total	144	100.0	

Conted…

Marital Status	Single	21	14.6	14.6
	Married	90	62.5	77.1
	Divorced	16	11.1	88.2
	Widowed	17	11.8	0
	Others	0	0	100.0
	Total	144	100.0	
Family	Nuclear	81	56.2	56.2
	Joint	63	43.8	100.0
	Total	144	100.0	



Graph 1: Showing the time of treatment when started

Conclusion

The study identifies that now-a-days patients are not more adherent towards their medications and treatment due to large number of factors. The inappropriate behaviour towards non-adherence causes patients to have long and sometimes serious illness. The results from MMAS-8 also showed that majority of the patients are low adherent towards their treatment. The major objective of the research was to analyse the factors that affect patient adherence level towards medication and treatment and some of the factors were like- monotonous life schedule, long waiting times in hospitals, irregular visits to doctors, severe symptoms during medications, interaction with healthcare professionals, family support, forgetfulness, high cost of medications and treatment etc.

On the support of improving patient adherence level, there are various factors that may help patients to stick towards medications such as- regular patient counselling, various campaigns by the hospitals or clinics, digital reminders for the patients provided by the medical healthcare professional and family support. Thus, it is very essential for the patients to stick to the treatment and medications for better improvement of the health.

Ethical Clearance: For this study there was no requirement for ethical clearance certificate.

Source of Funding: The source of funding was self.

Conflict of Interest: Nil

REFERENCES

1. Over 20 pc of Indians suffers from chronic diseases: report, Oct 4, 2016; New Delhi.
2. WHO report, 2018
3. Rao N., Who is paying for India's healthcare?, The Wire, April 14.
4. Hughes OA, Bagust A, Haycox A, Walley T, The impact of non-compliance on the cost-effectiveness of pharmaceuticals: a review of the literature, Health Econ., 2001; 10: 601-615.
5. Pladevall M, Williams LK, Potts LA. et al., Clinical outcomes and adherence to medications measured by claims data in patients with diabetes, Diabetes care, 2004; 27(12): 2800-2805.
6. DiMatteo MR, Giordani PJ, Leeper HS, Croghan TW, Patient adherence and medical treatment outcomes: a meta analysis, Medcare, 2002; 40: 794-811.
7. Ratanawongsa N, Karter A, Parker MM, et al., Communication and medication adherence: the diabetes study of Northern California, JAMA Intern Med., 2013; 173(3): 210-218.
8. Jones KR, Lekhak N, Kaewluang N, Using mobile phones and short message service to deliver self-management interventions for chronic conditions: a meta-review, Worldviews Evid Based Nurs., 2014; 11(2): 81-88.
9. Adherence to Long Term Therapies: Evidence for action, WHO, 2003; 18.
10. B. Vrijens, S. de Geest, D. A. Hughes et al., A new taxonomy for describing and defining adherence to medications, British Journal of Clinical Pharmacology, 2012; 73(5): 691–705.
11. American Diabetes Association. Direct and indirect costs of diabetes in the United States. Available at: www.diabetes.org/diabetes-statistics/cost-of-diabetes-inus. jsp. Accessed on December 2018.
12. Choo PW, Rand CS, Inui TS, et al., Validation of patient reports, automated pharmacy records, and pill counts with electronic monitoring of adherence to antihypertensive therapy, Med Care, 1999; 37: 846-857.
13. Inkster ME, Donnan PT, MacDonald TM, et al, Adherence to antihypertensive medication and association with patient and practice factors, J Hum Hypertens, 2006 20:295–7.
14. Osterberg L., Terrence B., Adherence to medication, N Engl J Med 2005; 353:487-497

A Study to Assess the Effect of Pineapple Extract on Episiotomy Wound Healing among Postnatal Mothers in Selected Hospitals of Sangli, Miraj and Kupwad Corporation Area

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ABSTRACT

Pregnancy[1] is a beautiful and natural condition. Nine transformative months full of excitement, planning and peering at the awesome unfolding of life. After delivery, Episiotomy is one of the most important areas of concern. The perineum is highly susceptible to infection due to different secretions like vaginal discharges, feces and urine. Episiotomy wound requires a proper intervention which could otherwise be self - limiting due to high vascularity of perineal area. If not taken care, episiotomy wound may lead to immediate complications like infection, dehiscence or remote complications like dyspareunia, scar endometriosis or chances of perineal lacerations in subsequent labour. Extracts from pineapple helps to improve healing time and would aid outcome. Pineapple is easily available and doesn't cost much. It is crucial to discover the opportunity of using pineapple to enhance episiotomy wound healing.

Aim: To assess the condition of episiotomy wound and assess the effect of pineapple extract on episiotomy wound healing.

Keywords: *Post natal mother, episiotomy, wound healing, pineapple extract.*

Introduction

Pregnancy has some complications[2] which needs specific care. Pregnancy is split into 3 trimesters.[3] in women ages 15-49years the number of pregnancies is 144.7 per 1000 women. About 43% were planned pregnancies, 9%miscarriage from planned pregnancies, 11%were unintended birth, and 33% induced abortion, 5% miscarriage from unintended pregnancy[4].

Vaginal delivery[5] is the most common way of childbirth. Postpartum period[6] is the time of adjustment after child birth when anatomical and physiological changes of consumption are reversed to an almost pre pregnancy level. Early discharge is given to mother and newborn within 48 hours of birth.[7] Midwifery care[8] is strengthened through the world; by monitoring physical, psychological and social well-being of mother throughout the childbearing cycle, providing individualised education to mother, counselling and prenatal care, and minimising technological interventions, identifying and referring women who require obstetrical attention.

Episiotomy[9] performed routinely during childbirth to prevent tears and trauma during delivery. Normal wound healing includes homeostasis, inflammation, proliferation and remodeling...Care of postnatal mothers with episiotomy can be done economically if the nurse is competent with skills to provide various remedial measures for wound healing. Pineapple is used for medical purposes since decades and it also used as a digestive aid and a remedy for skin disorders[10]. From pineapple stem and fruits.[11] a crude, aqueous Bromelain extract is derived. Bromelain is efficient in decreasing inflammation, bruising and pain in women having episiotomy. It helps in faster wound healing.

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Objectives:

1. To assess the condition of episiotomy wound.
2. To assess the effect of pineapple extract on episiotomy wound healing.

Materials and Method

A quasi-experimental two group pre-test post-test design was conducted to assess effect of pineapple extract on episiotomy wound healing among postnatal mothers in selected hospitals of Sangli, Miraj and Kupwad corporation area." By using non-probability purposive sampling method 60 samples were selected. A standardized REEDA SCALE was used to evaluate the impact of pineapple extract on episiotomy wound healing. "Widenbach prescriptive theory" was adopted as a theoretical base for framework of this study. Analysis was done using frequency and percentage distribution and paired' test.

Hypothesis:

H_0: There is no change in episiotomy wound healing after application of pineapple extract in experimental group.

Findings

Section I: Frequency and percentage distribution of demographic variables

Table 1: frequency and percentage distribution based on age, parity, education, and dietary pattern
n = 30 + n = 30

Variables		Experimental Group		Control Group	
		Frequency	Percentage	Frequency	Percentage
Age in years	19-23	15	50%	14	46.67%
	24-28	10	33.33%	13	43.33%
	29-33	5	16.67%	3	10%
Parity	1	17	56.67%	14	46.67%
	2	12	40%	15	50%
	3	1	3.33%	1	3.33%
Education	Under graduates	20	66.67%	25	83.33%
	Graduates	9	30%	5	16.67%
	Post graduates	1	3.33%	0	-
Dietary pattern	Vegetarian	12	40%	12	40%
	Mixed	18	60%	18	60%

Above table shows that, maximum number of samples 50% were between 19-23 years of age group, 56.67% were with parity 1, 66.67% were undergraduates and 60% were taking mix diet in experimental group, whereas maximum numbers of samples 46.67% were between 19-23 years of age group, 50% with parity 2, 83.33% were undergraduates and 60% were vegetarian in control group.

Table 2: Frequency and percentage distribution based on weight, family income, occupation and type of episiotomy
n = 30 + n = 30

Variables		Experimental		Control	
		Frequency	Percentage	Frequency	Percentage
Weight in kg	46-55	12	40%	12	40%
	56-65	12	40%	18	60%
	66-75	6	20%	0	0%

Family Income in Rs.	<10,000	5	16.67%	7	23.33%
	11,000-20,000	15	50%	16	53.33%
	21,000-30,000	7	23.33%	6	20%
	31,000-40,000	3	10%	1	3.33%
Occupation	Housewife	24	80%	26	86.67%
	Service	6	20%	4	13.33%
Type of Episiotomy	Medio-lateral	30	100%	30	100%
	Lateral	0	0%	0	0%
	Medial	0	0%	0	0%

Above table shows that maximum numbers of samples i.e. 40% of the mothers were in 46-55 kg weight group, 50% were in 11000-20000 family income groups, 80% were housewives and 100% mother had Medio lateral type of episiotomy in experimental group whereas 60% mothers were in 56-65 kg, weight group, 53.33% were in 11000-20000 family income group, 86.67% were housewives and 100% mother had Medio lateral type of episiotomy in control group.

Section II

Table 3: Pre/post observation of episiotomy wound healing parameters in control group

n = 30

Sr. No	Parameters	Pre		Post		t value	p value
		Mean	S.D.	Mean	S.D.		
1.	REDNESS	3.00	0.00	1.60	0.49	15.39	0.00
2.	EDEMA	3.00	0.00	1.96	0.31	17.70	0.00
3.	ECMOSIS	2.70	0.46	1.33	0.47	11.19	0.00
4.	DRAINAGE	2.60	0.47	0.96	0.41	17.40	0.00
5.	APPROXIMATION	3.00	0.00	1.93	0.25	23.03	0.00

Figure 1: Pre/post observation of episiotomy wound healing parameters in control group

Above table shows that pre observation episiotomy wound healing parameters scores of redness, edema, ecchymosis, discharge, approximation in control group are 3, 3, 2.70, and 2.60,3 respectively where as post observation scores are 1.60, 1.96, 1.33, 0.96, and 1.93 respectively.

Table 4: pre/post observation of episiotomy wound healing parameters in experimental group

n = 30

Sr. No.	Parameters	Pre		Post		t value	p value
		Mean	S.D.	Mean	S.D.		
1.	REDNESS	3.00	0.00	1.10	0.30	34.11	0.00
2.	EDEMA	2.96	0.18	1.16	0.37	24.23	0.00
3.	ECMOSIS	2.70	0.46	0.90	0.40	16.16	0.00
4.	DRAINAGE	2.66	0.47	0.36	0.49	21.14	0.00
5.	APPROXIMATION	3.00	0.00	1.60	0.49	15.39	0.00

Figure 2: Pre/post observation of episiotomy wound healing parameters in Experimental Group

Above table shows that pre observation episiotomy wound healing parameters scores of redness, edema, ecchymosis, discharge, approximation in experimental group are 3, 2.96, 2.70, 2.66, and 3 respectively where as post observation scores are 1.10, 1.16, 0.90, 0.36, and 1.60 respectively**.**

Table 5: Mean scores and s.d. of episiotomy wound healing parameters in experimental and control groups

n = 30 + n = 30

Sr. No.	Parameters	Experimental Group		Control Group		t value	p value
		Mean	S.D.	Mean	S.D.		
1.	REDNESS	1.10	0.30	1.60	0.49	4.69	0.00
2.	EDEMA	1.16	0.37	1.96	0.32	8.83	0.00
3.	ECCHYMOSIS	0.90	0.40	1.33	0.47	3.79	0.00
4.	DRAINAGE	0.36	0.49	0.96	0.41	5.12	0.00
5.	APPROXIMATION	1.60	0.49	1.93	0.25	3.27	0.002

Above table shows that, condition of episiotomy wound healing mean score of experimental group are 1.10, 1.16, 0.90,0.36, 1.6 and standard deviation are 0.30, 0.37, 0.40, 0.49, 0.49 .respectively whereas mean score of control group are 1.60, 1.96, 1.33, 0.96, 1.93 and standard deviation are 0.49, 0.32, 0.47, 0.41 and 0.25 respectively. Hence there is significant difference between Mean and SD of episiotomy wound healing parameters in experimental and control group. p value less than 0.005, it shows that pineapple (stem) extract application is effective in episiotomy wound healing.

Table 6: mean scores and s.d. of wound healing in experimental and control groups

n = 30 + n = 30

Group	Frequency	Mean	S.D.	t value	P value
Experimental	30	5.13	0.97	11.79	0.000
Control	30	7.83	0.79		

The average wound healing score of experimental group was 5.13 with standard deviation of 0.97. The average wound healing score of control group was 7.83 with standard deviation of 0.79. The test statistics value of the unpaired t test was 11.79 with p value 0.000. This shows that there was significant difference in the average wound healing score at 5% level of significance.

Conclusion

The study was conducted to assess the effect of pine apple extract on episiotomy wound healing. For this study the quasi experimental pre post test design was used, 60 samples were selected on the basis of the sampling criteria set for the study and samples are divided in two groups, pineapple extract application group and control group.Pre observation of wound was done before intervention in both the groups, post intervention observation of episiotomy wound was done to assess episiotomy wound healing in experimental group with the help of Reeda scale.

The intervention was done i.e. pineapple extract applied to the episiotomy wound twice daily and observation was done according to the REEDA Scale before application of pineapple extract for five days and findings were recorded.The episiotomy wound healing parameters mean scores in experimental group is 1.10, 1.16, 0.90,0.36, 1.6 and standard deviation is 0.30, 0.37, 0.40, 0.49, 0.49, respectively whereas wound healing parameters mean score in control group is 1.60, 1.96, 1.33, 0.96, 1.93 and standard deviation is 0.49, 0.32, 0.47, 0.41 and 0.25 respectively. This shows there is significant difference between Mean and SD in experimental and control group .p value is less than 0.005,

The average wound healing score of experimental group was 5.13 with standard deviation of 0.97. The average wound healing score of control group was 7.83 with standard deviation of 0.79. The test statistics value of the unpaired t test was 11.79 with p value 0.000. This shows that there is a significant difference in the average wound healing score at 5% level of significance. Mean score findings showed that pineapple extract application is useful in episiotomy wound healing and there is statistical significant difference in the intervention group and control group. The application of pineapple extract contains bromelain, which is effective in healing of episiotomy wound Hence it is concluded that pineapple extract application is the best and effective tropical agent in episiotomy wound healing.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Institutional Ethical Committee, meeting was held in Bharti Vidyapeeth (Deemed to Be University) College of Nursing, Sangli and research proposal was approved. Permissions were obtained from Private hospitals of Sangli and Miraj to conduct pilot study and the main study after I.E.C. Permission from Medical Superintendent was obtained for autoclaved materials required for episiotomy wound dressing. Purpose of the study was explained to postnatal mother and informed written consent was obtained from the subject prior to conduct study. Data collected from participants was kept confidential.

REFERANCES

1. D.C. Dutta, text book of obstetrics, 7th edition, 2011: 64-65.
2. Annamma Jacob, Comprehensive text book of midwifery and Gynecological nursing, 3rd edition 2018; 255-58.
3. Neelamkumari, Shivani Sharma, Dr Priti Gupta, midwifery and Gynecological nursing, 1st edition, 2011; 119-23.
4. Dr. Vinita Salvi, the Pregnancy Handbook for Indian Moms: A Doctor's Answers to All Your Questions, Sep 2013; 23-25.
5. Nutan Lakhanpal, Pregnancy: The Complete Childbirth Book, – 1st edition, March 2004; 14-16
6. Annamma Jacob. Comprehensive Text book of Midwifery and Gynecological Nursing, 3rd Edition, 2012; 440-42.
7. D.C. Dutta, text book of obstetrics, 7th edition, 2011; 150-51.
8. Neelamkumari, Shivani Sharma, Dr Priti Gupta, midwifery and Gynecological nursing, 1st edition, 2011; 352-353.
9. Annamma Jacob. Comprehensive Text book of Midwifery and Gynecological Nursing, 3rd Edition, 2012; 215-18.
10. SP Devi, The hand book of Horticulture. Directorate. Pineapple.

    Pineapple: Health Benefits, Risks & Nutrition Facts, 1st Edition, 2009; 5-6.
11. Fran Beauman: The Pineapple: The King of Fruits: Bromelain: Uses, Side Effects, Interactions, Dosage, and Warning. 1st Edition; Nov 2006; 17-19.

Assessment of Clinical Profile of Patients with Blunt Abdominal Trauma Admitting to Emergency Department

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ABSTRACT

Background: Abdominal trauma caused by blunt force is a common presentation in the emergency room seen in adults and children. The management of the patient with blunt abdominal trauma remains in continuous flux. Hence; we planned the present study to assess the clinical profile of patients with blunt abdominal trauma admitting to emergency department.

Materials & Method:A total of 200 patients were included in the present study. Complete clinical details of all the patients were obtained. Chest X-ray was carried out in all the patients. Computed tomography (CT) was also done in all the patients. This was followed by grading of the liver, spleen and gut according to their CT findings.Higher grade indicated higher severity of the trauma.

Results: In the present study, a total of 200 patients were analysed. Abdominal distension was found to be present in 152 patients (76 percent). Chest X ray findings were analysed in all the patients and it was observed that Chest X-ray revealed abdomen with air under diaphragm in 9 percent of the patients. On doing CT liver, it was observed that grade zero was present in 98 patients while grade three and four were present in 30 patients each.

Conclusion: In patients with blunt abdominal trauma, it is comparatively unreliable to diagnose the patient clinically. Rather radiograph and CT evaluation of the patients should be done for finalizing the treatment planning.

Keywords: *Abdominal,Blunt, Trauma*

Introduction

Abdominal trauma caused by blunt force is a common presentation in the emergency room seen in adults and children. The chief cause of blunt abdominal trauma is motor vehicle accidents. Other rare causes include falls from heights, bicycle injuries, injuries sustained during sporting activities, and industrial accidents. Abdominal injuries require surgery in about 25% of cases. 85% of abdominal traumas are of blunt character.[1-3] The spleen and liver are the most commonly injured organs as a result of blunt trauma. Clinical examination alone is inadequate because patients may have altered mental status and distracting injuries.The management of the patient with blunt abdominal trauma remains in continuous flux. The emergency physician cannot place undue reliance on physical examination, and plain radiography of the abdomen rarely adds to patient care. Laboratory tests particularly elevated liver function tests or a large base deficit, may increase our suspicion for intra-abdominal trauma.[4-6] Hence; under the light of above obtained data, we planned the present study to assess the clinical profile of patientswith blunt abdominal trauma admitting to emergency department.

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Materials & Method

The present study was conducted in the Department of Surgery, Krishna Institute of Medical Sciences deemed to be University, Karad, Satara, Maharashtra and it included analysis of clinical profile of the patients with blunt abdominal trauma admitting to emergency

department. A total of 200 patients were included in the present study. Ethical approval was obtained from the ethical committee of the institution.Complete clinical details of all the patients were obtained. Chest X-ray was carried out in all the patients. Computed tomography (CT) was also done in all the patients. This was followed by grading of the liver, spleen and gut according to their CT findings.[4, 5]Higher grade indicated higher severity of the trauma. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

Results

In the present study, a total of 200 patients were analysed. Mean age of the patients of the present study was 38.4 years. Majority of the patients belonged to the age group of 21 to 40 years. 91 percent of the patients in the present study were males while the remaining were females. Abdominal distension was found to be present in 152 patients (76 percent). Chest X ray findings were analysed in all the patients and it was observed that Chest X-ray revealed abdomen with air under diaphragm in 9 percent of the patients.

In the present study, on doing CT liver, it was observed that grade zero was present in 98 patients while grade three and four were present in 30 patients each.In the present study, on doing CT spleen, it was observed that grade zero was present in 150 patients while grade three was present in 30 patients.In the present study, on doing CT gut, it was observed that grade zero was present in 195 patients while grade one was present in 5 patients.

Table 1: Age-wise distribution of subjects

Age group (years)	Frequency
<20	18
21-40	138
41- 60	36
>60	8
Total	200

Table 2: Gender-wise of the distribution of subjects

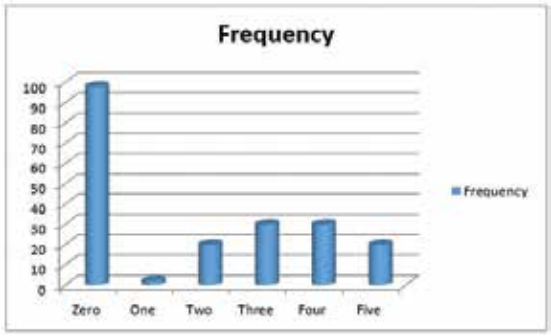
Gender	Frequency
Male	182
Female	18
Total	200

Table 3: Distribution of subjects according to abdomen distension

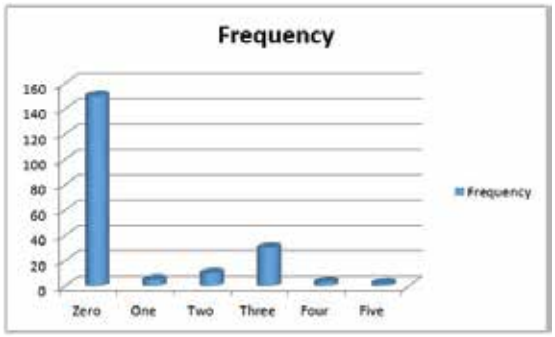
Abdomen distension	Frequency
Absent	48
Present	152
Total	200

Table 4: Distribution of subjects according to chest X- ray Abdomen with air under diaphragm

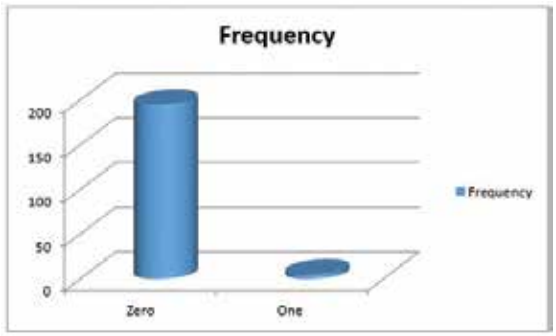
Parameter	Frequency
Absent	182
Present	18
Total	200



Graph 1: Distribution of subjects according to CT Liver grading



Graph 2: Distribution of subjects according to CT Spleen grading



Graph 3: Distribution of subjects according to CT Bladder

Discussion

In the present study, a total of 200 patients were analysed. Mean age of the patients of the present study was 38.4 years. Majority of the patients belonged to the age group of 21 to 40 years. 91 percent of the patients in the present study were males while the remaining were females. Davis JJ et al, in their study, highlighted the diagnosis and management of blunt abdominal trauma patients. The records of 437 patients with blunt abdominal trauma were reviewed and computer-analyzed. There was an 80% increase in the incidence of blunt abdominal trauma when compared with the preceding 15-year experience. Forty-three per cent of all the patients presented with no specific complaint or sign of injury. Blunt abdominal injury was usually diagnosed preoperatively using conventional methods including history, physical examination, and routine laboratory tests and x-rays. Abdominal paracentesis via a Potter needle had an 86% accuracy. The incidence and management of specific organ injuries with associated morbidity and mortality have been discussed. Mortality and morbidity continued to be significant in blunt abdominal trauma. Isolated abdominal injuries rarely (5%) resulted in death, even though abdominal injuries accounted for 41% of all deaths. Associated injuries, especially head injury, greatly increased the risk. The insidious nature of blunt abdominal injury was borne out by the fact that more than one-third of the "asymptomatic" patients had an abdominal organ injured.[7]

In the present study, abdominal distension was found to be present in 152 patients (76 percent). Chest X ray findings were analysed in all the patients and it was observed that Chest X-ray revealed abdomen with air under diaphragm in 9 percent of the patients.In the present study, on doing CT liver, it was observed that grade zero was present in 98 patients while grade three and four were present in 30 patients each.In the present study, on doing CT spleen, it was observed that grade zero was present in 150 patients while grade three was present in 30 patients.In the present study, on doing CT gut, it was observed that grade zero was present in 195 patients while grade one was present in 5 patients. Fransvea P et al assessed splenic trauma treatment, with particular attention to conservative treatment, its limits, its efficiency, and its safety in multi-trauma patient or in a severe trauma patient. The variables taken into account were spleen injury and general injuries, age, sex, cause and dynamic of trauma, hemoglobin, hematocrit, white blood cells count, INR, number and time blood transfusion, hemodynamic stability, type of treatment provided, hospitalization period, morbidity and mortality. Assessment of splenic injuries was evaluated according to Abbreviated Injury Scale (AIS). The overall mortality ratio was of 19.1% (13 patients). The average ISS value in patients who died was of 41.92 ± 12.48, whereas in patients who survided was of 23.33 ± 10.15. The difference was considered to be statistically significant ($p < 0.001$). The relashionship between the ISS and AIS values in patients who died was considered directly proportional but not statistically significant (Pearson test AIS/ISS = 0.132, p = n.s.). The initial management was a conservative treatment in 27 patients (39.7%) of them 4 patients (15%) failed, in the other 41 cases urgent splenectomies were performed. Splenic injury, as reported in our statistic as well as in literature, was the most common injury in closed abdominal trauma.[8]

Trauma is one of the most common causes of morbidity and mortality. After the evaluation and resuscitation of trauma patients, a detailed physical examination should be made. As a single physical examination is not sensitive, serial physical examinations are required. For subjects with abdominal injury who were admitted to emergency treatment, ultrasonography (US) and computed tomography (CT) are the most commonly used radiological tests. Sensitivity of US is between 56-97% for determining hemoperitoneum in the intra-abdominal organ injury. CT is the gold standard in the diagnosis of abdominal injuries. CT especially provides utility in planning conservative treatment and follow-up by classifying solid organ injuries in blunt abdominal injuries.[9-11]

Conclusion

Under the presence of above obtained results, the authors conclude that in patients with blunt abdominal trauma, it is comparatively unreliable to diagnose the patient clinically. Rather radiograph and CT evaluation of the patients should be done for finalizing the treatment planning.

Ethical Clearance: Taken from. Institutional Ethical. committee

Source of Funding: Self

Conflict of Interest: Nil.

REFERENCES

1. van der Vlies CH, Olthof DC, Gaakeer M. Changing patterns in diagnostic strategies and the treatment of blunt injury to solid abdominal organs. Int J Emerg Med 2011;4:47.
2. Lowe RJ, Boyd DR, Frank CM, Baker RJ. The negative laparotomy for abdominal trauma. J Trauma 1997; 2:853-61
3. Fernandes T Marconi, EscociaDorigatti A, Monteiro BT. Nonoperative management of splenic injury grade IV is safe using rigid protocol. Rev Col Bras Cir 2013;40: 323-8
4. Taviloglu K, Yanar H. Current trends in the management of blunt solid organ injuries. Eur J Trauma EmergSurg 2009;35:90-4.
5. Wang S-Y, Liao C-H, Fu C-Y, Kang S-C. An outcome prediction model for exsanguinating patients with blunt abdominal trauma after damage control laparotomy: a retrospective study. BMC Surg 2014;14:24.
6. Morton J, Hinshaw R. Blunt trauma to the abdomen. Ann Surg 1957;145:699-711
7. Davis JJ, Cohn I Jr, Nance FC. Diagnosis and management of blunt abdominal trauma. Ann Surg. 1976;183(6):672–678.
8. Fransvea P, Costa G, Massa G, Frezza B, Mercantini P, BaIducci G. Non-operative management of blunt splenic injury: is it really so extensively feasible? a critical appraisal of a single-center experience. Pan Afr Med J. 2019;32:52. Published 2019 Jan 30. doi:10.11604/pamj.2019.32.52.15022
9. Karamercan A, Yılmaz TU, Karamercan MA, Aytaç B. Blunt abdominal trauma: evaluation of diagnostic options and surgical outcomes. UlusTravmaAcilCerrahiDerg. 2008;14:205–10.
10. Davis JJ, Cohn I, Nance FC. Diagnosis and management of blunt abdominal trauma. Ann Surg. 1976;183:672–8
11. Leone RJ, Hammond JS. Nonoperative management of pediatric blunt hepatic trauma. Am Surg. 2001;67:138–42

Comparative Study of Semen Analysis in Fertile and Infertile Males

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ABSTRACT

Background: Prediction of male fertility potential on the basis of semen quality remains desirable but an elusive goal. There are no objective morphological criteria for defining normal spermatozoa in human semen. The morphometric diversity in the semen sample may be a useful measure of morphologic integrity.

Aim: The present study was undertaken to analyze the various parameters of semen analysis in fertile and nonfertile males and to analyze the role of collective parameters in infertility.

Materials & Method: The study was carried out in the department of anatomy. A total of 200 Semen samples were collected from the patients visiting private pathology laboratories and infertility centers located in and around Vijayawada city.

Results: In the macroscopic examination no significant difference was noted in infertile couples (experimental) for the parameters liquefaction, appearance, volume, viscosity, and pH when compared with a fertile group (control). In the microscopic examination, no significant difference was detected in agglutination and other cells in both groups.

Conclusion: The presence of subnormal values in the semen analysis report should not be regarded as a cause of infertility.

Keywords: *Semen analysis, Spermatozoa, Motility, Microscopic and Macroscopic*

Introduction

Infertility is the problem faced by mankind since its evolution on the earth. According to World Health Organization (WHO) and International Committee for Monitoring Assisted Reproductive Technology, infertility is a disease of reproductive system defined as failure of couple to conceive after 12 months of regular intercourse without the use of contraception in women <35 years; and after 6 months of regular intercourse without the use of contraception in women ≥35 years.[1]

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Approximately 72.4 million couples worldwide experience fertility problems, there are no reliable figures for the global prevalence of infertility.[2] WHO estimated that 8-12% of couples worldwide affect infertility.[1] In India, the overall prevalence of primary infertility ranges from 3.9% to 16.8%. It varies widely among Indian states from 3.7% in Uttar Pradesh, Himachal Pradesh, and Maharashtra, to 5% in Andhra Pradesh, and 15% in Kashmir. It was also reported that 40% of infertility cases were related to men, approximately 23% of the malefactor is the cause among the couples seeking treatment for infertility.[2, 3]

Infertility and problems of impaired fecundity have been a concern through ages and is also a significant clinical problem today, which affects 8–12% of couples worldwide. Of all infertility cases, approximately 40–50% is due to "male factor" infertility and as many as 2% of all men will exhibit suboptimal sperm parameters. It may be one or a combination of low sperm concentration,

poor sperm motility, or abnormal morphology.[4] The rates of infertility in less industrialized nations are markedly higher and infectious diseases are responsible for a greater proportion of infertility.[5, 6]

Semen analysis is the most important diagnostic tool for evaluation of the role of males in infertility. Compared to many other tests used in the assessment of the infertile couple, semen analysis has been standardized throughout the world. The semen analysis includes a sequence of steps; collection semen sample, evaluation of the physical properties of the semen such as liquefaction, viscosity, semen volume and seminal pH, determination sperm motility, vitality, counting of spermatozoa, assessment of sperm morphology, counting of other sperm cells, Biochemical assays including the measurement of fructose, zinc and epididymal glucosidase are outlined.[7, 8]

There are scanty reports about the study of all the macroscopic and light microscopic parameters in a semen sample and their correlation in both fertile and infertile groups. The study aimed to analyze the role of various parameters of macroscopic and microscopic examination of semen in infertility and also aims to analyze the role of collective parameters in infertility.

Materials & Method

The present study was carried out on patients visiting private pathology laboratories and infertility centers located in metropolitan cities. A total of 200 semen samples were studied, in which 100 experimental and 100 control groups. The collected data was analysed in the Department of Anatomy, All India Institute of Medical Sciences, Mangalagiri.

The infertile patients were sent to the laboratories for investigations from various clinicians in and around the city. Both wife and husband were investigated for the cause of infertility. After the complete investigation, if the female partner was detected as fertile and the male partner detected infertile were included in the experimental group. If the female partner was detected as infertile then her husband was included in the control group. The history of the subjects and consent form from both partners were taken.

Sample Collection: The subjects were advised to observe abstinence from intercourse for 3-4days and explained the procedure of collection of the sample by masturbation within the laboratory premises in the collection room. Semen was collected in sterile transparent circular glass jars of 7cms height with a diameter of 4 cm at the bottom and 6 cm at the top.

Analysis of the Sample: After liquefaction of the sample, the following parameters were measured;

1. Macroscopic examination– Liquefaction, appearance, volume, viscosity, semen pH
2. Microscopic examination:
   a. Morphology of spermatocytes by examining stained slides
   b. Motility

The motility of each spermatozoon was assessed by grading them into four groups as follows:

a = rapid- progressive motility (> 25u/second)

b = slow- progressive motility (5- 25u/second)

c = non- progressive motility (< 5u/second)

d = immobility

c. Estimation of cells other than spermatozoa

The cells were detected on the basis that they lacked the typical characteristics of spermatozoa, the typical head, midpiece, tail, their presence or absence was recorded. The number of round cells detected during the examination of various fields for counting 200 spermatozoa was noted.

The total number of round cells was calculated with the help of the following formula:

Round cells in millions/mt= Round cells counted/200 sperms x Sperm concentration in millions/ml100

d. Vitality: The test is based on the principle that dead cells with damaged plasma membrane take up certain stains. The number of live spermatozoa is measured during the motility counting test.

e. Total count of spermatocytes: Evaluation of actual sperm concentration was done after dilution, which was decided on the basis of the two averages for the sample recorded during the preliminary estimation of concentration.

Table 1: showing dilutions and conversions factor for the Neubauer Haemocytometer

Initial Microscopic examination		The conversion factor in Haemocytometer		
Sperms/400x field	**Dilution (Semen+Diluent)**	25	10	5
<15	1:5 (1+4)	20	8	4
15-40	1:10 (1+9)	10	4	2
40-200	1:20 (1+19)	5	2	1
>200	1:50 (1+49)	2	0.8	0.4

Preparation of smear and staining: Smears were prepared by placing the drop of semen on pre-cleaned slides by feathering technique and air dried. Smeared slides were stained by modified Papanicolaou staining. The stained slides were examined on the same day with the use of a binocular microscope.

Statistical Analysis: The collected data was entered in excel sheets, Mean, standard deviation, standard error of the difference between two means (Control and Experimental) and 'z' value were calculated using SPSS software. P value is <0.05 considered as significant.

Observations & Results

The macroscopic examination of semen analysis was done in both control and experimental groups to know the Liquefaction time, Appearance, Volume, Viscosity, pH of the semen.

All the samples in both experimental and control group liquefied within thirty minutes. Semen samples in both experimental and control groups of the present study were having a homogenous grey opalescent appearance. All the 200 samples in the present study showed the volume ranging from 2ml to 4.5ml. The mean volume in the experimental group was 3.4 ± 0.38ml and in the control group 3.46 ± 0.46ml. No difference was seen in the median value (3.4 ml) while the mode value for the experimental group was less by 0.06ml than that in the control group, it was statistically insignificant. The viscosity was within normal limits with the formation of thread less than the 2cm length for all the samples in the experimental and control group. All samples in the present study showed pH within the range of 7.0 to 8.0.

2. Microscopic examination:

a. Morphology of spermatocytes: The morphology of spermatozoa was observed in stained slides and categorized into head, neck, mid-piece and tail defects. It was observed that in the experimental group the percentage of morphologically normal sperms varied from 2 to 52%, abnormal sperms varied from 48% to 98%. The percentage of morphologically normal sperms varied in the control group from 80 to 91%, abnormal sperms varied from 9 to 20%. The mean differences in the percentage of abnormal sperms were statistically significant.

Table 2: Shows the Mean differences in abnormal sperms in the experimental and control groups

S. No.	Study groups	% Abnormal sperms			'P' value
		Mode	Median	Mean ± SD	
1.	Experimental	54	54	45.52 ± 6.24	0.001
2.	Control	10	13	13.15 ± 3.08	

*P≤0.05 considered as significant

Even though a various number of defects were categorized for each part of spermatozoa, in the present study four varieties of head defects are seen; those are Tapering, Pyriform, Amorphous, Double Heads. One variety of neck defects, two varieties of a mid-piece defect and two varieties of tail defects were found while examining the stained slides under the binocular microscope.

Table 3: Shows various morphological defects of spermatozoa

S. No.	Type of defects	Group	Mode	Median	Mean ± SD	'P' value
1.	Head defects	Exp.	40	20	20.40+-6.73	<0.001
		Control	3	18	1.25+-0.96	
2.	Neck defects	Exp.	2	2	21.14 ± 1.86	<0.001
		Control	2	1	1.23 ± 0.93	
3.	Mid-piece defects	Exp.	0	0	0.76 ± 2.01	<0.001
		Control	0	0	0.44 ± 0.57	
4.	Tail defects	Exp.	0	0	1.61 ± 2.04	>0.05
		Control	2	2	1.78 ± 0.63	
5.	Cytoplasmic droplets	Exp.	6	6	6.64 ± 3.46	<0.001
		Control	5	5	4.77 ± 2.07	

*P≤0.05 considered as significant

b. Motility: Motility of the spermatozoa was assessed by grading as described in the methodology. The difference between the experimental and control groups was significant in a-grade, b-grade, and c-grade motility and not significant in d-grade motility.

Table 4: Showing mode, median and mean values of the different grades of motility of the experimental and control group

S. No.	Grades of motility	Group	Mode	Median	Mean ± SD	'P' value
1.	a grade	Expt.	20	20	20 ± 0.36	<0.001
		Ctrl.	30	30	28.55 ± 7.40	
2.	b grade	Expt.	30	30	32 ± 9.74	<0.05
		Ctrl.	30	30	29.10 ± 8.05	
3.	c grade	Expt.	30	30	27 ± 10.1	<0.001
		Ctrl.	30	20	22.45 ± 9.49	
4.	d grade	Expt.	10	20	21 ± 13.52	>0.05
		Ctrl.	30	20	19.90 ± 9.67	

*P≤0.05 considered as significant

c. Estimation of cells other than spermatozoa: Round cells were observed in both experimental and control group samples. Round cells less than or equal to one million per ml were found in 83 cases of experimental and 92 cases of the control group. More than one but less than 2 million per ml was seen in 14 cases of the experimental group and 8 cases of the control group. In 3 cases of the experimental group, the number of round cells was more than 5 million per ml.

d. Vitality: The percentage of vital spermatozoa in the control group was more than 74% in control group cases, which was within the normal limits. However, 65 cases out of the total 100 in an experimental group, showed the vitality percentage within normal limits (>74%). In 35 samples of the experimental group, the vitality percentage was in the range of 60 to 73%. The mean differences between the experimental and control groups were statistically significant.

e. Total count of spermatocytes: The mean values were 192.48 ± 71.61 million and 269.03 ± 59.49 million for the experimental and control groups respectively. On comparing the mean differences of total spermatozoa count in control and experimental group was found significant

Table 5: Showing the mean differences between spermatozoa vitality and total count in experimental and control group samples

S. No.	Variables	Study groups	Mode	Median	Mean ± SD ml	'P' value
1.	Vitality	Experimental	80	80	82 ± 6.78	0.05
		Control	85	85	84.45 ± -6.31	
2.	Total sperm count	Experimental	129.2	198	193.48 ± 71.61	0.001
		Control	320	272.8	269.03 ± 59.49	

*P≤0.05 considered as significant

Discussion

Infertility severely affects the couple's psychological harmony, sexual life, and social function. The individual couple desiring a child but unable to conceive one, feel demanded, deprived and bitter. The inability to procreate is thus always perceived as a denial of basic rights, injustice, and a disappointment sometimes bordering on grief.

An internationally accepted method of classification of grades of motility was used in the present work. The percentage of grade wise motile sperms observed in the present study was in agreement with reports of Aitken R J (1982)[6], Bonde J P E (1998)[9], Menkveld R (2011)[10]. While comparing the motility in the present work it was observed that there is no significant difference in the d-grade motility in the experimental group when compared with the respective grade in the control group. This indicates that the presence of rapidly progressive motile sperms in a good number is essential for fertilization.[11] Reduced calcium from the prostate, increased secretion of MIF from the epididymis and decreased MSF from Sertoli cells are the major cause affecting the sperm motility.[12] Cholesterol containing floating vesicles in the semen may inhibit the calcium permeability and thus indirectly the motility.[11, 12]

A recent study was done by Nandini Bhaduri (2015)[13], on sperm morphology in males exposed to higher temperatures showed that occupational exposure to high temperature adversely affects sperm morphology and motility. This leads to oligoasthenoteratozoospermia (OAT). The percentage of sperms with normal morphology is strongly related to the likelihood of pregnancy independent of sperm concentration. Bonde, J.P.E. et al (1998)[9] found the mean proportion of morphologically normal sperms to be 40%. The percentage of morphologically abnormal cells found in the current study is in conformity with Aitken, R. J. et al (1982)[6], Rogers et al (1983)[14]. The results reported by Narayan et al (1981)[15] are higher the percentage of abnormal sperms as compared with current findings.

Analysis of retrospective data indicates that sperm counts may have declined in some parts of the world, but there seem to be geographical variations in the semen quality.[16] The reason for geographic variations in semen characteristics is not clear, but it may be due to environmental, nutritional, socioeconomic, or other unknown causes. The decline in the semen quality coincides with an increased incidence of abnormalities of the male genital tract including testicular cancer and cryptorchidism in various countries.[15, 16]

Conclusion

With the findings of the present work, we propose that the fertilizing capacity of an individual should not be assumed as within normal limits by the mere presence of all the parameters of semen analysis within normal limits. Similarly, the presence of some of the parameters better than the average also fails to conclude the fertilizing capacity of an individual. On the other hand, the mere presence of subnormal values in the semen analysis report should not be regarded as a cause of infertility. The degree of overlap between fertilizers and nonfertilizers for various parameters of the semen analysis is considerable.

We propose that the semen can be further analyzed in cases of unexplained infertility for its biochemical constituents and fertilizing capacity. Some of the newer parameters like sperm length: width ratio, sperm head length: width ratio, acrosome index, sperm deformity index, multiple anomalies indexes, sperm cytochemistry etc should be studied wherever required.

Acknowledgment

The authors are thankful to the fertility centers and laboratories for their assistance in the completion of the present work.

Ethical Clearance: The study was approved by Institutional Ethical Committee.

Source of Funding: Self-funded.

Conflict of Interest: None to be declared

REFERENCES

1. World Health Organization. World health statistics 2010. World Health Organization; 2010.
2. Amelar RD. Infertility in men: diagnosis and treatment. FA Davis; 1966.
3. Marimuthu P, Kapilashrami MC, Misro MM, Singh G. Evaluation of trend in semen analysis for 11 years in subjects attending a fertility clinic in India. Asian journal of andrology. 2003 Sep 1;5(3):221-6.
4. Bartoov B, Eltes F, Langsam J, Snyder M, Fisher J. Ultrastructural studies in morphological assessment of human spermatozoa. International Journal of Andrology. 1982 Mar;5:81-96.
5. Eliasson R. Standards for investigation of human semen. Andrologia. 1971 Apr 6;3(2):49-64.
6. Aitken RJ, Best FS, Richardson DW, Djahanbakhch O, Mortimer D, Templeton AA, Lees MM. An analysis of sperm function in cases of unexplained infertility: conventional criteria, movement characteristics, and fertilizing capacity. Fertility and sterility. 1982 Aug 1;38(2):212-21.
7. Swan SH, Brazil C, Drobnis EZ, Liu F, Kruse RL, Hatch M, Redmon JB, Wang C, Overstreet JW, Study For Future Families Research Group. Geographic differences in semen quality of fertile US males. Environmental health perspectives. 2003 Apr;111(4):414-20.
8. Joshi P, Gopal N, Bhat V. Study of semen analysis patterns in infertile males. Int J Pharm Bio Sci. 2011 Jan;1(1):44-9.
9. Bonde JP, Ernst E, Jensen TK, Hjollund NH, Kolstad H, Scheike T, Giwercman A, Skakkebæk NE, Henriksen TB, Olsen J. Relation between semen quality and fertility: a population-based study of 430 first-pregnancy planners. The Lancet. 1998 Oct 10;352(9135):1172-7.
10. Menkveld R, Holleboom CA, Rhemrev JP. Measurement and significance of sperm morphology. Asian journal of andrology. 2011 Jan;13(1):59.
11. Amann RP. Considerations in evaluating human spermatogenesis on the basis of total sperm per ejaculate. Journal of andrology. 2009 Nov 12;30(6):626-41.
12. Menkveld R, Stander FS, Kotze TJ, Kruger TF, Zyl JA. The evaluation of morphological characteristics of human spermatozoa according to stricter criteria. Human Reproduction. 1990 Jul 1;5(5):586-92.
13. Bhaduri(Bhattacharyya) N, Sarkar AP, Dewasi N, GhoshTK.Abnormalities in semen analysis among male partners of infertile couples: a study in a tertiary care level hospital of West Bengal, India.Int J Reprod Contracept Obstet Gynecol2015;4:100-2.
14. Rogers BJ, Bentwood BJ, Van Campen HA, Helmbrecht G, Soderdahl D, Hale RW. Sperm morphology assessment as an indicator of human fertilizing capacity. Journal of andrology. 1983 Mar 4;4(2):119-25.
15. Narayan P, Amplatz K, Gonzalez R. Varicocele and male subfertility. Fertility and sterility. 1981 Jul 1;36(1):92-7.
16. Overstreet JW, Hembree WC. Penetration of the zona pellucida of nonliving human oocytes by human spermatozoa in vitro. Fertility and sterility. 1976 Jul 1;27(7):815-31.

Recharging Ground Water using Age–Old Traditional Mechanisms

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ABSTRACT

"Give back unto the Earth if water is desired in the coming generations"

"Pawan Guru, Pani Pita, Mata Dharat Mahat" the Gurbani or word of the Gurus as embodied in the holy Guru Granth Sahib has in these words immortalized the relationship of men with Nature by saying that the "Wind is the teacher; Water is Father while the entire Earth is the mother". When this strong bonding of men and Nature had been recognized several centuries ago it stupefied the human senses to think that man had ended up destroying the natural habitat unmitigatedly.

Since earliest times almost all natural resources have been reserved and utilized judiciously by civilizations. The Chinese, Indus valley, Mesopotamian, Roman, Aztec and most other great settlements used water conservatively. Even back then there was concern for wastage of water.

This paper is focused on looking at the systems of conserving, purifying water and utilizing it to the optimum without wasting any part of it. The objective of the paper is to determine the functioning and use of these techniques for present day communities.

Keywords: *Earth, Ma, Nature, habitat, water, purification, conservation, techniques, civilizations, traditional, optimum, communities.*

Problem Statement: Dimensions of Water Access & Excess: India's population is over 1.3 billion. This population inhabits several thousands of villages in each of its states and union territories besides cities and towns. Over this and the past century, water availability to the world's population has been declining rapidly due to increased urbanization and urban populations. In India a large percentage of surface water is contained and unusable. It is a disturbing fact that India as of today uses more ground water than China and the United States put together. Needless to say the ground water levels are rapidly declining all over the country but in some regions they are doing so at an astronomical pace.

The drinking water situation in the country is fast becoming a Pandora's Box. On the one hand populations have been known to face death due to not having sustainable access to clean drinking water and on the other hand there is rampant waste of this precious commodity. The villages at one time had had wells and ponds that hummed with life[1]. These days' wells are obsolete while ponds have become stench holes. Most villages have their waste (solid and liquid) flowing gravitationally into their pond and they do not pay heed to the ominous degradation of this once healthy resource.

"If the villagers do not consider their ponds to be worthy of being saved they will in their lifetimes see the folly of their ways" said an octogenarian in one of the villages of the Doaba region in Punjab. Taking his concerns further it can be deduced that villagers will gradually loose:

(i) A healthy environment to live in

(ii) Be forced to live in a vector infested habitat

(iii) Be prone to diseases all the year round when neither children nor the elderly will be spared.

(iv) Loose the vital lungs of the village

(v) Become bereft of a vital water recharging source that could have replenished their water reservoirs.

(vi) Very few villagers choose to inhabit areas around the villages pond.

(vii) Gain a little bit of extra land for settlers and loose a major village asset like the pond.

In most villages it can be observed that people living near the pond are doing so only under duress. They have no choice, no alternative but to tolerate the harmful, stench saturated and unhealthy environment.

Rejuvenation through Ponds: Once the ponds have optimum content of oxygen in the water special blends of bacteria and enzymes can be introduced into them. These biological blends are successful at breaking down organic matter. They are efficient in consuming water borne pathogens that are causative of pollution and other bad effects of stagnation in the pond.

Access to clean water can affect the performance of milch animals markedly and is therefore very necessary for healthy livestock. With availability of clean water ponds these milk giving animals drink and eat more, and ultimately gain weight quicker. This directly affects their milk yield.

Downing[2] in his paper titled 'Emerging Global Role of Small Lakes and Ponds: Little Things Mean a Lot', presents the concept that little water bodies do a lot for the entire ecological systems. He carefully studied small ecosystems and proposed that ecosystems having small areal extent played a major role in global ecological processes of existence. He continued that the areal extent of continental waters is dominated by ponds and small lakes. They show a large functional intensity of many ecological processes and these can be seen through various seasonal cycles.

Ponds provide sustainable solutions to most of the major issues of water management being faced from the village to the global level. Thus, ponds, therefore, have been recognized as an important functional freshwater habitat[4]. They play a critical role in maintaining the environmental biodiversity. With sensitive planning at the village level these very ponds can bring about major benefits to the resident population in terms of:

(i) Rich, healthy Biodiversity

(ii) Promoting a Healthy Environment

(iii) Pollution alleviation and promotion of a clean environment

(iv) Conducive habitat for domestic animals

(v) Provide flood relief during heavy rains

(vi) Guards the environment against rapid climate change

(vii) Adds to an aesthetically appealing living environment for most villagers

The pond's ecosystem is directly connected with the resident community the people, the decision-makers and the implementers. The ponds also helped maintain, to a large extent, the communities' inherent cultural and economic resources. Ponds with good water quality are economically desirable all over the world.

The National Water Policy of India lays emphasis on the significance of ponds in India. These desirables have been underlined by several world bodies. The United Nation's Sustainable Development Goals (SDGs) have mandated that it is essential to safeguard the planet's water resources. By 2030 AD the world's water requirement is expected to increase by 30%. It is important to realize that ecological and ecosystem security is a prerequisite for human and water security.

No doubt the demand for water has accelerated over the decades because of the escalating population size and unsustainable consumption and production patterns that have began showing their debilitating impact in the current century. Competition for water has severely impacted upon the Earth's ecosystems and biodiversity. Its worst effects are visible on populations in parts of the developing world where natural water resources have been depleted and artificial water recharging mechanisms have proven to be cost prohibitive.

Significance of Ponds in the Village Habitat: There is no universally accepted definition of the term pond. Ponds can be described as a body of still surface water which is either natural or man-made and is quite smaller than a lake. These small water resources are significant contributors to development of local communities, and marginalized lower income households especially in the urban areas. The village ponds are essential receptors and reservoirs for natural rainwater harvesting. They are providential for maintaining groundwater levels, naturally.

According to Dubey[3] who closely examined the biological diversity presented in village ponds and their crucial role in sustainable development established irrefutably that there is an undeniable equation between man and his environment.

Dubey[3] details that the village ponds "conserve and preserve the history, mystery and science of rural realities of developing, underdeveloped and partially developed nations." We continues that ponds are "intricately wedded to biological identities carrying cultural concepts and social strains associated with religious tenets."

Biological Diversity of Indian Village Ponds: The flora and fauna of the ponds protect and preserve a wide variety of organisms and micro-organisms. These include the amphibians, aquatic invertebrates, aquatic plants and some mammals. The smallest pond is normally infested by a huge variety of invertebrates like the dragonfly and damselfly. Species like pygmy damselfly (Nehalennia speciosa) and island darter (Sympetrum nigrifemur) are salient ones inhabiting and surviving in the pond ecosystem. These ponds are home to the medicinal leech (Hirudomedicinalis) and the water beetle (Graphoderus bilineatus) along with a number of other creatures that are determined by the lay of the land, the temperatures and the population pressures. Being a complete ecosystem the pond is home to several commonly sighted birds like the egrets, the pond herons, the red wattled lapwings, the cormorants, the kingfishers, the ducks, the geese, the swans and the cranes alongwith a variety of others. In some areas these ponds are breeding grounds for a large number of migratory birds.

The plants growing in the pond provide food, oxygen and shelter to animals. Ponds in the open are healthier than ponds in the shade because they have access to sunlight to make their food. The smallest plants in a pond are the microscopic phytoplankton which provide most of the food in a pond. The phytoplankton and larger algae form the first part of the pond's food chains. Pond vegetation grows in 'zones'. Plants like the great willow herb and meadow sweet grow in the bank side zone. They like damp places but are not true water plants. The yellow iris and mud-sedge grow nearest the pond edge or the marsh zone. The ponds are potent shelters for several categories of microbes. They comprise bacteria, protozoa, algae and rotifers.

Dynamism of Pond Life and Biodiversity Value: Ponds have a distinctive life in which are featured different kinds of organisms which live in a number of networks that are interdependent and inter reactive. They share the available food to live and reproduce. Different types of foods are found in ponds because each animal eats different things. A pond, thus, may have combinations of three variant food webs. The first one is based on larger plants, the second one is based on decayed plants and the third is based upon algae. Ponds therefore provide significant sources of biological diversity in any geographic landscapes not only for plants and animals but it can be observed that ponds are central to the life and wholesomeness of the entire eco-system in rural India. Since earliest civilizations villages have been known tooriginate around ponds. Rain water gets harvested naturally by the pond. It gets stored up, rechargingthe ground water and indicating the level of the water table in the village. Each pond has its own unique biodiversity, with all participants dischargingtheir specific ecosystem functions.

There is another important aspect that brings forth the socio-cultural significance of ponds. It is an established fact that village ponds have had and continue to have a deeply entrenched cultural andhistorical significance. Since centuries ponds have played a crucial role inmaintaining and encouraging the vital link betweenpeople and wildlife. There are numerous socio-psychological links that have been established between ponds and their resident settlements. Several rituals are associated with ponds. There are several periodic, lesser or major monthly and annual fairs that are held on the banks of ponds. These are a significant salient reality even in the present times. The Biodiversity Value of ponds is reinforced on the basis of three fundamental truths:

(i) Their status as a critical habitat for uncommon and rare species

(ii) Their role as stepping stone habitats for upward or downward mobility of flora and fauna

(iii) Their value as thriving biodiversity hot spots

Threats to Ponds Biodiversity: Severe pollution of ponds is being done by the dumping of wastes, chemical pollutants like the powdery chemical fertilisers having nitrates that are washed off by rain into the nearby ponds. This rich supply of nitrogen causes water plants, like algae to grow rapidly. These plants use up much oxygen during the night and during their decaying processes that virtually none is left for the remaining pond-life forms. This unmitigated growth also prevents sunlight from reaching the organisms below. The past century has seen about forty percent of the old village ponds being choked and filled up for residential or pasture and even cropping purposes. Currently there are several villages in Punjab that are totally devoid of any water body.

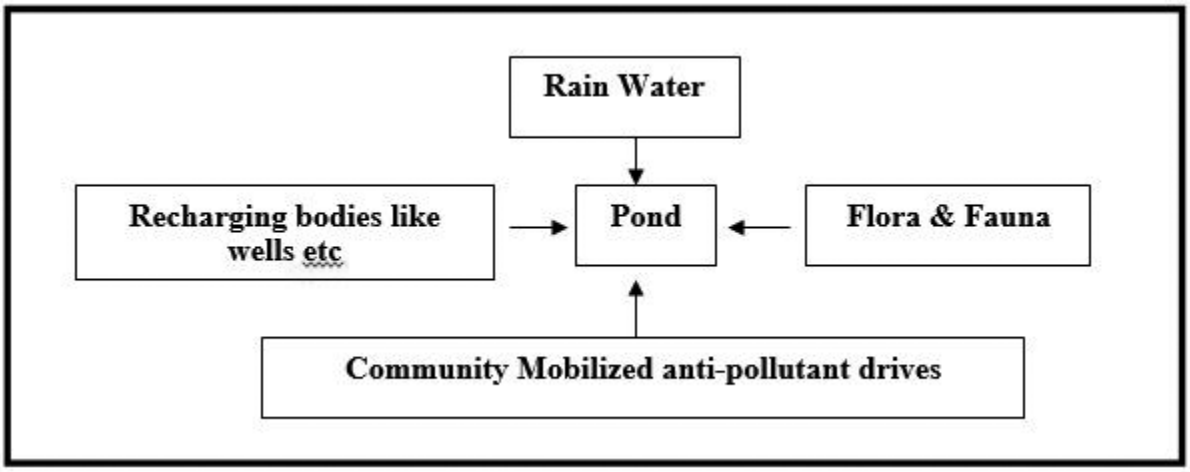


Figure 1: Interactive Relationships of Village Ponds

The above figure gives the almost symbiotic relationship network that develops between ponds and their human, flora and fauna partners. These may be positive or negative depending upon the needs and exploitative overtures of the users of the pond environment.

Government and Community Approach to Pond Restoration: Most village ponds require a pragmatic approach for their eco-restoration. The channelization of free flowing rain water from the village catchments is essential for sustainable eco-restoration of ponds. Another significant task is the stocking of various niches of the pond with native vegetation and animals.

This essential task of systematic eco-restoration and sustained management of ponds requires several collective steps to be taken in tandem by individuals, groups and organisations acting in unison.

The Chief Minister of Punjab, had vide his D.O. letter dated 22nd March, 2012, detailed the problems related to the disposal of waste water and need of rehabilitation of village ponds in Punjab. He appraised the Minister for Rural Development, Drinking Water and Sanitation that some pilot projects using the technology of UNICEF and Government of India had been in Ludhiana and Muktsar districts and should be replicated all over the State.

Subsequently, a team was constituted of various experts to study the situation of ponds and how they could be resurrected. The team looked into the status and survival of ponds in the following villages:

1. Village Mohlan, Mandal Malout, District Muktsar
2. Village Birk, Block Sidhwan Bet, District Ludhiana
3. Village Guru, Block Jagraon, District Ludhiana
4. Village Dewatwal, Block Ludhiana, District Ludhiana

The Waste Stabilization Ponds (WSP) do not require any electrical energy. They are extremely efficient. They efficiently remove excreted pathogens. The success and progress attained by WSPs is largely because the systematic stage-wise implementation of various steps of the process are measureable and standardized on the basis of internationally experimented and implemented procedures.

(i) The first stage of waste water treatment is the removal of large floating particles and heavy mineral particles like sand and grit. This is done by simple screening and grit removal a good duration before the raw waste water enters the other parts of the WSP.

(ii) Secondly, the measurement of the incoming waste water is important. This measurement is essential for determining diurnal flow variations and for constantly evaluating the performance of the treatment system.

(iii) The system comprises three treatment units:

1. Anaerobic pond
2. Facultativepond
3. Maturation pond

The anaerobic and facultative ponds are designed for BOD removal and the maturation ponds are designed for faecal bacteria removal.

a. **Anaerobic Ponds:** These are 2 to 5 metres deep tanks that receive high organic loading, more than 100 gms BOD/cum. Day. It is equivalent to 3000Kg./ha day, containing no dissolved oxygen and no algae. The primary function of these units is BOD removal.

b. **Facultative Ponds:** These units are designed for BOD removal on the basis of low surface BOD loading. It is usually in the range of 100-400kg/ha day to permit development of healthy algalgrowth, because the Oxygen for BOD removal by pond bacteria is mostly produced by algal photosynthesis. Liquid depthis usually in the range of 1 – 1.8 mts, 1.5 mts.

c. **Maturation Ponds:** The main maturation pond reduces the number of excreted pathogens, mainly faecal bacteria and viruses present in effluents from the facultative ponds. These ponds are typically aerobic. The depth of these maturation ponds isabout one metre. Shallow ponds are more efficient due to greater light penetration.

The principal mechanism for faecal bacteria removal in these and facultativeponds are:

(i) Temperature

(ii) HighpH values

(iii) High light intensity

Conclusions and Policy Implications

It has been derived from the foregoing narrative that rejuvenation and resurrection of village ponds is essential for the sustained promotion of human habitation conducive environments. Water is a rare source of life with increased ability to make informed choices. The following are some suggestions that may have policy implications at the state and national level.

(i) Waste Stabilisation Pond[5] technology is the simplest, suitable technology to treat waste water in rural areas.

(ii) Places having high water table may be in danger of ground water pollution.

(iii) A protocol for ground water quality monitoring should be developed to regularly monitor ground water quality near such WSPs.

(iv) Boulders can be used for inner embankment of ponds, up to the waste water level to check soil erosion.

Convergence with various government departments is envisaged, especially the Departments of Rural Development, Health as well as Forests and Environment besides Water and Sanitation. All these departments need to pool their efforts in giving a new lease of life to the stagnating pond wealth of Punjab. Needless to say this would not be practicable without the total participation of the community.

Conflict of Interest: Nil

Ethical Clearance: Taken from The Rural Environmental Enterprises Development Society (The REEDS) committee

Source of Funding: Self

REFERENCE

1. Cereghino, R., Boix, D., Cauchie, H-M., Martens, K., and Oertli, B. The Ecological Role of Ponds in a Changing World. Hydrobiologia,. 2014; 723: 1-6.
2. Downing, J. A. Global Role of Small Lakes and Ponds: Little Things Mean a Lot. Limnetica. 2010; 29(1): 9-23.
3. Dubey, T. P. *The Biodiversity of the Ponds. Water and Biodiversity, Uttar Pradesh State Biodiversity Board* 2015; 30-36.
4. Krishnamurthy, Radha. Water in Ancient India Indian Journal of History of Science. 1996; 31 (4).
5. Ray, M. K., and Majumdar, S.. Evaluating Economic Sustainability of Urban and Peri-urban Waterbodies: A Case Study from Kolkata Ponds. Editors: Sengupta, N., and Badyopadhyay, J. Biodiversity and Quality of Life, Macmillan, New Delhi,. 2005; (): 135-146.

MRI Image Training and Finding Acute Spine Injury with the Help of Hemorrhagic and Non Hemorrhagic Rope Wounds Method

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ABSTRACT

Magnetic resonance imaging (MRI) has been assuming an undeniably vital job in the spinal injury patients because of high affectability for discovery of intense delicate tissue and line wounds. An ever increasing number of patients are experiencing M.R.I on behalf of spinal injury in the crisis situations, accordingly requiring the deciphering doctors to subsist comfortable through M/R/I discoveries in spinal injury. In this pictographical survey, we determination initially portray the ordinary life systems of different ligamentous arrangement. Signs of M-R-I in spinal injury just as the job of MRI in makes a diagnosis spinal rope as well as delicate hankie wounds will at that point be examined. Delineated belongings are mostly of cervical backbone injury, however thoracolumbar spine wounds are likewise included where proper in our audit.

Keywords: *Spinal trauma, MRI, Spinal cord, Hemorrhage, Ligamentous injury*

Introduction

Imaging assumes a basic job in analysis of intense spinal injury and aides in starting brief and exact action in these patients. Regular radio-graphs furthermore, Computed/Tomography(C/T) is the underlying imaging modalities utilized in the determination of the majority instances of spinal wounds. Whereas strength of the back might subsist enough evaluated through C/T in support of careful basic leadership viaspinal column specialists, because of its expanded accessibility in the crisis settings and its naturally predominant differentiation goals, M/R/I havebein performance an undeniably critical job in the administration of spinal injury patients. Prominently, M-R-I is the methodology of decision in favor of assessment of ligament us alsoadditional delicate hankieorganizations, circle, spinal rope as well as mysterious bony wounds. In this pictorial audit, we will initially depict the typical life systems of different ligamentous structures including the craniocervicalintersection[1]. At that point, signs of MRI in spinal injury just as the job of M/R-I in make a diagnosis spinal string, delicate bandanna wounds also, mysterious bony wounds will be talked about. Outlined belongings are primarily of cervical spine injury, yet thoracolumbar backbone wounds are additionally integratedsomewhere proper. Different constraints in addition to entanglements of M.R.I in spinal injury imaging motivation likewise subsist talked about.

Indications of spinal MRI: As indicated by American/ College-of/Radiology-(A/C/R) suitability criterion, M,R,I of spine joined among C*T check is proper in the situations of intense spinal injury if:

1. National/Emergency/X-Radiography/Utilization/ Study-(N/E/X/U/S) otherwise Canadian/Cervical-Spine/Rule-(C/C/R) criterion are meetplus there are experimental discoveries of my elopathy.

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2. N-E-X-U-S or C-C-R criteria are met along with there are clinical or else imaging discoveries to propose ligamentous damage.
3. N.E.X.U.S-or-C.C.R criteria show imaging moreover the precisely shaky spine is foreseen.

Specialized deliberationsin favor of M*R*I The commonplace M/R/I convention on behalf of spinal damage incorporates sagittal T/1-weighted-(T/1-W) also T/2-weighted-(T/2-W) turn reverberation groupings, moreover T/2/weighted/(T/2*W) gradient/recalled/echo-(G/R/E) series, processed in addition to sagittal heavy short/tau/inversion/recovery (S/T/I/R) arrangements this methods, just as pivotal T-2/W plus T-2/W GRE groupings[2-5]. T*1/W pictures be fundamentally utilized in support of portrayal of life systems moreover bony cracks. As of late, dissemination/tensor/imaging (D/T/I) have been utilized to identify injury connectedmodifications in the spinal string which be not seeon ordinary M/R-I procedure. In a perfect world MRI ought to be executed inside 72/hours of damage as the T/2 hyper-intensity delivered through edema get better the conspicuity of the tendons which be viewed as smallflag power in ordinary state. Afterward on, a goal of the edema plus drain lessens affectability of M*R/I to identify ligamentous wounds [6-8].

Normal/Anatomy of the Spine: The backbone essentially comprises of vertebral column balanced out by different tendons together with the anterior/longitudinal/ligament-(A/L/L), posterior/longitudinal/ligament-(P/L/L), ligamentum flavum, interspinous tendon, supraspinous tendon, along with the apophyseal combinedcontainers[6-9]. Whereas typical tectorial layer plusoblique tendon preserve be effectively pictured on M/R/I, because of absence of difference from adjoining tissues, the ordinary alar tendons are hard to be envisioned[9-10].

Extra Medullary Hemorrhage also Fluid/Collections: Extradural/hematoma is the popular widely recognized kind of additional medullary accumulations in injury patients. Subdural/hematoma also sub-arachnoid drain are remarkable. Pseudomeningoceles/also/extradural liquid accumulations because of dural/tear befurther unprecedented sequelae of spinal injury. Despite the fact that CT can demonstrate the different kinds of hematomas in the spinal trench, because of pillar solidifying antiques in C/T as well asimproved delicate hankie differentiate goals in M-R-I, MR/I is the methodology of decision for picturinging of these substances. Epidural/hematomas normally show up isointense to marginally hyperintense on T/1-W pictures along with hyperintense on T/2-W pictures. Whole craniocaudal degree of the hematoma preserve be effectively assessed on sagittal M/R/I. Like epidural/hematomas, subdural/hematoma as well as sub/arachnoid discharge illustrate accumulations among differing indication powers in the subdural subarachnoid/spaces, separately.



Fig. 1: Axial T2 weighted/mage (a) demonstrates the attendance of position traumatic/vertebral blood vesselanalysisthrough double/lumen (arrow). Following C/T angiogram of the neck (b) verify of the judgment of vertebral/artery/injury/(arrow). Follow-up/angiography of the necklineperforms on the after that day (c) explains the occurrence of pseudo aneurysm (arrow).

Vascular Injuries: Vascular wounds container be brought about by together obtuse also infiltrating injury. In dull vascular wounds in the collar, vertebral veins are additional regularly included than carotid supply routes. Albeit asymptomatic one-sided wounds are of fewerscientific criticalness, they preserve prompt intellectualas well as cerebellar areas of localized necrosis, particularly when two-sided. The Denver

viewingcriterionhavebe utilized to recognize the patients in danger in favor of vascular wounds also incorporates C1– C3 breaks, crack of the cervical spine stretching out addicted to a foramen transversarium,/cervical spine/ subluxation, Le Fort/II before III/facial breaks, basilar/ skull support cracks including the carotid trench, disperse axonal damage, and extending neckline hematoma. In the event of thoracolumbar backbone injury, wounds to the aorta moreover its twigscontainerhappen.

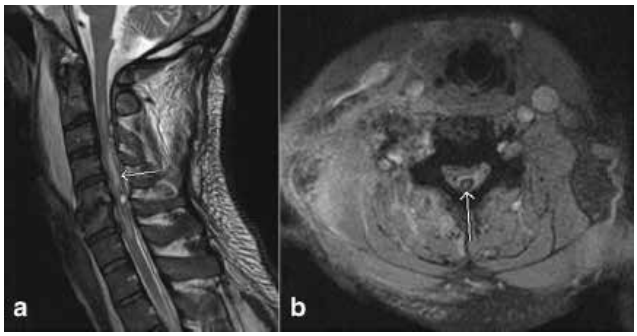


Fig. 2: Sagittal/T/2/weighted/image (a) also axial gradient/recalled/echo/(G/RE) picture (b) proves the occurrence of hemorrhagic/contusion/(arrow, a) in the spinal/cord/characterized through susceptibility/ artifact on G/R/E image (arrow, b).

The imaging discoveries of vascular wounds incorporate negligible intimal damage, representation of intimal fold pseudoaneurysm (Figure-2b),/ dismemberment through intramural/hematoma, absolute impediment, dynamic extravacation, and arteriovenous fistula arrangement.

Spinal Cord Injuries: Clinically, the degree of spinal line damage is characterized through the American/ Spinal/Injury/Association (A/S/I/A) Impairment/Scale (which is adjusted commencing the Frankel/arrangement) utilizing the accompanying classes: A=Complete– no tactile or engine work is protected in sacral sections S4-5; B=Incomplete – tangible, however not engine, work is safeguarded beneath neurologic dimension and stretches out from side to side sacral portions S4-5; C = unfinished – engine work is saved underneath the neurologic dimension, as well asmainlyinputstrength underneath the neurologic dimension contain a muscle/grade < 3; D = engine work is saved underneath the neurologic/ dimension, moreovermojority key muscles beneath the neurologic dimension include a muscle/grade ≥ 3; E = Normal. In M/R/I evaluation of spinal string damage, the pivotal and sagittal/T/2W/pictures, also T/2*W G/R/E pictures are especially helpfuls[11].

Albeit neurological capacity next to the introduction remainder the absolute greatest prescient aspecton behalf ofextended haul guess, nearness of string discharge have been depicted as the majority vital discoveries related amongdeprived visualization. Different discoveries of predictive esteem incorporate the degree of string hematoma as well as rope edema, along with spinal rope pressure by additional hub hematoma. Because of limited spinal trench, osteophytes or clasped ligamentum/flavum mightconsequence in wounds to the focal dim issue together with the focal parts of corticospinal territory of the cervical/string[12].

Pitfalls of MRI: There are couples of confinements of M/R/I in the assessment of spinal injury. Powerlessness relics because of metallic equipment for spinal combination along with dental inserts preserve corrupt the picture superiority particularly on G/R/E grouping. Weakness antiquities can be decreased by utilizing the turn reverberation successions, little T/E which permits fewer instancesin support of dephasing moreover lessens flag misfortune, expansive recipient transmission capacity, STIR instead of synthetically particular fat concealment, in addition toexchange the stage programalong with recurrence encode headings. Immersion beats utilized in MRI can at times cover the prevertebral hematoma. Liquid in throat and fragmented concealment of the prevertebral fat can here and there recreate prevertebral edema. Conspicuous veins in the interspinous district showing elevated flag on S/T/I/R pictures ought not subsist mistaken for edema related amid interspinous wounds which show up as badly characterized zone of high flag, while the veins show up too characterized direct territories of high flag. The affectability of M/R/I is additionally inferior than C/T for recognizing breaks of the back components because of insignificant edema related with separation wounds, and to wounds of the craniocervical intersection.

Main Work

Hemorrhage: The main widely recognized area of posttraumatic spinal string drain is the focal dim matter of the spinal string at the purpose of mechanical effect. The injury regularly speaks to hemorrhagic corruption; genuine hematomyelia is once in a while experienced. The injury shows up as a discrete focal point of hypointensity on T2-weighted and slope reverberation pictures, growing quickly after SCI. Drain

might be recognized in relationship with complete and fragmented wounds, with location of a center > 4 mm long on sagittal pictures regularly characteristic of total neurologic damage.

There is a spectrum of traumatic SCIs from cord/ edema, cord contusion, intramedullary hemorrhage to cord transection. SCI without radiographic abnormality is blunt damage to the spinal cord, usually the cervical cord, without overt osseous injury [14-15]. In such patients, MRI may reveal extraneural (ligament and disc) injury or neural injury. The anatomic and biomechanical characteristics of the pediatric spine make young patients (typically less than 8 years of age) more at risk for this type of injury (Figure 2). In adult patients, the term is not as widely used. If there are neurological symptoms in adults, who are likely to have underlying degenerative change, MRI is routinely used to assess for compressive pathology (ie, disc herniation).56 Cord edema has a potential for neurological recovery, whereas cord contusion tends to be associated with an incomplete SCI. The length of the edema/contusion is directly proportional to the degree of the initial neurological deficit. They found maximum spinal cord compression, spinal cord hemorrhage, and cord swelling are associated with a poor prognosis for neurological recovery, and that the scope of greatest spinal cord density is more reliable than attendance of canal stenosis for predicting the neurological result after SCI[16]. The prognosis of the compression pattern of SCI has been shown to depend on the degree of the initial neurological damage.

Conclusions

All in all, MRI is additional delicate than extra imaging modalities in the analysis of delicate tissue plus spinal string wounds. While C/T is viewed as sufficient for assurance of steady versus precarious spinal wounds, M/R/I be able topresent extra assist because of its capacity to all the more likely determine ligamentous wounds when contrasted with have CT. X-ray is likewise useful in anticipating the guess by exhibiting the hemorrhagic and non hemorrhagic rope wounds.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

REFERENCES

1. Rajasekaran S, Vaccaro AR, Kanna RM, et al. The value of CT and MRI in the classification and surgical decision-making among spine surgeons in thoracolumbar spinal injuries. Eur Spine J. 2016 Jun;1 [Epub ahead of print].
2. Saifuddin A. MRI of acute spinal trauma. Skeletal Radiol. 2001;30:237–46.
3. Benzel EC, Hart BL, Ball PA, Baldwin NG, Orrison WW, Espinosa C. Magnetic resonance imaging for the evaluation of patients with occult cervical spine injury. J Neurosurg. 1996;85:824–9.
4. Hogan GJ, Mirvis SE, Shanmuganathan K, Scalea TM. Exclusion of unstable cervical spine injury in obtunded patients with blunt trauma: is MR imaging needed when multi-detector row CT findings are normal? Radiology. 2005; 237:106–13.
5. Daffner RH, Hackney DB. ACR Appropriateness Criteria on suspected spine trauma. J Am Coll Radiol. 2007;4:762–75.
6. Georgy BA, Hesselink JR. MR imaging of the spine: recent advances in pulse sequences and special techniques. AJR Am J Roentgenol. 1994;162:923–34.
7. ShanmuganathanK GRP, Zhuo J, et al. Diffusion tensor MR imaging in cervical spine trauma. AJNR Am J Neuroradiol. 2008;29:655–59.
8. Rajasekaran S, Kanna RM, Shetty AP. Diffusion tensor imaging of the spinal cord and its clinical applications. J Bone Joint Surg Br. 2012;94:1024–31.
9. Selden NR, Quint DJ, Patel N, d'Arcy HS, Papadopoulos SM. Emergency magnetic resonance imaging of cervical spinal cord injuries: clinical correlation and prognosis. Neurosurgery. 1999;44:785–92.
10. Kliewer MA, Gray L, Paver J, et al. Acute spinal ligament disruption: MR imaging with anatomic correlation. J Magn Reson Imaging. 1993;3:855–61.

11. Schweitzer ME, Hodler J, Cervilla V, Resnick D. Craniovertebral junction: normal anatomy with MR correlation. AJR Am J Roentgenol. 1992;158:1087–90.

12. Denis F. The three column spine and its significance in the classification of acute thoracolumbar spinal injuries. Spine. 1983;8:817–31.

13. Haher TR, Tozzi JM, Lospinuso MF, et al. The contribution of the three columns of the spine to spinal stability: a biomechanical model. Paraplegia. 1989;27:432–9.

14. A Telemedicine Technology for Cardiovascular Patients Diagnosis Feature Using KNN- MPM Algorithm Journal of International Pharmaceutical Research, ISSN: 1674-0440, vol no:46,pp:72-77

15. Hadley MN, Walters BC. Introduction to the guidelines for the management of acute cervical spine and spinal cord injuries. Neurosurgery. 2013;72(suppl 2):5-16.

16. Saikumar, K., V. Rajesh, N. Ramya, S. H. Ahammad, and G. N. S. Kumar. 2019. "A Deep Learning Process for Spine and Heart Segmentation using Pixel-Based Convolutional Networks." Journal of International Pharmaceutical Research 46: 278-282.

Cloud Computing Based Diagnosis for Cancer Detection

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ABSTRACT

In the Rural Areas the construction/maintenance of cancer testing centre will be difficult. Due to poor maintenance the results at the testing centres are not accurate. There may be noise in the CT/MRI scan reports; there is also chance of blur report. To reduce such issues, we are going to use LabVIEW (Laboratory Virtual Instrumentation Engineering Workbench) a free software. Usually the cancer screening test includes colonoscopy, mammography and pap test all such tests costs more. Instead of simple CT/MRI scans softcopies are analysed and processed through LabVIEW software which reduces the cost. In this paper, Detection and Diagnosis of different types of Cancer is done through image processing techniques through LabVIEW software. The data that obtained in this process of detection is send to the doctors using cloud computing for further diagnosis.

Keywords: *LabVIEW, colonoscopy, mammography, paptest, cloud computing.*

Introduction

Cancer is a unidentified disease which became one of the dangerous of all. Cancer cell grows in a multiple fashion. The cells usually proliferate in human tissues. The death rate due to the cancer is growing rapidly due to no symptoms can be identified for a person who suffers from cancer until one may reach to the higher stages where it becomes incurable. Detection of different types of cancer is a complex process no one can identified easily. One may have found having cancer during some other tests for some other reasons.

Laboratory Virtual Instrumentation Engineering Workbench is shortly known as LabVIEW, a well-defined programming environment which is developed using different programing languages such as C, C++, JAVA. But LabVIEW is beyond coding.

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The LabVIEW software can be use in different ways. It can be extended to hardware, where we can detect in real time. The proposed idea is to detect the cancer using the CT/MRI scan images and process them using LabVIEW [3,4] software to get a clear picture of the cancer part. Usually the scan report or the microscopic images of test's may or may not be clear due to equipment they use in the testing centers, for getting clear picture of the reports they are processed in the software. Once the processing is complete then the results are sending to the doctor through "cloud computing".

The cloud computing (CC) [1] is a set of network enabled services, QoS guaranteed, personalized and inexpensive. These days the cloud services are being common, every network, electronics, browsers are providing cloud services. There are several cloud computing technologies such as Artificial Neural Networks (ANN) [5], Back Proportion Neural Networks (BPNN) [6]

This Neural Networking [7-9] is information processing paradigm. The Neural Networks are example of biological system such as human Brain. But the same Cloud Computing (CC) can be achieved through IoT (Internet of Things).

IoT is combination of sensors which makes our environment internet connected. The ESP8266 Wi-Fi module can create a cloud and send data through it.

Detection of Cancer using Lab VIEW:

Cancer: Cancer is not simply a disease it leads to different diseases with enormous cell growth. It can start in any place of the body and can spread to many other parts of the human body. Cancer cells grow rapidly and out of control when compared to normal cells. Normal cells grow periodically and are worn out after their life time, whereas cancer cell form lumps rapidly and outweigh the normal cells [11]

Some cancer types like Lung and gastric have many stages where it can't be identified during early stages but by the time it is identified then it will become beyond curable [13]

Types of Cancer: There are number of cancers which can't be identified in the early stages at which it is curable [12].

Lung Cancer, Bladder Cancer, Blood Cancer/ Leukemia, Breast Cancer, Pancreatic Cancer, Prostate Cancer, Thyroid Cancer, Gastric Cancer, Brain Tumor, Colon Cancer. These are few of such cancers where symptoms stay unknown. When these cancers are in their earlier stages they start to create solid mass of cancer cells that grows in a rapid fashion that kills the organ tissues.

Detection of Cancer Content: In the current technology LabVIEW provides a best Virtual Instrumentation, in this paper the microscopic or scan images are processed in LabVIEW. There are several image processing techniques which enhance the cancer part for the clear idea. Usually any image is made up of pixels, the pixels intensity will be more at cancer part. Using image processing techniques such as thresholding, edge detection, form those techniques we can obtain the edge of the cancer cells (in blood cancer) and the cancer mass (in lung cancer) from that we can clearly detect the presence of cancer in the tissues[10]

Initially the CT/microscopic image is taken and applied with image processing techniques, due to thresholding less pixel values are washed out if there is any cancer mass then it will be remained in the output image. The entire process is depending on pixel intensities.

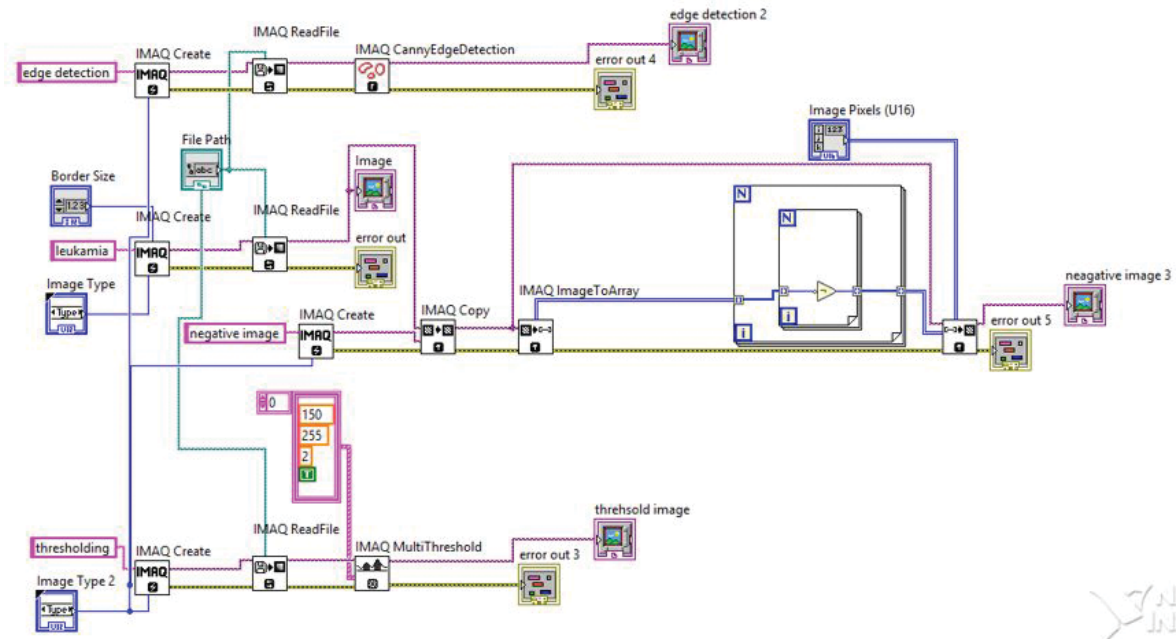


Figure 1: Detection of Cancer using LabVIEW

Figure.1 depicts the construction of cancer detection VI (Virtual Instrumentation). The microscopic image is fed through read image sub VI and then the image is flow through edge detection and thresholding sub VI's. Sometimes the X-Ray image may be not visible clearly but it's negative may provide adequate information for that purpose the image is changed to array and it passed through two for loops which convert 2D array to an element which is then inverted and again converted array to image using sub VI's. These three image processing techniques will help to have a clear vision of diagnosis perspective [3]

Methodology

The proposed idea is to process the image of microscopic report using image processing techniques such as image thresholding, image edge detection and image negative. All these image processing techniques uses pixel manipulation methods. Initially the scan results are converted to grayscale images. Later the grayscale image is threshold, where the particular pixels values are threshold to higher intensity, so all the blood cells or other content will be faded, and the cancer mass will be highlighted. Similarly, in the edge detection technique the edge of all the objects is obtained, due to this the shape is clearly picturized. Negative of the image highlights the cancer mass [4]

Later the results which we got in the LabVIEW are sent to the doctor or any authorized person through Cloud Computing (CC) using Internet of Things (IoT). The ESP8266 Wi-Fi Module helps in achieving Cloud Computing. The person on the other side gets these results, and prescribes medication.

Thresholding: Thresholding is a process of image segmentation usually used to convert a grayscale image to binary (0 or 255). Auto thresholding is a technique where the system itself thresholds lower pixels to 0 and higher pixel values to 255. It provides better visibility of cancer mass. Since the cancer mass in gray scale consists of more pixel values. There also other types of thresholding like multi band thresholding for colour images.



Figure 2: Thresholding of Blood Cancer Cells

Edge Detection: Edge detection incorporates an assortment of scientific techniques that go for distinguishing focuses in an advanced picture at which the picture splendor changes forcefully or, all the more formally, has discontinuities. The focuses at which picture brilliance changes forcefully are normally composed into a lot of bent line fragments named edges. A similar issue of discovering discontinuities in one-dimensional signs is known as step location and the issue of discovering signal discontinuities after some time is known as change identification. Edge detection is a central apparatus in picture preparing, machine vision, and PC vision, especially in the regions of highlight discovery and highlight extraction [2]

There are different types of edge detection techniques: Roberts Edge Detection, Sobel Edge Detection, Prewitt Edge Detection, Laplacian Edge Detection, Gaussian Filter, High Pass Filter, Low Pass Filter, Kirsch Edge Detection, Robinson Edge Detection, Marr-Hildreth Edge Detection, LoG Edge Detection, Canny Edge Detection

Usually all the Edge Detection techniques have their own kernels (3x3 matrix) with which the image is convoluted to get the edge of the image. Some of the edge detection kernels elements sum is non-zero which results in weighted pixels. Due to that the edges of the images aren't perfect enough for few applications such as medical fields. Out of all the Edge Detection techniques the Canny Edge Detection gives the perfect edges of the images. In Figure 2 the results of different edge detection techniques are given.

Canny Edge Detection: It is the most used edge detection technique in industrial level applications, the canny edge detection was introduced by john canny during his master's, MIT 1983. The canny edge detection is most precise edge detection technique of all the other techniques. It is shown clearly in Figure.3



Figure 3: Results of different edge detection techniques

The filters that are used in canny edge detection are exceptionally good at clearing noise from the image before detecting the edges. The approach of canny edge filtering is central difference.

Here's the kernel matrix for canny edge detection technique.

$$\begin{bmatrix} -1 & 0 & 1 \\ -1 & 0 & 1 \\ -1 & 0 & 1 \end{bmatrix}$$

Kernel matrix of canny edge detector

The mask or kernel is convoluted with the image such that every pixel of image is multiplied with the center element of kernel matrix and the final sum will gives the edge of the image. As the sum of the canny edge kernel elements is zero there's no weight in result image (edge detected image) also it all 1's the edge detection in manual way is also a bit easy while compare to the other edge detection techniques.

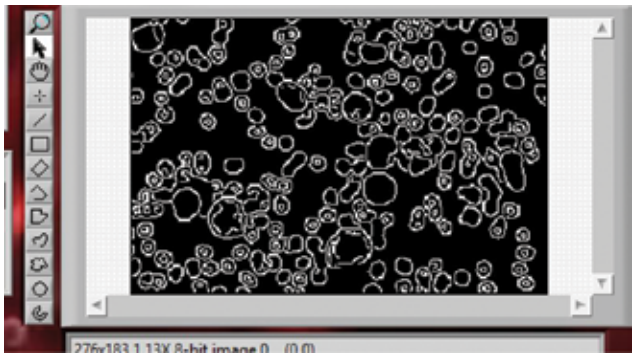


Figure 4: canny edge detection of blood cells

Results and Discussions

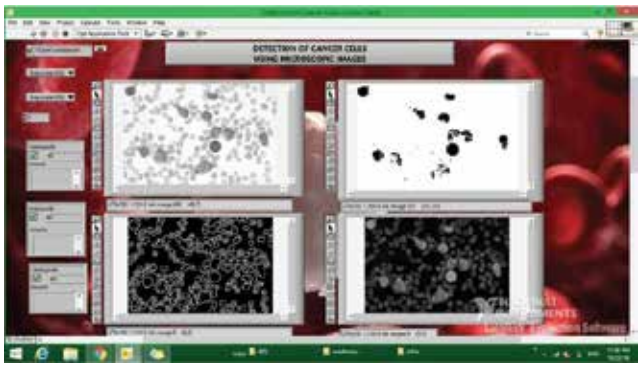


Figure 5: Detection of blood cancer cells

The Figure.5 depicts the detection of cancer cells in the blood, along with the RBC the cancer cells are found in the microscopic image. But the cancer cells have taken similar shape of RBC, so it will be difficult to report the cancer. After image processing through LabVIEW its been sure that the content which is present along with the RBC are cancer cells. After the edge detection the cancer cell content is clearly visible for better clarification the image is thresholded and obtained the presence of cancer content.

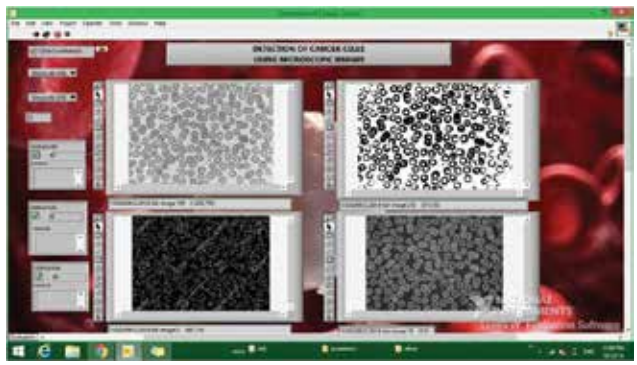


Figure 6: Microscopic image normal blood cells

In the Figure.6 the edge and threshold images of normal blood cells is shown. When we compared the Figure.5 and 6 the excess mass is detected that there is some extra content.

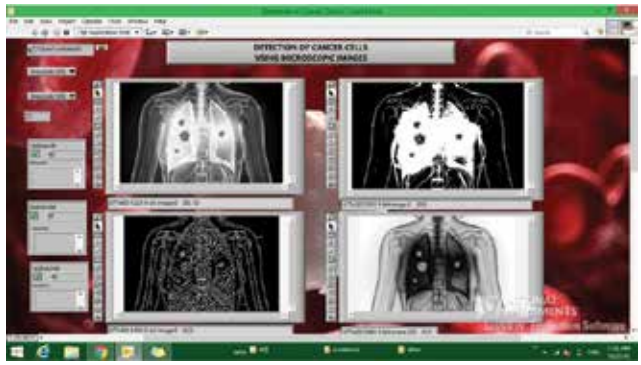


Figure 7: Detection of lung cancer

In this Figure.7 had taken the X-ray of human lungs and given as input to the LabVIEW, in the edge detection the image was so many edges so that we can't predict the extra mass, but if we see the thresholded part then it is clear that the lungs having some excess mass in left and right parts.



Figure 8: X-ray of Normal Human Lungs

When we compare both Figure 7& 8 then it will be clear the X- ray report that we have given containing some excess mass in it. As if it is normal lungs the threshold image will be plain without any disturbances.

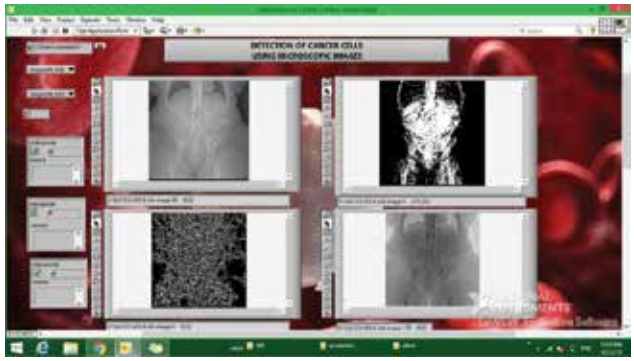


Figure 9: CT scan of human Abdomen



Figure 10: CT scan of Internal abdomen

When the CT scan reports of human abdomen are fed to the system as they are perfect in condition it doesn't shown any excess content which depicts that the logic is working correctly.

Conclusion

Using the LabVIEW assistance, we can process the X- ray, CT, Microscopic images and can find the presence of any excess content. Later the results are send to the doctor or any other authorized person for further tests so that the receiver can prescribe the medication accordingly. Also, sometimes when a person is affected with an accident then there is chance of blood clots in some organs. But the LabVIEW will show us that excess mass, but it may not be cancer content. So, we need to make sure of the content which is displaying is belongs to cancer or not. For that purpose, the given image is needed to compare with database of different types of cancer. By comparing the pixel values, it can be easily detected whether the content is of cancer or not. Also, we can directly display the type of cancer. Also by using this comparison method we can also predict the stages of cancer.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

REFERENCES

1. Guoyin Zhang, Liang Kou, Ye Yuan, Jianguo Sun, Yun Lin, Qingan Da, Wenshan Wang, "An Intelligent method of cancer prediction based on mobile cloud computing", Springer, 2017
2. Muthukrishnan. R and M. Radha, "Edge Detection Techniques for Image Segmentation", IJCSIT, 2011.
3. Meharun nisa S.P, Dr. K. Suresh, "LabVIEW Implementation of Identification of Eatly Signs of Breast Cancer", ICECCE, 2014.
4. Ankit, Sandeep Dahiya, "Detection and Measurement of Brain Tumor using LabVIEW", IJIET, 2016.
5. Ishwinder Kaur Sandhu, Meera Nair, Ravindra Prasad Aharwal and Sardul Singh Sandhu "Diagnosis of Cancer using Artificial Neural Networks and Cloud Computing Approach". World Journal Of Pharmacy And Pharmaceutical Sciences vol. 3. Issue 6, pp.1533-1548. June 2014
6. Vivek Navale, Philip E. Bourne, "Cloud Computing applications for Biomedical science: A Perspective", 2018.
7. Ritesh Anilkumar, Ratandeep, Emmanuel Mark, "Big Data Predective Analysis for Detection of prostate cancer on cloud computing platform", 2017.
8. Alex Mu -hsing Kuo, "Opportunities and challenges of cloud computing to improve health care servvices". March 2015.
9. Azmi Shawkat Abdulbaki, Saif Al-din M. Najim and Samir Abdulrasoul Khadim, "Eczema Disease Detection and recognition in cloud computing", International Journal of Applied Engineering Research, 2017.
10. P.Banupriya, G.Kiruthika, S.Kokila, R.Aruna, T.Radhu, I.Vinodhini, "implementation of liver cancer using LabVIEW", 2016.

11. https://www.cancer.net/cancer-types/Cancer.Net Editorial Board, 2016.

12. https://www.cancer.org/cancer/stomach-cancer/detection-diagnosis-staging/staging.html, December 14, 2017

13. https://www.healthline.com/health/lung-cancer, 21 Nov, 2016

A Cross-Sectional Study to Assess the Knowledge about Prevention and Home Management of Diarrhoea among the Mothers of Under Five Children in an Urban Area of Amritsar, Punjab

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ABSTRACT

Background: Acute diarrhoeal disease is the leading cause of mortality in children worldwide with the highest burden being in Sub Saharan Africa and in the countries of the World Health Organisation (WHO) South East Asia Region. In India, diarrhoea is the third leading cause of child mortality in India and is responsible for 13% of all deaths annually in children under 5 years of age.

Method: A community based cross-sectional study was conducted and total of 400 mothers of under-five children were interviewed. The mothers were selected by adopting simple random sampling method. A pre-designed & pre tested questionnaire was used to collect the information. House to house survey was done to collect the information. Statistical analysis was done by using SPSS 20.0.

Results: Majority of the mothers (72.8%) were in age group of 21-30 years. Out of total 53% knew that diarrhoea is passage of three or more loose stool in a day. Education status of mother has significant relation with the knowledge about diarrhoea and its spread (p=.000). 71.8% knew that it can be managed at home. Out of 400 females 75.7% knew about sugar salt solution can be prepared at home. 73% of the study participants knew that vaccination can prevent diarrhoea. Role of zinc therapy along with the ORS in treating diarrhoea was known to only 32% of the study participants.

Conclusions: The study concludes that there is a need of health education for mothers about prevention and home management of diarrhoea. Timely management at home can prevent deaths from dehydration caused by diarrhoea. IEC activities should be increased to educate the community about the principles of environmental hygiene.

Keywords: *Diarrhoea, under five, prevention, home management*

Introduction

Acute diarrhoeal disease is the leading cause of mortality in children worldwide with the highest burden being in Sub Saharan Africa and in the countries of the World Health Organisation (WHO) South East Asia Region. Viral diarrhoea is the most common in young children. Rota virus and adenovirus are prevalent in children less than 2 year.[1]

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Most deaths from diarrhoea occur among children less than 2 years of age living in South Asia and sub-Saharan Africa. Despite this heavy toll, progress is being made. From 2000 to 2016, the total annual number of deaths from diarrhoea among children under 5 decreased by 60 per cent. Many more children could be saved through basic interventions.[2]

Diarrhoeal disease is the second leading cause of death in children under five years old. It is both preventable and treatable. Each year diarrhoea kills around 5,25,000 children under five. A significant proportion of diarrhoeal disease can be prevented through safe drinking-water and adequate sanitation and hygiene. Globally, there are nearly 1.7 billion cases of childhood diarrhoeal disease every year. Diarrhoea is a leading cause of malnutrition in children under five years old.[3]

In India, diarrhoea is the third leading cause of child mortality in India and is responsible for 13% of all deaths annually in children under 5 years of age. Although there has been decline in total deaths from 2.5 million in 2001 to 1.5 million in 2012, the proportional mortality accounted by the disease still remains high. As per NFHS-3 report, 9% of all under-5 children were reported to be suffering from diarrhoea in the preceding 2 weeks.[4]

A number of interventions have been proposed for preventing diarrhoea in young children, most of which involve measures related to infant feeding practices, personal hygiene, cleanliness of food, provision of safe water, safe disposal of faeces, and immunization. An analysis of the effectiveness, feasibility, and cost of each proposed intervention has shown that some are particularly effective and affordable, whereas others are impractical or ineffective, or require further evaluation.[5]

Home treatment is an essential part of the correct management of acute diarrhoea. This is because diarrhoea begins at home and children seen at a health facility will usually continue to have diarrhoea after returning home. Children must receive proper treatment at home if dehydration and nutritional damage are to be prevented. Mothers who understand home treatment should begin it before seeking medical care. When "early home therapy" is given, dehydration and nutritional damage can often be prevented.[6]

Keeping in mind the importance of prevention and home management of diarrhoea, the present study was designed to assess the knowledge about the same among mothers of under five.

Material and Method

A community based cross-sectional study was conducted in the urban field practice area of the Department of Community Medicine of SGRD Institute of Medical Sciences and Research, Amritsar. The sample size required for the study was calculated as

$$n = \frac{Z^2 p(1-p)}{d^2}$$

Where

n = Sample size

p = expected prevalence or proportion

d = precision rate

Hereby taking

Z = 1.96 (approx. = 2, for level of confidence of 95%)

p = 0.5 (considering knowledge of mothers about diarrhoea as 50%)

d = 0.05

n = 384

So a total of 400 mothers of under-five children were interviewed during the period from June to August 2018. According to the quarterly report there were 1370 under-five children in urban field practice area of Community Medicine. The mothers were selected by adopting simple random sampling method. The mothers who gave consent were included in the study. A pre-designed & pre tested questionnaire was used to collect the information. House to house survey was done to collect information about demographic profile, knowledge about prevention and home management of diarrhoea. Statistical analysis was done by using SPSS 20.0.

Inclusion Criteria: The mothers of under-five who were willing to participate were included in the study.

Exclusion Criteria: The mothers who didn't give consent and those who were not available at the time of study were excluded from the study.

Results

A community based cross-sectional study was conducted in the urban field practice area of the Department of Community Medicine of SGRD Institute of Medical Sciences and Research. A total of 400 mothers of under-five children were interviewed. Out of 400 mothers, 72.8% were in age group of 21-30 years while 14.4% and 12.8% were <20 and >30 years old. 59.5% of the mothers had one child and 37.2% and 3.3% had two and three children respectively. Regarding the educational status of the mothers 43.7%, 22.5%, 15.8% and 1.8% were studied up to matric, middle school, graduation and post graduation respectively. 16.2% of the mothers were illiterate. 90.2% of the mothers were housewives and rest (9.8%) were employed. Education profile of the fathers revealed that 51.7% were educated up to matric, 20.8% up to graduation, 13.8% up to middle school, 3.5 up to post graduation and 10.2% were illiterate. Majority of the fathers (71.7%) were semiskilled worker, 18.5% were unskilled and 9.8% were skilled workers.

It was observed that 53% mothers knew that diarrhoea is passage of three or more loose stool in a day. 15% of the respondents said that it spread by contaminated water and food, 9% said by contaminated fingers and 76% knew about both the methods of spread. Education status of mother had significant relation with the knowledge about diarrhoea and its spread (p=.000). 71.8% knew that it can be managed at home. Out of 400 females 75.7% knew about sugar salt solution can be prepared at home. Regarding other home available fluids 80.7% knew about rice water, 84% knew about yoghurt drink and regarding coconut water 84.3% were aware. While about the harmful drinks in diarrhoea only 23.7% said that carbonated drinks should not be given and 22.2% and 28% discouraged packed juice and sweetened tea respectively (Table 2).

On asking about the prevention of diarrhoea, 63.3% said it can be prevented by not giving bottle feed. All the participants (100%) knew about the role of clean drinking water in preventing diarrhoea. Regular hand washing, keeping environment clean and giving fresh food as a method of preventing diarrhoea was known to 91.5%, 95.7% and 90.3% of the participants respectively.

Regarding vaccination 73% of the study participants knew about that vaccination can prevent diarrhoea, but out of them only 23% knew that measles vaccine can prevent diarrhoea. Role of zinc therapy along with the ORS in treating diarrhoea was known to only 32% of the study participants.

Table 1: Socio-demographic profile of the respondents

		Frequency	Percentage
Age in years	<20	58	14.4
	20-30	291	72.8
	>30	51	12.8
No. of children	1	238	59.5
	2	149	37.2
	3	13	3.3
Education status of mothers	Illiterate	65	16.2
	Middle school	90	22.5
	Matric	175	43.7
	Graduate	63	15.8
	Postgraduate	7	1.8
Occupation of mother	Housewife	361	90.2
	Employed	39	9.8
Education status of husband	Illiterate	41	10.2
	Middle school	55	13.8
	Matric	207	51.7
	Graduate	83	20.8
	Postgraduate	14	3.5

Conted…

Occupation of father	Unskilled worker	74	18.5
	Semi-skilled worker	287	71.7
	Skilled worker	39	9.8

Table 2: Knowledge of the mother about the beneficial and harmful fluids for diarrhoea

Fluid	Frequency	Percentage (%)
Beneficial Fluids		
Rice Water	323	80.7
Yoghurt drink	336	84.0
Coconut Water	337	84.3
Sugar salt solution	303	75.7
Harmful fluids (those who said that it should not be given)		
Carbonated drink	95	23.7
Packed juice	89	22.2
Sweetened tea	112	28.0

Table 3: Knowledge of the mothers regarding prevention of diarrhoea and association with educational status

Preventive Measures	Frequency	Percentage
Not giving bottle feed	253	63.3
Clean drinking water	400	100
Hand washing	366	91.5
Clean environment	383	95.7
Fresh food	361	90.3
Vaccination	292	73.0

Discussion

The study was conducted in the urban field practice area of the Department of Community Medicine of SGRD Institute of Medical Sciences and Research. A total of 400 mothers of under-five children were interviewed. Majority (72.8%) were in the age group of 21-30 years. Similarly in a study done in southern Odisha 74% mothers were in age group of 21-30 years.[7] 59.5% of the mothers had one child and 37.2% and 3.3% had two and three children respectively. Regarding the educational status of the mothers 43.7%, 22.5%, 15.8% and 1.8% were studied up to matric, middle school, graduation and post graduation respectively. 16.2% of the mothers were illiterate. In a study done among mothers in a tertiary care hospital it was found that 11.5% of the mothers were illiterate, 51.5% had studied up to high school level and 12.5% were graduates or post-graduates.[8] In the present study 90.2% of the mothers were housewives and rest (9.8%) were employed. Education profile of the fathers revealed that 51.7% were educated up to matric, 20.8% up to graduation, 13.8% up to middle school, 3.5 up to post graduation and 10.2% were illiterate. Majority of the fathers (71.7%) were semiskilled worker, 18.5% were unskilled and 9.8% were skilled workers.

It was observed that 53% mothers knew about the correct definition of diarrhoea. 15% of the respondents said that it spread by contaminated water and food, 9% said by contaminated fingers and 76% knew about both the methods of spread. Education status of mother had significant relation with the knowledge about diarrhoea and its spread (p=.000). 71.8% knew that it can be managed at home. Out of 400 females 75.7% knew about sugar salt solution can be prepared at home. Regarding other home available fluids 80.7% knew about rice water, 84% knew about yoghurt drink, 84.3% coconut water. While about the harmful drinks in diarrhoea only 23.7%

said that carbonated drinks should not be given and 22.2% and 28% discouraged packed juice and sweetened tea respectively. In another study done among Nigerian mothers it was found that 22.7% of mothers would use salt sugar solution (SSS) to treat their children who had diarrhea, while 9.9% of them would use UNICEF oral rehydration salt (ORS) for the same purpose.[9] Similarly in a study done in Ethiopia only less than half of the participants (42.4%) used homemade solution during diarrheal disease of their child.[10]

63.3% of the participants said it can be prevented by not giving bottle feed. All the participants (100%) knew about the role of clean drinking water in prevention of diarrhoea. Regular hand washing, keeping environment clean and giving fresh food as a method of preventing diarrhoea was known to 91.5%, 95.7% and 90.3% of the participants respectively. In a study done in Karnatka 68% of the participants had knowledge about the preventive measures of diarrhoea.[11]

Regarding vaccination 73% of the study participants knew about that vaccination can prevent diarrhoea, but out of them only 23% knew that measles vaccine can prevent diarrhoea. Role of zinc therapy with the ORS in treating diarrhoea was known to only 32% of the study participants Knowledge about the zinc therapy was significantly assoiciated with the educational status of mother (p=.003). Similar findings were there in a study done by Ogunrinde et al.[12]

Conclusions

The level of knowledge of the mothers of under five regarding the prevention of diarrhea was found to be good but the home available fluids given in diarrhea were not known by many of the participants. Efforts should be made to educate the mothers about the home management of diarrhoea. IEC activities should be strengthened to educate the community about prevention of diarrhoea. Other preventive measures like environment sanitation, hand hygiene, vaccination should also be taught to the mothers and rest of the community.

Acknowledgement

We would like to thank the faculty of the Department of Community Medicine for their valuable suggestions. We would also like to thank the mothers who participated in the study and to all those who contributed to the completion of this proposal in one way or another.

Conflict of Interest: None declared

Source of Funding: None

Ethical Clearance: The study was approved by the institutional ethics committee.

REFERENCES

1. Kadri AM,Epidemiology of Acite Diarrheal diseases and its prevention and control. IAPSM's Textbook of Community Medicine. 1st edition, 2019:373
2. Diarrhoeal disease, UNICEF. Available at: https://data.unicef.org/topic/child-health/diarrhoeal-disease/
3. Diarrhoeal disease, WHO. Available at: https://www.who.int/en/news-room/fact-sheets/detail/diarrhoeal-disease
4. Bhalwar R, Dudeja P, Jindal AK. Acute Gastoenteritis, Communicable Diseases. Textbook of Community Medicine. 2nd edition. 2018:571
5. UNIT 8 - Prevention of Diarrhoea, Medical Education: Teaching Medical Students about Diarrhoeal Diseases. Available at: https://rehydrate.org/diarrhoea/tmsdd/8med.htm
6. Unit 4 - Treatment of Diarrhoea at Home Medical Education: Teaching Medical Students about Diarrhoeal Diseases. Available at: https://rehydrate.org/diarrhoea/tmsdd/4med.htm
7. Padhy S, Sethi RK, Behera N. Mother's knowledge, attitude and practice regarding prevention and management of diarrhoea in children in Southern Odisha. Int J Contemp Pediatr. 2017 May;4(3):966-971
8. Ashraf A, Bhat MA, Mahrukh. Childhood diarrhoea: assessment of knowledge, attitude and practices among mothers attending the tertiary care hospital – an observational analytical study. Int J Community Med Public Health 2017;4:1219-22.
9. Adimora GN, Ikefuna AN, Ilechukwu G. Home management of childhood diarrhoea: Need to intensify campaign. Niger J Clin Pract 2011;14:237-41.
10. Workie HM, Sharifabdilahi AS and Addis EM. Mothers' knowledge, attitude and practice towards the prevention and home-based management

of diarrheal disease among under-five children in Diredawa, Eastern Ethiopia, 2016: a cross-sectional study. BMC Pediatrics,2018;18:1-9.

11. Gollar LH, Avabratha KS. Knowledge, attitude, and practice of mothers of underfive children regarding diarrheal illness: A study from coastal Karnataka. Muller J Med Sci Res 2018;9:66-70.
12. Ogunrinde OG, Raji T, Owolabi OA, and Anigo KM Knowledge, Attitude and Practice of Home Management of Childhood Diarrhoea among Caregivers of Under-5 Children with Diarrhoeal Disease in Northwestern Nigeria. Journal of Tropical Pediatrics,2012;58(2):143-6.

A Study to Assess the Parents Satisfaction Regarding Pediatric Care Services Rendered by Staff Nurses from Selected Pediatric Units of Sangi City

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ABSTRACT

A quantitative study was conducted by Ms. Karishma Mulla. out with the purpose of to know the parents satisfaction level towards pediatric care which rendered by staff nurses in the hospital.

Aims of the Study :

1. To assess the satisfaction level of parents regarding pediatric care services.
2. To find out association between satisfaction score and selected demographic variables.

Materials and Method: This study based on quantitative approach and it is a non – experimental descriptive research design was used to assess the parent satisfaction regarding paediatric care rendered by staff nurses from pediatric units of sangli city. Total 110 samples were selected by simple random sampling technique. A likert scale of five domains which includes 30 items were administer to collect data. The reliability coefficient was found to be 'r' value is 0.8 which is more than 0.7 hence, the tool was found to be reliable. The conceptual framework based on the Jean Watson human caring theory.

Result: The result of the parents satisfaction level regarding towards pediatric care were found 98.18% parents are highly satisfied, and 1.82 % of parents were moderately satisfied with the pediatric care which is rendered by staff nurses in the pediatric unit.

As per the domain, The satisfaction level of parents was found towards the environment 94.55 %, information 94.55 %, communication 96.36 %, nursing care 95.45 %, recreation 83.64 %.

This result shows the parents are highly satisfied towards the pediatric care rendered by staff nurses in the pediatric unit.

Keywords: *Assess, Parents, satisfaction.*

Introduction

Now a days more competition occurs in the organization to improve the standard of care as a means to determine particular health care facilities provision auxillaryl portion of the pediatric health care they are very achieve with higher parental predisposition for child care. As a result of wards need to check the parental satisfaction towards the pediatric care which is given by the staff nurses or health (taken) while maintaining a higher level of parents satisfy of child's care than ever before. The everyday care is improved and time and time period recognize as when parental satisfaction requirements should be fulfillment of care it include the word environment receiving the proper information about ward, staff, and care of child, open communication, flexible nursing care and also recreation or entertainment for the children.[2]

Parents after determine satisfaction of care given to the children by analyzing the attitudes of staff nurses and another health care team. Every hospital incidents is special to each and every individual and depends on

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other elements. Children are unable to express their needs. So parents to interpret their needs. Assess quality of services on the basis of level of parental satisfaction is essential to an important outcome issue.

Now a days however evaluation and notice the deficiency and standard of intelligibility to the optimum health services as the crucial concern of the guideline makers in health globally. As a result now a days improvement in quality of cares, managers and planners of health care system are much more interested. It is clear out evaluation of present state and designing for further development. This one of the crucial factor an affect on standards of health care services. To improve the quality of health care services, assessment of parents satisfaction level is one of the indicator. Determining the level of health services the researchers believe this one of the important factor

Findings

Section I: Frequency and Percetage Distribution of Demographic Variables

Table 1: Frequency and percentage distribution of demographic variables

Sr. No.	Variables	Groups	Frequency	Percentage (%)
1.	**Age in years**	18-24	48	43.64
		25-31	61	55.45
		32-38	1	0.91
2.	**Education**	Illiterate	11	10.00
		Primary	27	24.55
		Secondary	33	30.00
		Higher secondary	16	14.55
		Graduation	14	12.73
		Post graduation	9	
3.	**Occupation**	Housewife	72	65.45
		Service	25	22.73
		Business	13	
4.	**Monthly Income in rupees**	5000-10000	20	18.18
		10001-20000	55	50.00
		20001-30000	26	23.64
		above 30000	9	8.18

Section II: Assessment of level of parents satisfaction as per domain

Table 2: Assessment of level of parents satisfaction as per domain

N = 110

Sr. No.	Domains	Groups	Score	Frequency	Percentage %
1.	**Ward Environment**	Dissatisfied	06-10	01	0.91
		Moderately Satisfied	11-14	05	4.55
		Highly Satisfied	15-18	104	94.55
2.	**Information**	Moderately Satisfied	11-14	06	5.45
		Highly Satisfied	15-18	104	94.55
3.	**Communication**	Moderately Satisfied	11-14	04	3.64
		Highly Satisfied	15-18	106	96.36

Conted…

4.	**Nurse Care**	Moderately Satisfied	11-14	05	4.55
		Highly Satisfied	15-18	105	95.45
5.	**Recreation**	Dissatisfied	06-10	03	2.73
		Moderately Satisfied	11-14	15	13.64
		Highly Satisfied	15-18	92	83.64

In the ward environment domain there were 94.55% parents were highly satisfied with the ward environment and 4.55 % of parents were moderately satisfied with ward environments, hence result found is parents are satisfied with ward environment which is provided by staff nurses.

In the information domain there were 94.55% parents were highly satisfied with the information 5.45 % were moderately satisfied with information, hence result found is parents are highly satisfied with information which is provided by staff nurses related to children's health.

In the communication domain were 96.36 % parents were highly satisfied with the communication and were 3.64 % of parents moderately satisfied with communication, hence result found that parents are highly satisfied with communication of the staff nurses.

In the nursing care domain were 95.45 % parents are highly satisfied with the nursing care and 4.55 % were moderately satisfied with nursing care, hence result found that parents are highly satisfied with nursing care which was provided by the staff nurses.

In the recreation domain 83.64 % parents were highly satisfied with the recreation and 13.64 % of parents were moderately satisfied, hence result found parents was highly satisfied with recreation which is provided by the staff nurses in the pediatric unit.

Section III: Assessment of satisfaction Level of Parents

Deals with analysis of data related to assessment the level of parents' satisfaction regarding pediatric care services, in terms of frequency and percentage

Table 3: Satisfaction level of the parents' regarding pediatric care services

N = 110

	Groups	Score	Frequency	Percentage (%)
Satisfaction	Moderately Satisfied	50-70	2	1.82
	Highly Satisfied	70-90	108	98.18
	Total		110	100.00

The above table no. 3 shows the satisfaction level of the parents regarding pediatric care services, such a that 98.18% of parents were highly satisfied with their experience about hospital services, 1.82% parents were moderately satisfied. No one was in dissatisfied category.

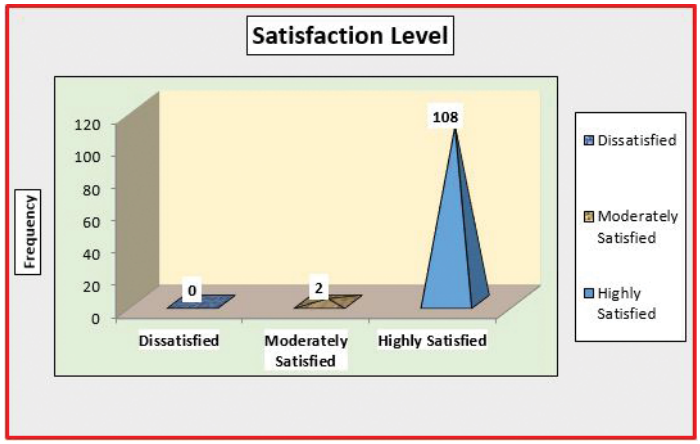


Figure 1: Level of parents' satisfaction regarding pediatric care services

Section IV: Analysis of data related to the association between satisfaction score and selected demographic variables

Table 4: Association between satisfaction score and selected demographic variables

N = 110

Sr. No.	Variables	Groups	Satisfaction		Chi Square	d. f.	p value	Significance
			Moderately Satisfied	Highly Satisfied				
1	Age	18-24	2	46	2.63	2	0.27	Not Significant
		25-31	0	61				
		32-38	0	1				
2	Education	Illiterate	0	11	3.53	5	0.62	Not Significant
		Primary	1	26				
		Secondary	0	33				
		Higher secondary	1	15				
		Graduation	0	14				
		Post graduation	0	9				
3	Occupation	Housewife	0	72	15.19	2	0.00	**Significant**
		Service	0	25				
		Business	2	11				
4	Monthly Income	5000-10000	0	18	9.16	3	0.03	**Significant**
		10001-20000	0	55				
		20001-30000	0	26				
		above 30000		9				

Age and Satisfaction: The p value of the association test between age and parent satisfaction was 0.27 which is, more than 0.05. Concludes that, there was no significant association between age of parents and their satisfaction about paediatric care services which is rendered by staff nurses in the paediatric units.

Education and Satisfaction: The p value of the association test between education and parent satisfaction was 0.62, more than 0.05. Concludes that, there was no significant association between education of parents and their satisfaction about paediatric care services which was rendered by staff nurses in the paediatric units.

Occupation and Satisfaction: The p value of the association test between occupation and parent satisfaction was 0.00, less than 0.05 Concludes that, there was significant association between education of parents and their satisfaction about paediatric care services which was rendered by staff nurses in the paediatric units.

Monthly Income and Satisfaction: The p value of the association test between monthly income and parent satisfaction was 0.03, less than 0.05. Concludes that, there was significant association between monthly income of parents and their satisfaction about paediatric care services

Discussion

Section I: Analysis of demographic data in terms of frequency and percentage distribution

1. **Age:** In this study according to age of parents, most of parents 55-45% were between 25-31 years of age group, 43.64% were 18-24 years of age, 0.91% between 32-38 years, hence maximum parents were 25-31 years of age group.
2. **Education:** In the study according to education of parents, most of them 30% were educated secondary, 24.55% were up to primary, 14.55% up to higher secondary, 12.73% graduates, 10% illiterate and 8.18% were educated up to post graduation, hence it observed that maximum were educated up to secondary education.

3. **Occupation:** In the study according to occupation of parents, most of them 65.45% were housewives, 22.73% doing services, and only 11.82% in the business category, hence the maximum parents occupation 65.45% were housewife category.
4. **Monthly Income:** in the study according to monthly income of parents, most of them 50% from the income group 10001-20000, 23.64% in the 20001-30000 income group, 18.18% from 5000-10000 and only 8.18% in the income group above 30000 per month, hence the maximum monthly family income was between 10001-20000/-.

Section II: Assessment the satisfaction level of parents regarding paediatric care as pr domain

Environment: Assessment of the satisfaction about environment in the hospital of the parents of 1-3 years children's at selected paediatric hospitals shows, 94.55% of parents were highly satisfied with their experience about hospital environment, 4.55% parents were moderately satisfied and 0.91% in the dissatisfied category.

Similar study result reported by Victoria S. Koontz in year 2003, A descriptive study was conducted in USA. To assess the parental satisfaction in a paediatric ICU. The parental satisfaction survey measured 3 domains of caring (a) hospital environment (b) patients care (c) communication. The results of this study found very highly satisfied for ICU environment the p value is less than 0.01.[1]

Information: Assessment of the satisfaction about information provided in the hospital of the parents of 1-3 years children's at selected paediatric hospitals shows, 94.55% of parents were highly satisfied with their experience about information, 5.55% parents were moderately satisfied

Communication: Assessment of the satisfaction about communication service provided in the hospital of the parents of 1-3 years children's at selected paediatric hospitals shows, 96.36% of parents were highly satisfied with their experience about communication, 3.64% parents were moderately satisfied.

Similar study result reported by Hongs and Susan S. in years 2008. a pre experimental research conducted in USA. Parental satisfaction with nurses communication and pain management in a paediatric unit. High satisfaction rating on the communication item.[12]

Nursing Care: Assessment of the satisfaction about nursing care service provided in the hospital of the parents of 1-3 years children's at selected pediatric hospitals shows, 95.45% of parents were highly satisfied with their experience about nursing care, 4.55% parents were moderately satisfied.

Similar study result reported by Naiire salmani et.al. 2015. A Grounded theory study conducted in Yazd, Iran. The process of satisfaction with nursing care in parents of hospitalized children. Sample size was 25 consisted of parents of children. They are used in-depth semi-structured interviews. The result founds parents are satisfied with the nursing care.[13]

Recreation: Assessment of the satisfaction about recreation in the hospital of the parents of 1-3 years children's at selected pediatric hospitals shows, 83.64% of parents were highly satisfied with their experience about hospital recreation, 13.64% parents were moderately satisfied and 2.73% in the dissatisfied category.

Section III: Deals with analysis of data related to the association between satisfaction score and selected demographic variables

Age and Satisfaction: The p value of the association test between age and parent satisfaction was 0.27, more than 0.05. Concludes that, there was no significant association between age of parents and their satisfaction about pediatric care services.

Education and Satisfaction: The p value of the association test between education and parent satisfaction was 0.62, more than 0.05. Concludes that, there was no significant association between education of parents and their satisfaction about paediatric care services.

Occupation and Satisfaction: The p value of the association test between occupation and parent satisfaction was 0.00, less than 0.05. Concludes that, there was significant association between education of parents and their satisfaction about paediatric care services.

Conclusion

In this study results found over all satisfaction of the parents out of the 100 % the 98.18 % of parents were highly satisfied, and 1.82 % of parents were moderately satisfied their experience about the care services in the pediatric unit. Parents were getting clean

ward environment adequate information about the child health, staff nurses communication is also good, meeting all nursing care their children's, only in the recreation the parents were moderately satisfied.

Conflict of Interest: Column is Nil.

Source of Funding: Self.

Ethical Cearance: Proposal of research with the data collection tool was presented in the front of research committee for approval. prior permission from hospital and child development officer, were taken. Informed written consent from each participant was taken. Which included name, number, organization, time duration of participation, termination of participation, purpose of the study, incentives, benefits, and where it was promised that there will be no risk to the clients. Principle of confidentiality was attained by giving code number to data collection tool. The received information also kept confidential. Ethical clearance is done with the committee members Dr. Sripriya G. and Dr. Mrs. Nilima Bhore

REFERENCE

1. Vasiliki M., Barbara B.,Anthi C., Theodora M. et.alparents satisfaction concerning their child's hospital care, Japan Journal of Nursing Science (2011-Dec), vol-8 issue-2,p163-173.
2. Ahmad A Emad Y., Somaie heidari,et.al, Outpatient and Inpatient services satisfaction in Iranian Military Hospitals, Iran Red Cresent Med. Journal, 2013 Sep ; vol-15, issue(9): p843-847.
3. Berna erenf, filiz A., kursat F.et al., Parents expectations and satisfaction of pediatric clinic, Trans. Med (sunnayvale) vol-4 issue-4,year 2014p137.
4. Suresh k., Pawan k. patient satisfaction with nursing care in public and private hospital, nursing and midwifery research journal- 2013 july, vol-9,no.3, p-130-141.
5. Erling S., Adrew M. G., parent experience of inpatient pediatric care in relation to health care delivery and socio demographic characteristics, BMC health services Reseach 2013,vol-13;p512.
6. Cenita J. Pavai A. T. Surya, Parental satisfaction with pediatric day care surgery and its Determinants in a tertiary care hospital, Journal Indian Associate pediatric surgery 2017, Oct-Dec, vol- 22, issue(4): p226-231.
7. S. Aslanabadi, SH Shahbazi, 2014., Mothers satisfaction with Nursing care in a children's hospital, International Journal of Nursing 2014, vol-26 issue-(86): p61-70.
8. Jos M. L., Johannes B., Marcel, perception of parents on satisfaction with care in the pediatric intensive care unit., Intensive Care Med.,(2009) 35 : p1082-1089.
9. Hong, Susan S. Murphy et.al., Parental Satisfaction with nurses communication and pain management in a pediatric unit, pediatric nursing, July/aug 2008, vol.34 issue4, p289-293.
10. kale a, pitre s. Effect of music therapy on selected physiological parameters among the premature babies, wjpr, 2016, vol.5 issue 12,p348-356.
11. Aparna Kale, A Study to assess the effectiveness of planned teaching programme related to home care of acute lymphocytic leukemia (ALL) on knowledge among caregivers of children receiving chemotherapy, IJNR, 2016, vol-2,issue(3), p128-134.

Effect of Depression on Treatment Outcome in Multi-Drug Resistant Tuberculosis Patients Under Programmatic Management of Drug Resistant TB Services in Amritsar, Punjab

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ABSTRACT

Background: Depression and Multi-drug resistant tuberculosis (MDR-TB) are worldwide public health problems with an immense impact on human health. Depression leads to poor health seeking behaviour and poor compliance which leads to unfavourable treatment outcomes.

Method: This cross-sectional study was conducted on all MDR-TB patients who were registered and being treated under PMDT services in Amritsar district from 1st April 2014 to 31st March 2015. The prevalence of depression and its effect on the treatment outcome was determined. Data management and analysis was done by using Microsoft excel and SPSS.

Results: Out of 87 MDR-TB patients, 57 (65.5%) were males and 30 (34.4%) were females. Depression was significantly associated with the unfavourable treatment outcomes.

Conclusions: On statistical analysis, it was observed that 50.6% of the patients were depressed and unfavourable outcome was significantly associated with depression (p=0.005) in MDR-TB patients.

Keywords: *MDR-TB, Depression, Treatment outcomes, Socio-demographic factors.*

Introduction

Multidrug-resistant tuberculosis (MDR-TB) is a major public health challenge in the twenty-first century. The World Health Organization (WHO) defines MDR-TB as TB that is resistant to two first-line drugs i.e. isoniazid and rifampicin. Worldwide the cure rate is only around 50% in MDR-TB programme settings.[1] The estimated prevalence of mental disorders, including depression among people with TB is between 40% and 70%. This is due to various underlying factors. Patients with mental disorders are at an increased risk of TB exposure due to higher rates of homelessness which leads to their residence in other shelters and group homes. These patients also carry other risk factors for TB like smoking, poor nutrition and co-morbidities such as diabetes and HIV infection.[2]

Depression is considered as a comorbidity of tuberculosis due to the nature of tuberculosis infection, side effects from medications, and other social determinants of health. Depressed patients are less likely to seek treatment or take their medications regularly which results in more cases of default, failure or death. Therefore, depression could be considered as a concerning exacerbating factor in a potential MDR-TB epidemic.[3]

Psychiatric problems such as depression has a significant role to play in patient's quality of life and it also affects the physician's approach toward MDR-TB

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therapy. Therefore, effective management of depression is a key for not only the desired patient outcome, but also for patient's overall quality of health and physician's satisfaction while dealing with MDR-TB treatment. [4]

Since there is paucity of such studies in Punjab, the study was undertaken to ascertain the effect of depression in MDR-TB patients on their treatment outcomes.

Material and Method

The study was a cross-sectional study conducted on all MDR-TB patients registered from 1st April 2014 to 31st March 2015 and being treated with second line anti-tuberculosis drugs under PMDT services in Amritsar City.

Inclusion Criteria: All drug sensitivity tested (DST) confirmed MDR-TB cases who signed written informed consent.

Exclusion Criteria: Pregnant females and critically ill patients who needed management in an Intensive Care Unit (ICU).

Data Collection and Analysis: A total of 87 patients registered with DTC (District Tuberculosis Centre) Amritsar and being treated with second line anti TB drugs were included in the study. A pre-designed and pre – tested proforma was administered to the subjects after taking his/her consent. Questionnaire included questions regarding the socio-demographic profile, past history, past duration of treatment, family history and occupational history of the patients. The possible outcomes of the MDR TB patients under DOTS can be: cured, treatment completed, died, failure, defaulted, lost to follow up or regimen changed/shifted to XDR.[5]

Depression was assessed in the study subjects by CES-D-R 10 (Assessment of depression by Centre for Epidemiologic Studies Short Depression Scale during the first 4 months of starting the treatment. This scale is a self-report measure of depression containing 10 items. The reliability and validity of the scale has been assessed by various authors. The 10 items are-

CES-D-R 10 items	Rarely or none of the time (less than 1 days)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)
I was bothered by things that usually don't bother me.				
I had trouble keeping my mind on what I was doing.				
I felt depressed.				
I felt that everything I did was an effort.				
I felt hopeful about the future.				
I felt fearful.				
My sleep was restless.				
I was happy.				
I felt lonely.				
I could not " get going"				

Scoring

	Rarely or none of the time (less than 1 days)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)
Questions 5-8	3	2	1	0
All other Questions	0	1	2	3

The total score is calculated by finding the sum of 10 items. Do not score the form if more than 2 items are missing. Any score equal to or above 10 is considered depressed.[6]

Depression was compared with the treatment outcomes of the study patients and the valid conclusions drawn. Data analysis was done by SPSS version 20. Chi-square test was applied to prove their statistical significance and $p<0.05$ was considered to be significant.

Ethics: The research proposal was approved by the college ethical committee at the time of commencement of the study.

Results

The present study was carried out on 87 MDR- TB cases registered under PMDT services in Amritsar city. The total sample consisted of 57 (65.5%) males and 30 (34.4%) females.

Table 1: Distribution of cases according to their Socio-demographic profile

	Number	Percentage (%)
Age (years)		
15-29	38	43.7
30-44	23	26.4
45-59	23	26.4
>60	3	3.4
Sex		
Male	57	65.5
Female	30	34.5
Marital status		
Married	50	57.5
Single	28	32.2
Widow/Widower	9	10.3
Education		
Above Matric	23	26.4
Matric	23	26.4
Below Matric	19	21.8
No schooling	22	25.3
***Occupation**		
IGA	63	72.4
Non-IGA	24	27.6
Socio-economic status		
High	5	5.7
Upper middle	21	24.1
Lower middle	43	49.4
Low	18	20.7

*IGA- Income generating activity; Non-IGA- Non income generating activity.

Table 1 reveals that majority (43.7%) of the patients were in the younger age group i.e. 15-29 years followed by 26.4% each in the age groups of 30-44 years and 45-59 years. Majority i.e. 65.5% were males. 57.5% of the cases were married, 32.2% were single and 10.3% were in the category of widow/widower. As far as educational status is concerned, 26.4% each were above matric and matric, 21.8% were below matric and 25.3% were illiterate. Out of the total 87 patients, 72.4% were involved in income generating activities and rest i.e. 27.6% were unemployed. As far as socio-economic status is concerned, 49.4% were in the lower middle status, 24.1% in the upper middle status, 20.7% belonged to low status and only 5.7% were from the high socio-economic status.

Table 2: Distribution of cases according to CES-D-R 10 scale

S. No.	*CES-D-R 10 items	Rarely or none of the time (less than 1 day) N (%)	Some or a little of the time (1-2 days) N (%)	Occasionally or a moderate amount of time (3-4 days) N (%)	All of the time (5-7 days) N (%)
1.	I was bothered by things that usually don't bother me.	31 (35.6)	35 (40.2)	15 (17.2)	6 (6.9)
2.	I had trouble keeping my mind on what I was doing.	35 (40.2)	33 (37.9)	13 (14.9)	6 (6.9)
3.	I felt depressed.	29 (33.3)	43 (49.4)	14 (16.1)	1 (1.1)
4.	I felt that everything I did was an effort.	30 (34.5)	35 (40.2)	17 (19.5)	5 (5.7)
5.	I felt hopeful about the future.	3 (3.4)	13 (14.9)	64 (73.6)	7 (8)
6.	I felt fearful.	2 (2.3)	11 (12.6)	65 (74.7)	9 (10.4)
7.	My sleep was restless.	1 (1.1)	14 (16.1)	60 (69.0)	12 (13.8)
8.	I was happy.	1(1.1)	3 (3.4)	48 (55.2)	35 (40.2)
9.	I felt lonely.	20 (23.0))	53 (60.9)	9 (10.8)	5 (5.7)
10.	I could not " get going"	24 (27.6)	50 (57.5)	12 (13.8)	1 (1.1)

*Scoring of items done as explained in Materials and methods.

Table 2 shows that out of the total 87 patients, 40.2% were bothered about things that usually don't bother for some time i.e.1-2 days per week, 40.2% rarely (<1 day) had trouble keeping in mind things they were doing, 49.4% felt depressed for some time, 40.8% think that they did things with effort for some time, 73.4% were hopeful about their future for moderate amount of time, at the same time 74.7% felt fearful also for 3-4 days or moderate amount of time, 69% had restless sleep for moderate time, at the same time 55.2% were happy for the same period, 60.9% felt lonely for some time and 57.5% said that they could not "get going" for some time per week.

Table 3: Distribution of cases according to their treatment outcome

*Treatment Outcome	Number	Percentage (%)
Cured	30	34.5
Treatment Completed	19	21.8
Defaulted	13	14.9
Failure	3	3.5
Shifted to XDR	4	4.6
Died	18	20.7
Total	87	100

*Favourable outcome included Cured and Treatment completed; Unfavourable outcome included Defaulted, Failure, Shifted to XDR and Died patients.

The perusal of table 3 depicts the treatment outcome of the study subjects. Out of the total 87 patients, 30 (34.5%) were cured, 19 (21.8) completed treatment, 18 (20.7%) died, 13 (14.9%) defaulted, 4 (4.6%) were shifted to XDR regime and 3 (3.5%) were failure.

Table 4: Distribution of cases showing the effect of depression on the treatment outcome

Treatment Outcome	Depression		Significance
	Present N (%)	Absent N (%)	
Cured	12 (40.0)	18 (60.0)	$\chi 2=16.753$ df=5; p=0.005
Treatment Completed	5 (26.3)	14 (73.7)	
Default	7 (53.8)	6 (46.2)	
Failure	2 (66.7)	1 (33.3)	
ST XDR	2 (50.0)	2 (50.0)	
Died	16 (88.9)	2 (11.1)	
Total	43 (50.6)	44 (49.4)	

It is observed in the table 4 that 60% of the cured patients and 73.7% of the patients who completed treatment were not depressed i.e. depression was less common in patients with favourable outcome. At the same time 53.8% of the patients who defaulted, 66.7% of subjects with outcome as failure, 50% of who shifted to XDR regime and 88% of the patients who died were depressed. This means that depression was more seen in patients with unfavourable treatment outcome and the results were found to be statistically significant (p-0.005).

Discussion

Table 1 shows the socio-demographic profile of the patients. Our study reveals that out of the total, majority i.e. 43.7% were less than 30 years and 52.8% of the patients were in the age group of 30-59 years which includes the economically productive age group. Kumar A et al in their study also showed that majority (63.1%) were less than 30 years. [7] Studies by Hire et al and Nair et al in Nagpur and Chennai respectively also observed that more than half of the patients belonged to economically productive age group. [8,9] Present study observed that out of total 87 patients, 57 (65.5%) were males and 30 (34.5%) were females. Similar over representation of males was found by Kumar A et al [7] and Thiruvalluvan E et al [10] in their studies. Our study revealed that 57.5% were married, 47.1% were below matric, 72.4% were working (IGA) and 49.4% and 20.7% belonged to lower middle class and lower class respectively. Somewhat similar findings were observed by Thiruvalluvan E et al in Chennai that 78% were married, 36% had education level below secondary school and 76% were involved in income generating activities. [10] Bhatt G et al in Ahmedabad city along with the similar findings observed that majority belonged to upper lower socio-economic status. [11]

Table 2 depicts the distribution of cases according to CES-D-R 10 depression scale. It is evident from our study that more than half (50'6%) of the study patients were depressed according to CES-D-R 10 scale (Table 4). 40.2 % were bothered by things and had trouble keeping things in mind. 49.4% felt depressed and 74.7% were fearful. 69% had restless sleep occasionally and 60.9% felt lonely sometimes. Similar association of depression with the chronic illness like MDR-TB has been observed by KM de Castro-Silva et al [12], Jawad K et al [13], Das M et al [14] and Sharma RC et al [15] in their studies at various places.

Table 3 presents the treatment outcome of the study patients. Favourable outcome was seen in 56.3% cases i.e. cured (34.5%) and treatment completed (21.8%) cases. Unfavourable outcome was observed in 43.7% cases comprising of defaulted (14.9%), failure (3.5%), shifted to XDR (4.6%) and died (20.7%) cases. Similar, treatment success rates 62% and 68.3% and other outcomes were seen in studies in Portugal and China respectively. [16,17]

As is evident from the table 4 that out of the total 87 patients, 43 (50.6%) were depressed and 44 (49.4%) were not depressed according to CES-D-R 10 scale. 60% of the cured and 73.7% of the treatment completed patients were not depressed while 88.9% of the died, 66.7% of failure, 53.8% of the defaulted and 50% of those shifted to XDR regime were found depressed i.e. depression was significantly associated with the unfavourable treatment outcomes (p=.005). Similarly, Ugarte-Gil C in their study on TB patients found that major depressive episodes is significantly associated with negative outcomes. [18] Another study by Ambaw F also stated that untreated depression in people with tuberculosis was independently associated with worse treatment outcomes. [19]

Conclusion

CES-D-R 10 scale was found to be very useful instrument for screening of depression. Depression among MDR-TB is a common entity which should be taken care of on priority bases. Therefore it is recommended that during treatment all the patients should be screened for depression at least once and staff of DOTS centre should be educated about symptoms of depression and the counselling techniques for improving patient compliance.

Source of Funding: Nil.

Conflict of Interest: None

REFERENCES

1. Walker IF, Kanal IS, Baral SC, Farragher TM, Joshi D, Elsey H, Newell JN. Depression and anxiety in patients with multidrug-resistant tuberculosis in Nepal: an observational study. PHA 2019; 9(1): 42–8.
2. Assessed on 23rd June 2019. Available at http://www.tbonline.info/posts/2017/4/11/world-health-day-2017-lets-talk-about-depression/#.
3. Lee, Esther, "Prevalence of Depression among Active TB and TB/HIV Patients in Kisumu County" (2015). Independent Study Project (ISP) Collection. 2152. Assessed on 23rd June 2019. Available at https://digitalcollections.sit.edu/isp_collection/2152.
4. Pachi A, Bratis D, Moussas G, Tselebis A (2013) Psychiatric morbidity and other factors affecting treatment adherence in pulmonary tuberculosis patients. Tuberc Res Treat. 2013: 489865.
5. Guidelines on Programmatic Management of Drug Resistant TB in India. Central TB Division, Directorate General of Health Services, Ministry of Health & Family Welfare, Government of India, New Delhi, 2017.
6. Assessed on 20th June 2019. Available at https://www.brandeis.edu/roybal/docs/CESD-10_website_PDF.pdf.
7. Kumar A, Chaudhari D, Anand R, Verma SK, Kumar A, Chaudhry S. Occurrence of psychiatric disorders in the patients of multi drug resistant tuberculosis under treatment. Int J Res Med Sci. 2018;6:3538-41.
8. Hire R, Kale AS, Dakhale GN, Gaikwad N. A Prospective, Observational Study of Adverse Reactions to Drug Regimen for Multi-Drug Resistant Pulmonary Tuberculosis in Central India. Meditterr J Hematol Infect Dis. 2014;6(1):e2014061.
9. Nair D, Velaytham B, Kannan T, Tripathy J P, Harries AD, Natrajan M, Swaminathan S. Predictors of unfavourable treatment outcome in patients with multi-drug resistant tuberculosis in India. Int Union Against Tuberculosis and Lung Disease. PHA. 2017;7(1):32-8.
10. Thiruvalluvan E1, Thomas B, Suresh C, Sellappan S, Muniyandi M, Watson B. The psychosocial challenges facing multi drug Resistance tuberculosis patients: a qualitative study. Saarc J Tuber Lung Dis HIV/AIDS, 2017; xiv(1):14-21.
11. Bhatt G, Vyas S, Trivedi K. An epidemiological study of multi-drug resistant tuberculosis cases registered under Revised National Tuberculosis Control Programme of Ahmedabad city. Indian J Tuberc. 2012;59:18-27.

12. De Castro-Silva KM, Carvalho AC, Cavalcanti MT, Martins PS, Franc¸a,JR, Oquendo M, Kritski AL,1 Sweetland A. Prevalence of depression among patients with presumptive pulmonary tuberculosis in Rio de Janeiro, Brazil. Brazilian Journal of Psychiatry. 2018;00:000–000.

13. Jawad K, Mehreen S, Haq ZU, Amin, Iqbal Z, Yousaf M, Javaid A, Basit A. The frequency of depression in the treatment of multi drug resistant tuberculosis. Pak J Chest Med 2017; 23 (4):134-8.

14. Das M, Isaakidis P, Van den Bergh R, Kumar AMV, Nagaraja SB, Valikayath A, Jha S, Jadhav B and Ladomirska J. HIV, multidrug-resistant TB and depressive symptoms: when three conditions collide. Glob Health Action 2014, 7: 24912. Assessed on 21st June 2019. Available at http://dx.doi.org/10.3402/gha.v7.24912.

15. Sharma RC, Sharma DD, Kanwar N, Thakur MK and Kanwar P. Assessment of the frequency of depression and anxiety among tuberculosis patients at a tertiary care health centre - A cross sectional study. ejpmr, 2018,5(4), 496-9.

16. Oliveira O, Gaio R, Villar M, Duarte R. Predictors of treatment outcome in multidrug-resistant tuberculosis in Portugal. Eur Respir J. 2013;42:1747–9.

17. Chen Y, Yuan Z, Shen X, Wu J, Wu Z, Xu B. Time to multi-drug-resistant tuberculosis treatment initiation in association with treatment outcomes in Shanghai, China. Antimicrob Agents Chemother. 2018;62:e02259-17.

18. Ugarte-Gil C, Ruiz P, Zamudio C, Canaza L, Otero L, et al. (2013) Association of Major Depressive Episode with Negative Outcomes of Tuberculosis Treatment. PLoS ONE 8(7): e69514. doi:10.1371/journal.pone.0069514.

19. Ambaw F, Mayston R, Hanlon C, Medhin G and Alem A. Untreated depression and tuberculosis treatment outcomes,quality of life and disability, Ethiopia. Bull World Health Organ. 2018 Apr 1; 96(4): 243–55.

Incidence of Pulmonary and Extrapulmonary Tuberculosis among Jaintia Tribes, Meghalaya: A Hospital based Study

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ABSTRACT

Tuberculosis (TB) is a global public health problem. Pulmonary tuberculosis (PTB) is most common and highly contagious infection, whereas, Extrapulmonary tuberculosis (EPTB) in also an important clinical problem. The present study aimed to evaluate the demographic factors associated with PTB and EPTB patients of Jaintia Hills, Meghalaya. Total 317 patients clinically diagnosed with TB and belonged to the age group 15-50 years were enrolled for the study from different health centres of Jaintia Hills. Out of all the TB patients, 64.4% had PTB and 35.6% were diagnosed with EPTB. Male were more frequently affected by PTB (61.1%), whereas EPTB was more detected among female (57.1%) and found to be statistically significant ($p=0.002$). Significant differences ($p<0.05$) were also observed between other demographic parameters such as religion ($p=0.000$), community ($p=0.008$), marital status ($p=0.000$) and occupation ($p=0.000$) with type of TB. Early detection and appropriate treatment of TB must be started as soon as possible for reduction of this disease with increased awareness among the community.

Keywords: *Tuberculosis, Pulmonary, Extrapulmonary, Jaintia Hills, Meghalaya.*

Introduction

Tuberculosis is public health challenge in almost all developing countries and estimated that almost one-third of the population is infected globally[1-2]. India is the highest TB burden country and accounting for one-fifth global incidence of this disease[3]. More prevalent age group of this infectious disease is 15-54 years. Lack of awareness and negligence towards symptoms and treatment are the major cause of increasing the number of TB patients. Fear of death and social stigma are the other important reasons for hiding of truth regarding the disease[4]. PTB is highly contagious infection. The proportion of PTB and EPTB varies with respect to geographical exposure, social, ethnic and economical parameters[5-6]. The most common sites for EPTB are lymph nodes, pleura, cutaneous tissue, abdomen, gastrointestinal system and bones [1-2,7]. Nearly all organs of the body can be infected by EPTB and it can also have a wide variety of clinical manifestations, thus leading to difficulty and delay in diagnosis[8]. Socio-demographic factors such as age, sex, education, occupation, marital status, life style play a crucial role in etiology and epidemiological situation of TB[9]. Therefore, the present study was conducted focusing on demographic factors associated with pulmonary and extrapulmonary tuberculosis among the Tribes of Jaintia Hills, Meghalaya.

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Method

A cross-sectional study was conducted among 317 patients diagnosed with TB at the health centres of Jaintia Hills (East and West), Meghalaya. Since, the present study was a part of ICMR funded project entitled "Prevalence and Risk Factors leading to HIV Infection among the Two Tribes of Jaintia Hills, Meghalaya and Ethical clearance for ICMR funded project was sought from Amity University Research Ethics Committee. Patients belonged to the age group 15-50 years were enrolled for the study. Written permission was sought from District Medical and Health Officer (DM&HO)

and Medical officers (MOs) of all the health centres before conduct the study. Informed consent was obtained from each patient prior to conduct the interview and gathered information kept confidential. To collect the demographic data such as age, sex, religion, community, occupation, marital status, structured schedule was used. Statistical analysis was carried out using SPSS V22. Differences between frequencies were tested using Chi-square test (significance level $p<0.05$).

Results

The study revealed that, of 317 TB patients 64.4% were diagnosed with PTB and 35.6% had EPTB (Fig. 1).

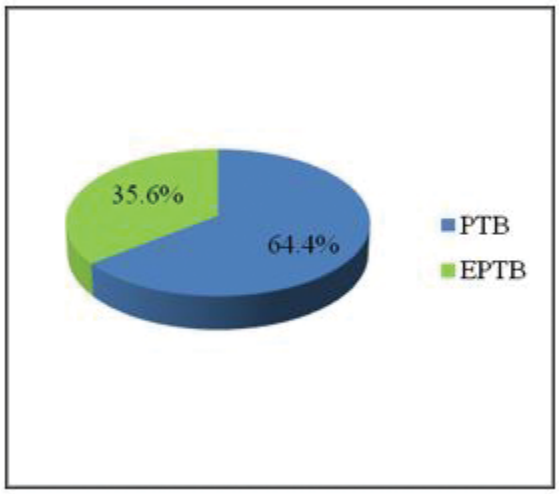


Fig. 1: Distribution of Pulmonary and Extrapulomonary Tuberculosis

Table 1 shows the demographic distribution of TB patients with respect to type of TB. It was observed that, among all the subjects 65.2% were male and 37.5% were female. Amongst all male, majority (61.1%) were infected with PTB; whereas amongst female, 57.7% were diagnosed with EPTB. Distribution of gender with type of TB was found to be highly significant (p=0.002). With respect to age group, patients between 31-40 years of age were more prone to PTB, whereas a different finding was observed for EPTB cases. However, these differences were not found to be statistically significant ($p\geq0.05$). Most of the Christian (69.7%) and Niamtre (85.5%) group were found to be as pulmonary tuberculosis patients. Different scenario was observed for Hindu as majority of them were infected with EPTB (59.8%). Statistical analysis shows a highly significant variation between region and type of TB (p=0.000). Majority of the TB patients belonged to Jaintia community (85.5%), among them 66.6% had PTB. Significant distribution was observed with respect to community and type of TB (p=0.008). Married group in Jaintia hills were majorly affected with PTB (71.2%) as compare to unmarried group which was more prone to EPTB (58.1%) and also found to be statistically highly significant (p=0.000). occupation is an important parameter responsible for exposure of tuberculosis. Around, 40% of the patients were involved with coal mine work, which shows a relevant cause for high prevalence of TB infection in Jaintia hills. Approximately, 86% PTB patients were coal mine workers in the present study. Occupation is also found to significantly associated with type o tuberculosis (p=0.000).

Table 1: Demographic distribution of TB patients by type of TB:

Variables	PTB Patients		EPTB Patients		Total	p value
	N	%	N	%		
Gender						
Male	121	61.1	77	38.9	198	0.002*
Female	51	42.9	68	57.1	119	
Age group (in year)						
<21	11	57.9	8	42.1	19	0.143
21-30	48	58.5	34	41.5	82	
31-40	123	69.9	53	30.1	176	
40+	22	55.0	18	45.0	40	
Religion						
Christian	101	69.7	44	30.3	145	0.000*
Hindu	39	40.2	58	59.8	97	
Niamtre	64	85.3	11	14.7	75	

Conted…

Community						
Jaintia	184	67.6	88	32.4	272	0.008*
Garo	1	25.0	3	75.0	4	
Khasi	19	46.3	22	53.7	41	
Marital Status						
Married	173	71.2	70	28.8	243	0.000*
Unmarried	31	41.9	43	58.1	74	
Occupation						
Coal mine workers	109	85.8	18	14.2	127	0.000*
Driver	65	58.6	46	41.4	111	
Vendor	11	61.1	7	38.9	18	
Store keeper	7	41.2	10	58.8	17	
Sex worker	2	40.0	3	60.0	5	
Health workers	2	28.6	5	71.4	7	
Private employee	5	23.8	16	76.2	21	
Unemployed	3	27.3	8	72.7	11	
Total	**204**	**64.4**	**113**	**35.6**	**317**	

Discussion

The incidence of TB is one of the most important surveillance indicators in public health. The present study revealed that the pulmonary tuberculosis was higher among male (61.1%) as compared to females, whereas, female (57.1%) were more prone to extrapulmonary tuberculosis than male, which showed highly significant differences (p=0.002). These differences could be due to regional, cultural and occupational variations. Similar findings were observed in urban area of Pune, Maharashtra, Nepal and West Africa[9-11]. However, no statistical significance was observed with respect to age and type of TB, but it was found that more than half of the TB patients (55.5%) belonged to the age group 31-40 years. According to WHO (2018), tuberculosis mostly affects adults in their most productive years; however, all age groups are at risk. Around 95% of cases and deaths have been occurred in developing countries[12]. Variables like religion (p=0.000), community (p=0.008), marital status (p=0.000) had highly significant association with PTB and EPTB in accordance with other study[9]. The present study confirmed that nearly 40% patients were working in coal mine areas. Occupation is an important risk factor responsible for active PTB in general population[13]. Findings of the other studies confirmed that patients were exposed to coalmine dust were more prone to tuberculosis, which was a known cause of occupational risk factors for tuberculosis[14-18].

Several social determinants and risk factors are impediments to TB control in high burden countries such as: poverty, malnutrition, HIV, smoking, diabetes mellitus, alcoholism, indoor air pollution, presence of large numbers of undiagnosed or poorly treated infectious pulmonary TB diseased persons in the community, overcrowding and weak health systems[19]. However, TB control efforts are primarily based on early diagnosis and treatment of patients with pulmonary TB disease. Chronic, productive cough is one of the cardinal symptoms of pulmonary TB disease, and therefore it is recommended that all individuals who have a productive cough of two weeks or more in high burden countries be evaluated for TB[20-21].

Conclusion

The present study concludes that the proportion of pulmonary tuberculosis was significantly higher among male than their counter part. Female constituted with majority of the patients with extrapulmonary tuberculosis. Other demographic factors such as region, community, marital status, occupation were significantly associated with tuberculosis in Jaintia hills, Meghalaya. Early detection and treatment of TB along with creating awareness regarding preventive measures for TB patients in various infection prevention programme is necessary in Jaintia Hills. It is also very important to make sure the

availability of anti-tuberculosis regimens in all Health Centres of Jaintia Hills. Tuberculosis control programs must be targeted at specific populations under risk with special care on young and female populations to reduce TB morbidity and mortality.

Acknowledgement

Sincere thanks to ICMR for financial support. We are thankful, to Heads of the Jaintia Hills District Administrative and Health Centers for their support. Heartfelt thanks to the participants of Jaintia Hills for their cooperation in providing the valuable information.

Conflict of Interest: NA.

Ethical Clearance: The present study was a part of Indian Council of Medical Research (ICMR) funded project, so, the Ethical clearance was sought for the project from Amity University Research Ethics Committee.

REFERENCES

1. Ates Guler S, Bozkus F, Inci MF, Kokoglu OF, Ucmak H, Ozden S et al. Evaluation of pulmonary and extrapulmonary tuberculosis in immunocompetent adults: a retrospective case series analysis. *Med Princ Pract Med Princ Pract*. 2015; **24**:75–79.
2. Sunnetcioglu A, Sunnetcioglu M, Binici I. et al. Comparative analysis of pulmonary and extrapulmonary tuberculosis of 411 cases. *Ann Clin Microbiol Antimicrob.* 2015; **14**: 34. https://doi.org/10.1186/s12941-015-0092-2
3. Global tuberculosis report world health organization 2014. http://www.who.int/tb/publications/global_report/gtbr14_executive_summary.Pdf.
4. Sajith M, Thomas A, Kothia JJ, Chandrakar B and Bargaje MD. Socio-Demographic characteristics of tuberculosis patients in a tertiary care hospital. *International Journal of Medical and Health Research*. 2015; **1**: 25-28.
5. Sreeramareddy CT, Panduru KV, Verma SC, Joshi HS and Bates MN. Comparison of pulmonary and extrapulmonary tuberculosis in Nepal- a hospital-based retrospective study. *BMC Infect Dis. 2008*; **8**: 8. doi: 10.1186/1471-2334-8-8.
6. Global Tuberculosis Control. WHO Report. Geneva: World Health Organization; 2002. Surveillance, Planning, Financing.
7. Musellim B, Erturan S, Sonmez Duman E and Ongen G. Comparison of extra-pulmonary and pulmonary tuberculosis cases: factors influencing the site of reactivation. *Int J Tuberc Lung Dis*. 2005; **9**: 1220–1223.
8. Gonzalez OY, Adams G, Teeter, LD, Bui TT, Musser JM and Graviss EA. Extra-pulmonary manifestations in a large metropolitan area with a low incidence of tuberculosis. *Int. J Tuberc Lung Dis*. 2003; **7**: 1178-1185.
9. Bhawalkar J, Khedkar D, Lanjewar B, Landge J and Ghonge S. Socio-Demographic Factors Associated with Tuberculosis Cases Registered Under RNTCP in an Urban Area of Pune, Maharashtra. *National Journal of Community Medicine.* 2018; **9:** 130-134.
10. Mohammed T, Sharma S, Roherberg D, Gupta D, Singh U and Sinha P. DOTS at a tertiary care center in Northern India: Successes, Challenges and the Next steps in TB control. *Indian J Med Res*. 2006; **123**: 702-06
11. Sreeramareddy CT, Panduru KV, Verma SC, Joshi HS and Bates MN. Comparison of pulmonary and extrapulmonary tuberculosis in Nepal- a hospital-based retrospective study. *BMC Infect Dis*. 2008; **8**: 8. doi:10.1186/1471-2334-8-8
12. World Health Organization. Tuberculosis Fact 2018. https://www.who.int/news-room/fact-sheets/detail/tuberculosis
13. Lienhardt C, Fielding K, Sillah JS et al. Investigation of the risk factors for tuberculosis: a case-control study in three countries in West Africa. *Int J Epidemiol*. 2005; **34**: 914-923.
14. Mandell GL, Bennett JE and Dolin R. Principle and practice of infectious diseases. *7th ed. Philadelphia, USA: Churchill Livingstone*; 2010; 931–945.
15. Leung CC, YuI T and Chen W. Silicosis. *Lancet*. 2012; **379**: 2008–2018.
16. Milovanovic A, Nowak D, Hering KC et al. Silicotuberculosis and silicosis as occupational

diseases: Report of two cases. *Srp Arh CelokLek*. 2011; **139**: 536–539.

17. Singh G, Pal A, Khoiyanbam RS. Impact of mining on human health in and around Jhansi, Bundelkhand region of Uttar Pradesh, India. *J Ecophysiol Occupt Health*. 2009; **9**: 47–54.
18. Mahapatra H, Goswami S, Dey D. Coalmine dust concentration and rate of tuberculosis infection around I valley coal field, Orissa. *India. J Environ Biol*. 2010; **31**: 953–956.
19. Narasimhan P, Wood J, MacIntyre CR and Mathai D. Risk Factors for Tuberculosis. *Pulm Med*. 2013; **2013**: 828939.
20. Rosen MJ, Chronic Cough Due to Tuberculosis and Other Infections. *CHEST Journal*. 2006; **129**: 197S-201S. DOI: https://doi.org/10.1378/chest.129.1_suppl.197S
21. Campbell IA and Bah-Sow O. Pulmonary tuberculosis: diagnosis and treatment. *BMJ*. 2006; **20**: 1194–1197. doi: 10.1136/bmj.332.7551.1194

An Automatic Disease Early Prediction and Diagnosis Recommendation Framework for Brain Tumours

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ABSTRACT

Use of computation techniques in medical research have progressed to a greater extend with the availability of higher order complex and accurate algorithms for detecting diseases. The medical diagnosis processes with human intervention cannot match with the demands from the consumers as the human process is slow and less accuracy as it completely depends on the skills of the individuals. One of the prominent medical diagnosis is detection of brain tumours cells. Human brain being the most important component of the body, can cause multiple other life-threatening diseases. These diseases are caused due to the presence of tumour in the brain cell. Hence, this research attempts to propose a higher accurate tumour detection algorithm. The improved accuracy is achieved due to the novel proposed dynamic intensity-based MR image enhancement algorithm and the proposed adaptive coefficient-based segmentation algorithm. Further, it is also been observed that, the presence of the tumour in the brain cortexes can lead to other diseases as well. These diseases from a large number of possibility space, can take a huge amount of time to diagnose and further propose medications. Hence a reduction of the possibility space and the reduced diagnosis process can give more time for medication to save the precious human life. Thus, yet another objective of this research is to automate the disease early prediction by recommending the diagnosis for reduced number of diseases by applying tumour centroid detection and mapping to human brain cortex functionalities. The work demonstrates a very high 97% accuracy for the detection and early prediction.

Keywords: *Tumour Detection, MR Image Enhancement, Adaptive segmentation, Tumour Region Detection, Disease Early Prediction, Diagnosis Recommendation.*

Introduction

In last few decades, reports from various medical statistics analysis organizations have demonstrated that there is a significant increase in the brain tumour effected patients from various parts of the world. The most recent study by A. S. Mohammad et al.[1] have shown that the nearly over 50,000 reports only in the year of 2017 in different states of USA. These reports and datasets have intrigued the demand for further research and early prediction of brain tumours in the human brain. D. E. Job et al.[2] have reported a processed dataset with nearly 90,000 patient information captured in the form of MR imagining for further analysis. This dataset is a major collection or the major set of BRATs datasets. Similar studies have also demonstrated that, due to the complex symptoms, the detection of the brain tumour and the cancerous growth is highly delayed. Hence, the demand for early detection of brain tumours and diseases might be caused by the tumours cannot be ignored.

The primary source of information processing to detect the brain tumours are the MR images captured during the initial diagnosis. Various research attempts have reciprocated the advantages of using MR images for such diagnosis. One of the most recent work by R. M. Chen et al.[5] have proven the similar believes by showcasing higher accuracy compared with the MR images with other mediums. Though the MR Imagining technique is criticised by some group of researchers due to the presence of noise and additional time complexity for removing and enhancing the image during the pre-processing phases, the work by C. C. Benson et al.[6] and the work by A. Jenitta et al.[7] have demonstrated two newer advantages as possibilities of fractal analysis and easy image data retrieval on MR images respectively. Thus, this research proposes a novel automated framework for Disease Early Prediction and Diagnosis Recommendation for Brain Tumours.

Literature Review

Analysing and detecting the brain anomalies highly relies on tumours and other factors causing the tumours such as injuries to the brain cortex, both external and internal, damages to the brain cell tissues due to multiple effects. The wide variety of the possibilities for tumour formation makes the task to identify the classes of the tumours. The work by P. M. Shakeel et al.[7] is the most recent analytical study to identify the connectivity of these parameters to realise the tumour detection. The capturing or extraction of these interdependent parameters is made possible with the improvements in the medical imaging techniques such as CT scan or the MRI scans. Though, the extraction of the parameters still a highly complex process until the work presented by S. Baskar et al.[8] with the improvisation of error reduction in the brain imaging data. This work is further tested and compared by L. Keinan-Boker et al.[9] with other parallel research works. The conclusion made by various researchers that the recent methods for error reduction is highly complex and cannot justify device related influences during the noise reduction and MR image enhancements. Thus, a demand for higher accurate and higher adaptive model is expected by the research community to improve the complete tumour detection process. This work addresses this issue and proposes a novel image enhancement model.

Further, for classification of the brain tumours, a wide range of the methods were introduced by various research attempts. The most recent outcome reported by K. Usman et al.[10] is to install machine learning components in the detection framework for tumour detection. The machine learning algorithms are expected to perform highly accurate detection and classifications for the tumour detection. Provided, the algorithms are feed with enough training data. The problem arises in case of tumour detection as in case of every subject or patient, the tumour formation is different and lease very less similarity-based detection possibilities, which lead to higher time complexity for each training phase and results into higher time complexity. This phenomenon was established by L. Lefkovits et al.[11]

Henceforth, with the understanding of the parallel research outcomes and the limitations, this work obtains a direction to model the new algorithms for the automated framework.

Brain Function Processing Analysis: In this section of the work, the working paradigm of the human brain is analysed for having better understanding of the tumour detection and subsequently the disease detection.

The human brain cortexes are majorly divided into six compartments to contain Prefrontal Cortex, Amygdala, Neocortex, Hippocampus, Cerebellum and Basal Ganglia.

Prefrontal Cortex: Prefrontal cortex region has been implicated in planning complex cognitive behaviour, personality expression, decision making and social behaviour. It is considered to be orchestration of thoughts and actions in accordance with internal goals.

Amygdala: It is part of the limbic system of the brain, which involved with emotions and other reactions to stimuli. It is highly involved with different emotional responses.

Neocortex: It is part of cerebral cortex. It is involved in functions like sensory perception, generation of motor commands, conscious thoughts and spatial reasoning.

Hippocampus: It is a small organ located within the brain medial temporal lobe and it is part of limbic system, the region that regulates emotion. It is associated with long-term memory.

Cerebellum: It receives information from the sensory systems, the spinal cord and other parts of the brain and regulate the motor movements such as posture, balance, coordination and speech.

Basal Ganglia: It is part of Cerebrum strongly interconnected with cerebral cortex, thalamus and brain stem other brain areas. It includes the functionality like habit learning, eye movement, procedural learning, and cognition and emotion.

Brain Disorder Diseases: In order to map the diseases based on the tumour location, it is important to understand the complications and effects from the diseases. Hence, in this section of the work, the diseases are discussed and finally mapped with the location of tumours.

Motor Memories Dysfunction: It is contextual interference effect resulting loss of short-term and long-term motor memory.

Parkinson's Disease: Nerves in a central area of the brain degenerate slowly, causing problems with

movement and coordination. Early signs are a tremor of the hands, stiffness of the limbs and trunk, slowness of movement and unstable posture.

Huntington's Disease: An Inherited nerve disorder that causes a degeneration of brain cells. Dementia, a decline in cognitive function due to malfunction of nerve cells in the brain, mood swings, depressions and irritability are its symptoms.

Alzheimer's Disease: It is most common form of dementia, causing progressive loss of memory and metal functions and changes in behaviour and personality.

Methodology and Proposed Framework

Firstly, the images captured from the MR imaging devices must be pre-processed, normalized by removing noise and blurriness and then is applied to DIBIE Algorithm to get enhanced images and apply to AICISA Algorithm for segmentation and identify the tumours regions and locations can be identified by TCDCF Algorithm and Finally mapping with Brain cortex with KVBDP Algorithm with useful for Disease Recommendation for doctors. The followings algorithms are described as Tumour Based Disease Prediction Framework as shown in [Fig. 1]

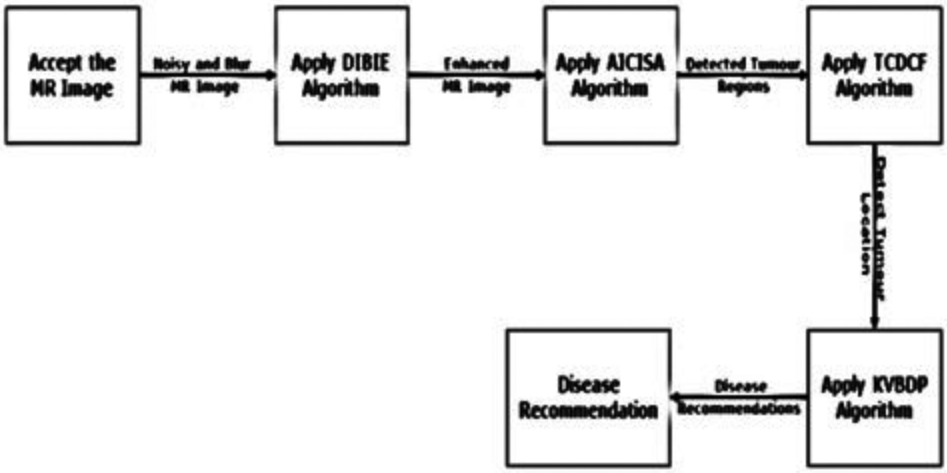


Fig. 1: Tumour Based Disease Prediction Framework

Algorithm 1: **Dynamic Intensity Based Image Enhancement Algorithm** (DIBIE)

Step - 1. Accept the MR Image
Step - 2. For each pixel in the image
- a. Calculate the gray intensity as GI[i][j]
- b. If GI[i][j] > GI[i+1][j+1]
- c. Then
  - i. MaxGI[k(i),k(j)] = GI[i][j]
  - ii. Cord[k(i),k(j)] = i,j
- d. Else
  - i. MaxGI[k(i),k(j)] = GI[i+1][j+1]
  - ii. Cord[k(i),k(j)] = i+1,j+1

Step - 3. End
Step - 4. For each Maximum Intensity Point
- a. Increase the intensity difference as
- b. MaxGI[Cord[k(i),k(j)] = {MaxGI[Cord[k(i),k(j)]] - MaxGI[Cord[k(i+1),k(j+1)]]}. log(MaxGI[Cord[k(i),k(j)]] + MaxGI[Cord[k(i+1),k(j+1)]])}
- c. If MaxGI[Cord[k(i),k(j)]]{t}> MaxGI[Cord[k(i),k(j)]] {t+1}
- d. Repeat Step - 2

Step - 5. End

The Algorithm-1 describes about the dynamic intensity based Image enhancement for remove noise in the image and blurriness and identifies the coordinates of maximum gray intensity level.

The Algorithm-2 describes about the adaptive intensity coefficient based image segmentation to tumour regions.

Algorithm 2: **Adaptive Intensity Coefficients Image Segmentation Algorithm (AICISA)**

Step - 1. Accept the enhanced MR Image
Step - 2. Calculate the mean intensity
Step - 3. Calculate the intensity variance
Step - 4. Calculate the adaptive intensity coefficient as MaxMember = {Mean,Variance}
Step - 5. For each pixel
  a. Identify the pixels for maximum likelihood
  b. Build classifier for each pixel likelihood
    i. For each class
      1. Mark the region
Step - 6. End
Step - 7. For each marked region
  a. Check for brain cell area and cell volume
    i. If region_cell_volume = brain_cell_area % 10
    ii. Then
      1. Mark the region as Tumour
Step - 8. End

The Algorithm-3 describes about the tumour centroid detection using curve fitting method.

Algorithm 3: **Tumour Centroid Detection using Curve Fitting Algorithm (TCDCF)**

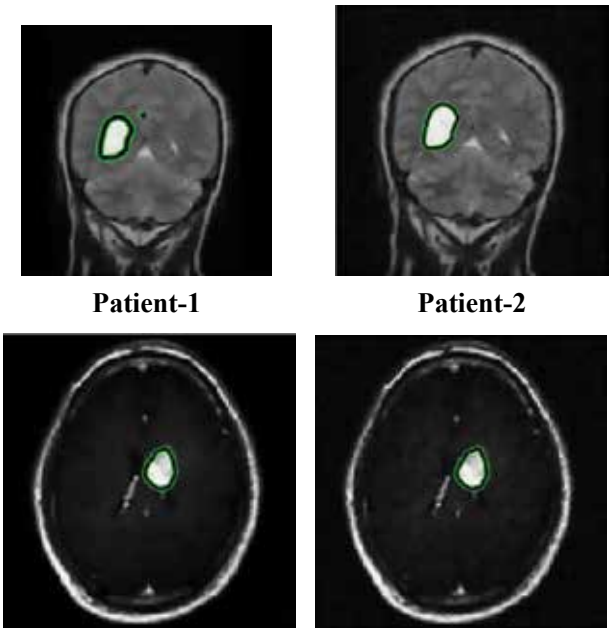
Step - 1. Accept the Tumour regions
Step - 2. For each region
  a. Apply curve fitting method to match the regular geometric shapes
  b. Calculate the centroid for each shape as C[i]
  c. Calculate the composite centroids as CC[K] from C[i]
Step - 3. End

The Algorithm-4 describes about the Key Value Map based disease prediction based on Centroid set.

Algorithm 4: **Key Value Map Based Disease Prediction Algorithm (KVBDP)**

Step1. Build the Key-Value Pair Set for Disease set,D
  a. As <<CS[i],D[j]>>
  b. Accept the Composite Centroid Set, CC[K]
Step - 1. For each CC[K]
  a. Identify the cortex from Cortex Set, CS
  b. If CC[K] belongs to CS[i]
  c. Then
    i. Mark CS[i] as tumour affected Cortex
    ii. Return D[j] for {CS[i],D[j]}
Step - 2. End

The results obtained from the proposed algorithm and the framework is furnished for Patient 1,2,3 &4 for tumour location and Centroid detection [Fig. 2].



Patient-1 **Patient-2**

Patient-3 **Patient-4**

Fig. 2: Patient – 1, 2, 3, 4 Tumour Location and Centroid Regions

Results and Discussion

The results obtained from the proposed framework and the novel algorithms are highly satisfactory and are furnished here.

Firstly, the tumour region size detection results are furnished with brain cell tumour volume and tumour volume. This work usages the BRATs 2010 dataset, which includes 500 patient data. Nevertheless, the work demonstrates the results with 50 patient data.

The proposed framework demonstrates high accuracy. The extracted results are analysed, the diameter of the detected tumour region and the tumour volume to brain cell volume ratio is analysed graphically [Fig. 3]. The table also shows the result regions detection based on the threshold of the ratio and the diameter and centroids for the tumour cells are anlysised.

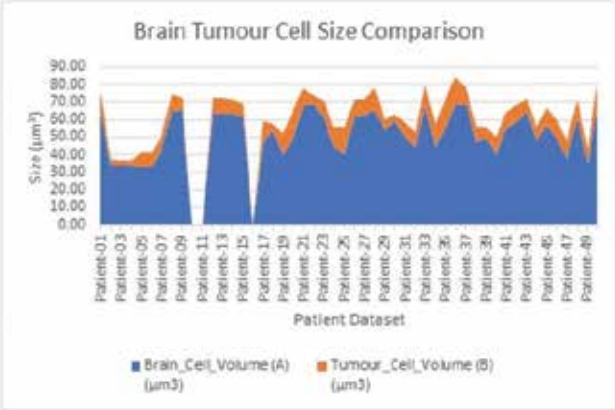


Fig. 3: Tumour Region Extraction Results

Finally, Tumour & Brain Cortex Mapping [Fig. 4] and the disease diagnosis recommendation results are furnished in [Table-1]. Finally, the 97% accuracy analysis is obtained from 100 datasets of tumour data, 97 are correctly identified and 3 incorrectly identified form the proposed framework [Table-2].

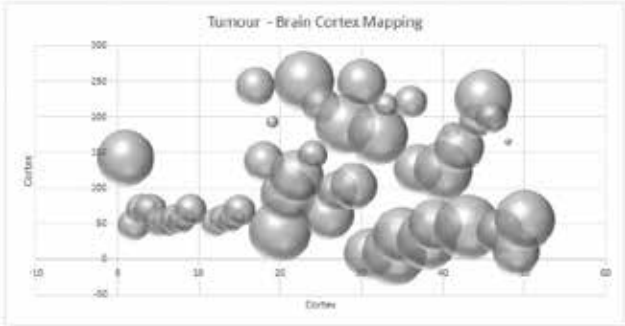


Fig. 4: Tumour & Brain Cortex Mapping

Table 1: Disease Recommendation

Test Run	Brain Cortex	Disease Early Prediction and Diagnosis Recommendation
1	Hippocampus	Episodic Memories recall Dysfunction
2	Prefrontal Cortex	Motor memories dysfunction Short-term memory loss working memory dysfunction
3	Neocortex	Sensory Disperception Irregular Motor Commands Spatial Reasoning Problem Language Interpretation Problem
4	Cerebellum	Fine Motor Control Errors Vestibulo-Ocular Reflex Error
5	Hippocampus	Episodic Memories recall Dysfunction
6	Amygdala	Emotional dysfunction post-traumatic stress disorder
7	Undetected	Undetected

Table 2: Accuracy Analysis

Number of Datasets	Tumour Data	Correctly Identified	Incorrectly Identified	Accuracy
100	100	97	3	97%

Conclusion

This work proposes a novel automated framework for detection of brain tumour with higher accuracy and early recommendation of diagnosis for reducing the possibility space of the medical treatments. Further, the detection of the tumour by accurate location is significant. Hence, this work deploys another novel curve fitting based algorithm to detect the tumour centroid and the radius to map the tumour region to the brain cortexes.

After the successful mapping of the brain tumour to the brain cortex, this work further deploys another key-value map novel algorithm for possible disease mapping. This mapping process significantly reduces the time to diagnosis and start the medication process on the subject. The proposed framework, as explained, demonstrates a higher accuracy of 97% in detection and early prediction of tumour and tumour-based diseases to make this work be considered as one of the benchmark contributions to this field of study.

Ethical Clearance: Taken from Dr. Parada Vara Prasad Dora, MBBS, MD, Cardioanesthesia, Omni RK Hospital, Vishakapatnam.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. A. S. Mohammad et al. Liposomal Irinotecan accumulates in metastatic lesions crosses the blood-tumor barrier (BTB) and prolongs survival in an experimental model of brain metastases of triple negative breast cancer: Pharm Res. 2018 Jan 9; 35(2): 31.doi:10.1007/s11095-017-2278-0.
2. D. E. Job et al. A brain imaging repository of normal structural MRI across the life course: Brain images of normal subjects (BRAINS):NeuroImage. 2017 Jan;144(B): 299-304.
3. Y. Zhang, J. Yang, S. Wang, Z. Dong, P. Phillips et al., Pathological brain detection in MRI scanning via Hu moment invariants and machine learning:J. Exp. Theor. Artif. Intell.: 2017; 29(2):299-312.
4. R.-M. Chen, S.-C. Yang, C.-M. Wang, et al. MRI brain tissue classification using unsupervised optimized extenics-based methods: Comput. Elect. Eng.,2017 Feb; 58,489-501.
5. C. C. Benson, V. L. Lajish, K. Rajamani, et al. Robust classification of MR brain images based on fractal dimension analysis: Proc. Int. Conf. Adv. Comput. Commun. Inform. (ICACCI): 2017 Sep;1135-1140.
6. A. Jenitta, R. S. Ravindran et.al. Image retrieval based on local mesh vector co-occurrence pattern for medical diagnosis from MRI brain images:J. Med. Syst. 2017 Aug 31;41(10):157.doi:10.1007/s10916-017-0799-z.
7. P. M. Shakeel, S. Baskar, V. S. Dhulipala, S. Mishra, M. M. Jaber, et al. Maintaining security and privacy in health care system using learning based deep-Q-networks:J. Med. Syst.. 2018; 42(10): 186.
8. S. Baskar, V. R. Dhulipala, et al. Biomedical rehabilitation: Data error detection and correction using two dimensional linear feedback shift register based cyclic redundancy check: J. Med. Imag. Health Informat. 2018; 8(4): 805-808.
9. L. Keinan-Boker, E. Friedman, B. G. Silverman et al. Trends in the incidence of primary brain central nervous system and intracranial tumors in Israel 1990–2015:Cancer Epidemiol. 2018 Oct; 56: 6-13.
10. K. Usman, K. Rajpoot et al. Brain tumor classification from multi-modality MRI using wavelets and machine learning: Pattern Anal. Appl.2017; 20(3): 871-881.
11. L. Lefkovits, S. Lefkovits, M. F. Vaida, S. Emerich, R. Măluţan et al. Comparison of classifiers for brain tumor segmentation: Proc. Int. Conf. Adv. Med. Health Care Through Technol. 2017;195-200.
12. M. Soltaninejad et al. Automated brain tumour detection and segmentation using superpixel-based extremely randomized trees in FLAIR MRI: Int. J. Comput. Assist. Radiol. Surg. 2017 ;12(2):183-203.
13. A. R. Abdulraqeb, W. A. Al-Haidri, L. T. Sushkova, M. M. Abounassif, P. J. Parameaswari, M. A. Muteb, et al. An automated method for segmenting brain tumors on MRI images: Biomed. Eng. 2017; 51(2): 97-101.

Does Right Hand Second Digit to Fourth Digit Ratio Correlate with Primary Infertility in Males?

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ABSTRACT

Introduction: Male infertility is one of the areas of prime interest nowadays. There are various causes for Male infertility. Identifying the correct cause and appropriate treatment can improve fertility rate. One such approach is the association of digit ratio (2D:4D) with fertility. In this regard there is paucity of literature in Indian setup. The aim of this study was to correlate the association between digit ratio and Sperm count with testosterone levels.

Materials and Method: In this Case-control study, 79 primary Infertile males with oligozoospermia and 79 age matched controls were selected and their right hand 2nd and 4th digits were measured using Vernier caliper. 2D:4D values are calculated and correlated with sperm count and testosterone levels. Statistical analysis was done to find the significance.

Results: Male Infertility peaks at the age group of 31-40 years. The 2D:4D values are increased in infertile males and it increases with decreasing sperm count and decreasing Testosterone levels and they were found to be statistically significant and shows negative correlation.

Conclusion: The 2D:4D values negatively correlates with sperm count and testosterone levels. This implies that digit ratio can serve as an indicator of testosterone level and sperm count thereby male fertility. It is a promising diagnostic or predictive marker of male infertility.

Keywords: *2d:4d, Male infertility, Hox genes, Sperm count*

Introduction

Infertility is a term applied for couple's who are unable to get pregnancy after a year of unprotected intercourse. In the past female partner was the primary focus of attention and male factors were regarded as a relatively uncommon cause of infertility. But now abnormalities in male are identified as independent cause of Infertility in about 60-80 million couples who suffer from infertility and it is recognized as an important contributory factor in 20-30% couples with reproductive failure.[1] Majority of Male infertility is due to reduced sperm count and accurate diagnosis and prompt treatment can reverse male infertility and thus can avoid costly artificial insemination procedures. The development of a person's fingers and toes begins at the age of 6th week of gestation.[2] Digit ratios are determined during embryonic development and will then remain the same without change after birth. So, any alterations in the intrauterine environment at this embryonic period

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such as intrauterine under nutrition or changes in the hormonal levels, in addition to changes in fetal organ structures, the development of fingers and toes of the fetus also will be affected. There is a family of genes called Hox genes which regulate the development of both the genital system and limb development. Hence change in the digit ratio (2D:4D) can reveal defects in Hox gene and indirectly indicate defect in genital system. Based on this concept, we aim to look into the possibility whether 2D:4D digit ratio and fertility can serve as a diagnostic and prognostic tool in male infertility among the South Indian population.

Materials and Method

This study is case control study conducted in Kasturba Medical college and hospitals, Mangalore and Govt. Wenlock hospital, Mangalore. All outpatient cases of primary infertility aged between 21-50 years, who satisfied the inclusion and exclusion criteria were recruited for the above study as subjects and equal number of controls were selected**.** Patients with sperm analysis below the reference value and with normal or increased FSH and LH were taken as Cases and age group matched Males found to have normal sperm count (fertile) during infertility work up were taken as Controls.

Patients with age > 50 yrs and age <21yrs, those with visible gross deformity of hand and fingers, testicular atrophy due to infections, injuries to urogenital system, varicocele, patients on drugs like Chlorambucil, Cyclophosphamide), Anabolic Steroids, Spirinolactone, Flutamide, Ketoconazole, Gnrh analogs, history of substance abuse, excessive alcohol consumption and smoking (those who smoke>10 cigarettes/day) were excluded.

After taking Informed consent, Information was collected from cases with reduced sperm counts and Hospital based controls, and the comparison made between their finger length ratio pattern. Right hand 2nd digit and 4th digit was directly measured with Vernier caliper on the ventral surface of the hand from the basal crease of the finger to the distal tip. When there was thick crease at the base of digit, measurement started from the most proximal crease. Data were entered in Microsoft office excel worksheet and analyzed using statistical software SPSS version 17.0. Descriptive statistics like mean, proportion and standard deviation were used for expressing the Results. For categorical values chi square test used and for quantitative data student unpaired 't' test used and p value < 0.05 was considered statistically significant. Confidence interval is 95% and Power of study is 80%.

Results

Our study subjects and controls were under the age group of 31-40years. The measurement error was ruled out by calculating repeatability values which showed nil significant values with anova calculations. Mean length of second digit was 68.583(SD- 5.758, CI- 67.294 to 69.873) in cases and 67.172(SD- 6.745, CI- 65.661 to 68.683) in controls with t value 1.414 and p value of 0.159. Mean length of fourth digit was 68.622(SD- 6.018, CI- 67.274 to 69.970) in cases and 69.603(SD- 7.405, CI- 67.944 to 71.261) in controls with t value 0.914 and p value of 0.362. The ratio of length of second and fourth digit was calculated and the mean value among cases was 1.000 with 95% Confidence Interval(CI) 0.996-1.003. The mean value among controls was 0.996 with 95% CI 0.956-0.975. It was observed that the mean value of 2D:4D was higher in infertility cases than in controls and it was statistically found to be highly significant with t test p value <0.001. (Table-1). Azoospermic men also showed higher 2D:4D value with 1.009 compared to oligozoospermic men where the 2D:4D value was 0.998. The 2D:4D value in men with normal count was still lower with 0.966. This association was found to be statistically significant with p value of 0.024. The mean value of level of testosterone was calculated as 2.915 (with a SD-1.223, 95% CI of 2.641-3.189) among cases and 7.953 (with SD -2.737, 95% CI of 7.34-8.566) among controls. This shows that the level of testosterone is significantly low among infertility cases compared to normal controls with a p value of <0.001. On correlating the 2D:4D values with level of testosterone among the whole sample, it was found that the value of 2D:4D correlated well with the level of testosterone with significant p value of 0.000 and Pearson correlation of -0.446. (Fig 1).

Table 1: Mean values of 2D:4D in right hand of infertility cases and controls

	N	Mean	SD	95% CI of Mean		t value	p value
				Lower Bound	Upper Bound		
Cases	79	1.000	.016	.996	1.003	7.418	.000
Controls	79	.966	.037	.958	.975		<0.001, HS
Total	158	.983	.033	.978	.988		

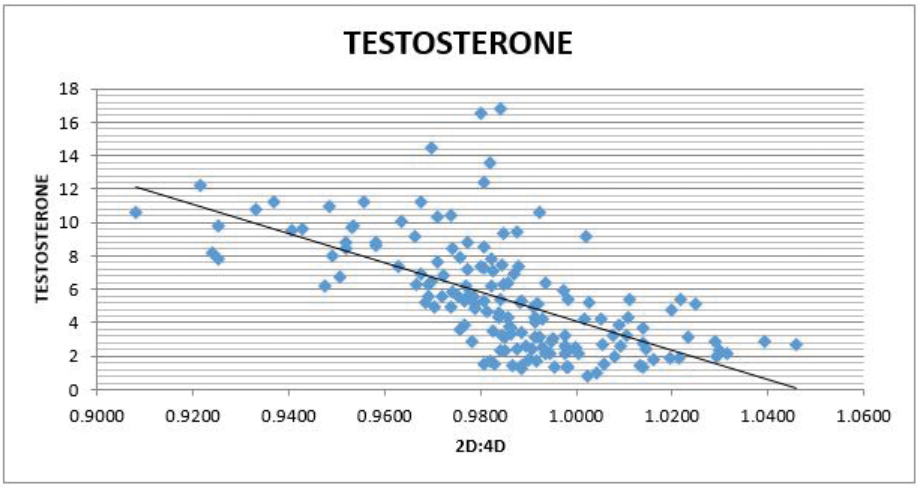


Fig 1: Correlation of 2D:4D values with testosterone levels

Discussion

World Health Organization defines "Infertility is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse[3]. 60-80 million people worldwide are suffering from infertility out of which male infertility constitutes 20-30% cases. Urogenital and limb development are controlled by Homeobox family of genes, the vertebrates Hox genes are required for the growth and patterning of digits and differentiation of genital bud. Homeobox gene sperm is transiently expressed prior to meiosis in germ cells, whereas Hoxa4 is expressed specifically in post meiotic germ cells. Hoxb4 is expressed both in somatic cells and germ cells of testis. Hox1a expressed by leydig cells[4]. The dual control of Hox gene over limbs and urogenital development and the fact that Digit ratio can indirectly indicate the status of Hox gene thereby the genital development and fertility were explained by theories proposed by Denis Duboule and Herfautte and Piechel[5,6]. Hence modulators of Homeobox gene expression and function like positive modulators in case of male infertility and negative modulators in male birth control can serve as future therapeutic goals[7]. Also the peak production of testosterone and fixation of digit ratio occurs at same period of intrauterine life and prenatal testosterone has some influence in fixing digit ratio.[8,9,10] So any insult during this period like hormonal changes, undernutrition influence digit ratio in addition to affecting internal organs and digit ratio can also indicate intrauterine environmental changes. Manning et al compared digit ratio of second and fourth digit in right hand with fertility and found out that low 2D:4D ratio was associated with higher testosterone level and high sperm count. They also proposed that right hand is more sensitive which is explained by the laterality in the association of dermatoglyphic asymmetry and testosterone.[11,12] Wood et al found that lower 2D:4D ratio is correlated significantly with high sperm count and higher levels of testosterone.[13] Lu hong et al[14] done a study on 2d:4d, 2d:3d, 3d:5d, 4d:5d, 2d:5d ratios with relation with infertility and found that 2d:4d ratio compared to other ratios has more relationship with hormonal patterns.(Table 2). By supporting these studies, our study results showed that 2D:4D values are significantly high in infertile men compared to normal males, 2D:4D v alue decreases with increasing sperm count with statistically significant p value, Testosterone levels are significantly low in infertile men compared to normal males, Testosterone level increases with increasing sperm count with significant p value. 2D:4D value negatively correlates with testosterone level with p value <0.001and with Pearson correlation -0.446.

Table 2: Comparison of 2D:4D values in various studies

2D:4D	H.Lu et al[49]	Manning et al[57]	Current study
Infertile cases	0.949	1.00	1.00
Normal controls	0.9478	0.97	0.966

Conclusion

Male infertility is a growing problem, identifying the correct cause and appropriate treatment can improve fertility rate. One such approach is the association of digit ratio (2D:4D) with fertility. This study showed an inverse association between digit ratio, testosterone level and sperm count. The study showed that digit ratio can serve as an indicator of testosterone level and sperm count thereby correlate with primary male fertility. We conclude that digit ratio (2D:4D) can be used as a diagnostic or predictive marker of primary male infertility and that Hox gene modulators can serve as useful future therapeutic modulators, which can avoid costly artificial insemination procedures.

Ethical Clearance: Taken from the institutional ethics Committee, Kasturba Medical College, Mangalore.

Source of Funding: Self.

Conflict of Interest: Nil

REFERENCES

1. World Health Organization. Infecundity, infertility, and childlessness in developing countries. DHS Comparative Reports No 9. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004.
2. Manning JT. Resolving the role of prenatal sex steroids in the development of digit ratio. PNAS 2011; 108(39):16143–4.
3. World Health Organization. Reproductive health indicators for global monitoring: Report of the second interagency meeting, 2001. Geneva: World Health Organization; 2001. p. 23.
4. Simon Wood, Ellen Vang, John Manning, Julie Walton, Steven Troup, Charles Kingsland, And Iwan David Lewis-Jones. The Ratio of Second to Fourth Digit Length in Azoospermic Males Undergoing Surgical Sperm Retrieval: Predictive Value for Sperm Retrieval and on Subsequent Fertilization and Pregnancy Rates in IVF/ICSI Cycles; Journal of Andrology, Vol. 24, No. 6, 2003.
5. N.Lonfat, T.Montowon, D.Duboule. Convergent evolution of complex regulatory landscapes and pleiotrophy at Hox loci. Science, 2014;346(6212):1004 DOI :10.1126/science.1257493
6. Herault Y, Fradeau N, Zakany JU. A regulatory mutation inducing both loss-of function of posterior Hoxd genes. Development 1997;124(18):3493–500.
7. Mortlock, D.P. and Innis,1997, Mutation of Hoxa13 in Hand Foot Genital syndrome, Nat. Genet.15:179.
8. Malas MA, Dogan S, Hilal Evcil E, Desdicioglu K. Fetal development of the hand, digits and digit ratio (2D:4D). Early Hum Dev 2006; 82:469–75.
9. BerenbaumSA, Bryk KK, NowakN, Quigley CA, Moffat S. Fingers as a marker of prenatal androgen exposure. Endocrinology 2009; 150:5119–24.
10. Hurd PL, Vaillancourt KL, Dinsdale NL. Aggression, digit ratio and variation in androgen receptor and monoamine oxidase genes in men. Behav Genet 2011; 41:543–56.
11. Manning JT, Scutt D, Lewis-Jones DI. Developmental stability, ejaculate size and sperm quality in men. Evol Hum Behav 1998; 19:273–82.
12. Manning JT, Vang ES, Walton J, Bundred PE, Van Heyningen C, Lewis-Jones DL. Second to fourth digit ratio (2D:4D) and testosterone in men. Asian J Androl 2004; 6:211–6.
13. Wood S, Vang E, Manning J, Walton J, Troup S, Kingsland C, et al. The ratio of second to fourth digit length in azoospermic males undergoing surgical sperm retrieval: predictive value for sperm retrieval and on subsequent fertilization and pregnancy rates in IVF/ICSI cycles. J Androl 2003;24(6):871–7.
14. Lu Hong, Huo Zheng-hao, Liu Yong-jie, Shi Zhi-yun, Zhao Jun-li, Correlations between digit ratio and infertility in Chinese men., Early Human Development 88 (2012) 865–869.

Prevalence and Characterization of Opportunistic Candidal Infection among Patients with Type II Diabetes Mellitus

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ABSTRACT

Background and Purpose: Diabetic patients are more susceptible to oral candidiasis infection due to poor glycemic control and therapeutic dentures and Xerostomia, which reduces the salivary flow and a salivary pH disorder. In the current study, we aimedfor Prevalence and characterization of opportunistic Candidal infection among patients with Type II diabetes mellitus.

Materials and Method: Oral washwere taken from the mouth of 400 participants and were cultured on Sabourauddextrose agar (SDA) medium. The study was performed during January to December 2016 in diabetic patients (n=400) admitted in medicine ward. The *Candida* spp. were differentiated by culture on CHROMagar,Sugar assimilation test, Sugar fermentation test and antifungal susceptibility test.

Results: The frequency of *Candida* spp. was higher in diabetic patients. Oral candidiasis more significant in females 129(52%),alcoholic 98(85%), smoker 89(77%)and Denture174(71%).*C. albicans*was the most prevalent species in diabetics 135(55%)followed by*C.tropicalis*43(17.6%), *C.*dubliniensis27(11%) *parapsilosis*15(6.1%), *C. glabrata*15(6.1%)and *C.krusei*9(3.6%).All *C. albicans*were susceptible to fluconazole. Non-*albicans Candida* isolates were shown to have higher azoleamphotericin B, ketoconazole, itraconazolethan *C. albicans*isolates.

Conclusion: Our study clearly showed that diabetes patients are more likely to develop the Candida infection.The scores were slightly higher among the females as compared to males. Furthermore, smoking and denture were are at high risk of being infected.*C. albicans*was the most prominent species followed by C.tropicalis. The knowledge of prevalence species distribution, rapid species identification, antifungal susceptibility testing and the development of newer antifungal drugs are mandatory to achieve a decrease in *Candida* infections

Keywords: *Diabetes mellitus; Oral candidiasis; Fluconazole; Xerostomia*

Introduction

Diabetes mellitus (DM) is a clinical syndrome, which associated with deficiency of insulin secretion or action. It is considered as one of the largest emerging threats to health care in the 21st century. It is estimated that there will be 380 million persons with DM in 2025.[1] DM reduced the T cells, neutrophil function and disorders of humoral immunity. Consequently, DM increases the susceptibility to opportunistic fungal infection such as predisposition to the manifestations of oral diseases like Candidiasis, which is associated with poor glycemic control and therapeutic dentures.[2] Oral candidiasis is one of the superficial fungal opportunistic infection and it mainly caused by *Candida albicans.*

Candida is a genus of opportunistic yeasts, unicellular fungi that can cause oral, vaginal, lung and sometimes systemic infections. Typical colonization

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sites in the oral cavity include the mucosal surfaces of the cheek and palate, which are sparsely populated although certain specialized surfaces such as the keratinized stratified squamous epithelium of the palate. It can influence the microbial distribution of the oral cavity as well as the surface of the tongue which consists of saliva-coated desquamated epithelium for microbial adhesion[3]and higher microbial density. The average concentration of oral yeasts in saliva has been reported to be about 300–500 cells/ml. Usually Candida species are present in the oral cavity of almost half of the population without causing disease. Asymptomatic carriage may cause a higher risk of Candida associated complications through yeast infections if they become Immunodeficiency and immunosuppressed.[4]Oral colonization of Candida is more prevalent in people with diabetes mellitusand many studies have shown a higher prevalence of Candida colonization in the oral cavity of diabetics compared with non-diabetic individuals.

The manifestation of oral Candidiasis can occur in median rhomboid glossitis, atrophic glossitis, denture stomatitis, and angular chelitis. Oral candidiasis is associated with a high density of yeasts in the lesions which have been reported in 9% to 65% of the population.[5] In addition to *C. albicans*, Non albicansspp has been commonly isolated from diabetic patients are *Candida glabrata*, *Candida tropicalis*, *Candida dubliniensis*, *Candida krusei*, *Candida parapsilosis*. Therefore, theaim of the present study isto differentiate the Candida species from type 2 DM patientsand todetermine the carbohydrate fermentation and assimilation tests, todeterminethe resistance to azole group.

Material and Method

This study was conducted in the Microbiology Department atSri Lakshmi Narayana Institute of Medical Sciences, Pondicherry. The study was approved by the institutional ethical committee of Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry according Helsiniki 1975 Human ethical guidelines. All the data were collected in a prescribed perform and obtained informed consent form from subjects. All the oral wash samples received in the laboratory from January to December 2016, smear positive for yeast were inoculated on Sabouraud's Dextrose Agar (SDA). Colonies were identified as gram positive budding yeast cells in Gram stain.

Identification of Candida Species: CHROM Agar was prepared as per the manufacturer's instructions. These plates were incubated at 30°C for 24-48 hours. Species were identified on CHROM Agar by the morphology and colour of the colony. The appearances of various Candida species on CHROM Agar were light green- Candida albicans, cream to white- Candida glabrata, purple fuzzy- Candida krusei and blue to purple - Candida tropicalis. Germ tube test, pick a small portion of an isolated colony was suspended in a test tube containing 0.5 ml of human serum then incubated at 37ºC for 2 hours then examined microscopically after 2 hours for the presence of germ tube.

Chlymadosporeformation on corn meal agar (Dalmau plate): Prepare Cornmeal agar in a 90mm plate. Divide the plate into 4 quadrants and label each quadrant. Using a sterile needle, lightly touch the yeast colony and then make 2-3 streaks of approximately 3.5 - 4cm long and 1.2 cm apart. Place a flame sterilized and cooled 22mm square cover glass over the control part of the streak. This will provide partially anaerobic environment at the margins of the cover slip. Incubate the plates at 25C for 3-5 days. Remove the lid of the petriplate and place the plate in the microscope stage and focus the edge of the cover glass under the high-power objective (40X). Observe morphological features of candida species.

Sugar Fermentation: Prepare liquid fermentation medium containing peptone (1%), sodium chloride (0.5%), Andrade's indicator (0.005%). Sterilize by autoclaving at 120ºC for 15 min at 15 pounds pressure. Add filter-sterilized sugar at the concentration of 2% to the medium. Pour into the sterile test tubes and place sterile Durham's tube into each tube. Plug the tubes with colour coded cotton plugs.

Inoculum preparation is done by suspending heavy inoculum of yeast grown on sugar free medium. Inoculate each carbohydrate broth with approximately 0.1 ml of inoculum. Incubate the tubes at 25ºC up to 1 week. Examine the tubes every 48-72hrs interval for the production of acid and gas in Durham's. Production of gas in the tube is taken as fermentation positive while only acid production may simply indicate that carbohydrate is assimilated.

Assimilation Test: Suspend a heavy inoculum of a 24-48 hrs old yeast culture that has been subculture thrice on sugar –free medium in 2ml of Yeast Nitrogen Base. Add

this suspension to the 18ml of molten agar (cooled to 45 °C) and mix well. Pour the entire volume into a 90mm petri plate. Allow agar to solidify at room temperature. Place the carbohydrate-impregnated discs onto the agar surface.Incubate the plates at 37 °C for 3-4 days. The presence of growth around the disc is considered as positive for that particular carbohydrate.

Antifungal Susceptibility Test: The antifungal susceptibility testing of yeast isolates was carried out using the disk diffusion method as per M44-A CLSI guidelines (CLSI document M44-Aet al, 2004.). Mueller Hinton agar supplemented with 2% glucose and 0.5µg/ml methylene blue was used for sensitivity testing. The isolated Candida species were cultured on SDA at 35°C for 24 hours. Inoculums was prepared by picking five distinct colonies with approximately 5mm diameter. Then the colonies were suspended in 5ml of sterile physiological saline and resulting suspension was vortexed thoroughly. The turbidity of the inoculum suspension was adjusted to 0.5 McFarland standard followed by inoculation of plates containing MHA supplemented with 2% glucose and 0.5µg/ml methylene blue with a sterile cotton swab moistened with inoculum suspension.

The plates were allowed to dry for 3-5 minutes and then antimicrobial discs were dispensed onto the surface of inoculated agar plate. The discs tested were Fluconazole (10mcg), Amphotericin B (50mcg),voriconazole (1µg) and Itraconazole (10mcg) with their zone diameters measured as per the instruction manual of manufacturer. All the media and discs were procured from Hi Media Labs, Mumbai.[6]

Results

Table 1: Total Type II Diabetes mellitus and Gender distribution of oral candidiasis in Type II DM

Total sample	Positive	Female	Male
400	244 (61%)	129 (52%)	115 (47%)

Out of total, Candida species were isolated in **244(61%)** patients. It was more significant in females129(52%) than the males115(47%) in Type II diabetes mellitus

Table 2: Oral Candidiasis isolated in Alcoholic and non alcoholic of Type II DM

Male	Alcoholic	Nonalcoholic	smokers	Non smokers
115	98(85%)	1 7[15%]	89(77%)	26(23%)

Oral Candidiasis were higher in Alcoholic 98(85%) than the non alcoholic17[15%] among male Type II DM and also Oral Candidiasis more significant in smoker 89(77%) in type II DM

Table 3: Denture and Non-denture in Type II DM

Total sample	Denture	Non-denture
244()	174(71%)	70(29%)

Oral Candidiasis were higher in Denture among Type II DM

Table 4: Candida species distribution in male and female patients

Spp	Total n = 244	Female n:129	Male n = 115
C.albicans	135(55%)	69(53.4%)	66(57.3%)
C.tropicalis	43(17.6%)	26(20%)	17(14.7%)
C.dubilinesis	27(11%)	13(10%)	14(12.1%)
C.krusei	9(3.6%)	4(3.1%)	5(4.3%)
C.glabrata	15(6.1%)	9(6.9%)	6(5.2%)
C.paralopsis	15(6.1%)	8(6.2%)	7(6%)

Out of 244 samples, 135(55%)C.albicanswas isolated. In females C.albicans more significant followed by non–albicans were C.tropicalis,bC.dubilinesi and C.glabrata.

Table 5: Candida species distribution in alcoholic, nonalcoholic patients, smoker and non smoker patients

spp	Total (n = 115)	Alcoholic (n = 98)	Nonalcoholic (n = 17)	smokers (n = 89)	Non smokers (n = 26)
C.albicans	66(57.3%)	57(58.1%)	9(52.9%)	57(64.0%)	9(34.6%)
C.tropicalis	17(14.7%)	13(13.2%)	4(23.5%)	12(13.4%)	5(19.2%)
C.dubilinesis	14(12%)	11(11.2%)	3(17.6%)	10(19.1%)	4(15.3%)
C.krusei	5(4.3%)	4(4.0%)	1(5.8%)	2(2.2%)	3(11.5%)
C.glabrata	6(5.2%)	6(6. 1%)	0	4(4.4%)	2(7.6%)
C.paralopsis	7(6%)	7(7.1%)	0	4(4.4%)	3(11.5%)

Out of 115, 98 Candida species were isolated in alcoholic Type II DM Patients.C.albicans was higher in both alcoholic and non alcoholic but varied in non albicans. C.glabrata and C.paralopsis not isolated in non alcoholic patients. Out of sixty six C.albicans, 57were isolated in smoker and 9 were isolated in non smoker. Non albicans, C.tropicalis was more significant followed by C.dubilinesi and C.glabrata

Table 6: shows the antibiotic susceptibility of Candida species

Anti fungal drug	C.albicans (n = 135)		C. dubilinces (n = 27)		C. tropicalis (n = 43)		C. krusei (n = 9)		C. galabrata (n = 15)		C. pralopsis (n = 15)	
	S	R	S	R	S	R	S	R	S	R	S	R
Fluconazole (10mcg)	112	23	21	6	32	11	7	2	10	5	12	3
Amphotericin B(50mcg)	42	80	13	12	14	28	1	5	6	9	2	12
voriconazole (1mcg)	59	67	16	9	20	17	5	3	7	6	9	4
Itraconazole (10mcg)	32	70	8	10	7	27	4	4	4	9	2	11

Out of the135 isolates of C. albicans,23 were resistant to fluconazole, 80 wereresistant to amphotericine B,67 were resistant to voriconazole and70 were resistance toItraconazole. Of the 109 isolates of NCA, 66were more resistant to amphotericine B and 61were resistant to Itraconazole.

Discussion

Oral Candidiasis is one of the most common opportunistic mycotic infection which can occur broad-spectrum antibiotics, antihistamines, radiotherapy, diabetes, drug abuse, malnutrition, immune deficiencies and old age.[7] Diabetes mellitus is a major predisposing factor to oral and symptomatic candidiasis.[8]

In present study, prevalence of *Candida* carriers in diabetes was **61%** which is similar to that found in AkpanA and Talabani AN et al reported [9, 10,] that due to most of the microorganisms in the saliva are derived from other parts of the oral cavity. The microvascular changes and possibly increased glucose concentration in the saliva and gingival which might contribute in declining pH of saliva resulting in acidogenic microorganism substrate and plaque formation [Table-1].

Oral Candidiasis was more significant in females 129(52%) in the present investigation. which result similar to the Khosravi AR, et al.study.[11]It has been found that elderly women presented more oral lesions,hormonal factor, iron deficiency in women could be responsible for that disparity and this difference can be women seek dental treatment at a higher rate than men.[12]

In present study,Candida is higher in Alcoholic(85%) than nonalcoholic, this result agrees with L.D. Wilson et al,[13] that Candida itself produces small quantity of alcohol as part of its metabolic. One Fifteen patients enrolled in the study were males,of whom 89were *Candida* carriers in smokers. Therefore, it can be inferred that smoking was a relative risk factor for presence of *Candida* in the oral cavity.[14] [Table-2]

Javed et al. described more significant of oral *Candida* carriage associated with denture 74% with type 2 diabetes. This results correlated in present study71%. Dentures act as an additional reservoir for these organisms through the biofilm formation of *Candida* in the oral cavity.[15][Table-3].

Although, among the *Candida* species, *C. albicans* has the highest frequency in the oral cavity, in the last two decades, the incidence of oral candidiasis with other species such as *C tropicalis*

In present study C.albicans more significant in females followed by non –albicans were C.tropicalis,C. dubilinesi and C.glabrata. According to Pfaller et al,[16] evaluated the use of CHROMagar as a differential culture medium that allows the isolation of yeasts and simultaneously identifies colonies of *C. albicans, C tropicalis*and *C krusei.* They found that more than 95% of the values and clinical isolates of *Candida* species were correctly identified based on colony morphology and CHROMagar pigmentation.Among the *Candida* species, *C. albicans*has the highest frequency in the oral cavity, in the last two decades[Table-4].

In this investigation, the most common association was *C. albicans*and *C. tropicalis*, which was detected in smoker and alcoholic of type II diabetes. In this study, 41 isolates were seen as darkgreen colonies and identified as *C. dubliniensis*. Willingeret al.[17] also reported that some of *C. dubliniensis*isolates yielded a dark green colour[Table-5].

In present study C.albicans more resistant to azoles[Table-6]. These results correlated with Martinez M et al study.[18] because the length of time such antifungal agents were used and Perturbations in the oral microenvironment to help the growth of new *Candida* species which might be one of the terrible consequences of current medical practice in India.

Conclusion

The present study clearly showed that diabetes patients are more likely to develop the candida infection. The scores were slightly higher among the females as compared to males.Furthermore, smoking and denture were at high risk of being infected.*C. albicans*was the most prominent species followed by C.tropicalis.The knowledge of prevalence species distribution, rapid species identification, antifungal susceptibility testing and the development of new antifungal drugs are mandatory to achieve a decrease in *Candida* infections.

Conflict of Interest: Nil

Source of Funding: Self

REFERENCES

1. Muller LM, Gorter KJ, Hak E, Goudzwaard WL, Schellevis FG, Hoepelman AI. Increased risk of common infections in patients with type 1 and type 2 diabetes mellitus. Clinical Infect Dis. 2005;41(3): 281–8.
2. Soell M, Hassan M, Miliauskaite A, Haikel Y, Selimovic D. The oral cavity of elderly patients in diabetes. Diabetes Metab. 2007; 33(1): S10–S18.
3. Takahashi N.Microbial ecosystem in the oral cavity: metabolic diversity in anecological niche and its relationship with oral diseases. Int Congr Ser. 2005; 2005(1284):103–112.
4. Southerland JH, Taylor GW, Offenbacher S. Diabetes and Periodontal Infection: Making the Connection. Clinical Diabetes. 2005; 23(4):171–178.
5. Daniluk T, Tokajuk G, Stokowska W, Fiedoruk K, Sciepuk M, Zaremba ML. Occurrence rate of oral Candida albicans in denture wearer patients. Adv Med Sci. 2006; 51(1): 77–80.
6. Clinical and Laboratory Standards Institute. Method for antifungal disk diffusion susceptibility testing of yeasts; approved guideline. M44-A2 Clinical and Laboratory Standards Institute, Wayne, PA; 2004.
7. Nikam M & More M., et al. Study of prevalence of candida infections of oral cavity in diabetes patientsandcomparison with the non-diabetics Scholars Journal of Applied Medical Sciences. 2016; 4(7F): 2714-2717.
8. Khaled H Abu-Elteen, PhD, Mawieh A Hamad, PhD,Suleiman A. Salah, PhD. Prevalence of Oral Candida Infections in Diabetic Patients. Bahrain Medical Bulletin. 2006; 28(1): 1-8.
9. Akpan A, Morgan R. Oral candidiasis: a review. Postgrad Med J. 2012,78, 455-9.

10. Talabani AN, Kim CL, Kiat AOH, Ismail AR, Chinna K; The prevalence of Candida spp. in the saliva of controlled and uncontrolled diabetes mellitus type II patients. J Bagh College Dentistry. 2013; 25:171-6.

11. Khosravi AR, Yarahmadi S, Baiat M, Shokri H, Pourkabireh M. Factors affecting the prevalence of yeasts in the oral cavity of patients with diabeter mellitus. J Mycol Med 2008; 18: 83-8.

12. Paula VolpatoSanitá, Ana CláudiaPavarina,et al, *Candida* spp. prevalence in well controlled type 2 diabetic patients with denture stomatitis Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2011; 111:726-733.

13. L.D.Wilson. Alcoholism; may 2016. Available from https://www.drlwilson.com/Articles/alcoholism.htm.

14. Ramon Felipe Fernandez Martinez, Alejandra Jaimes-Aveldañez, Francisco Hernández-Pérez and Roberto Arenas. Oral Candida sppcarriers: its prevalence in patients with type 2 Diabetes Mellitus. An Bras Dermatol. 2013; 88:222-5.

15. Javed F, Klingspor L, Sundin U, Altamash M, Klinge B, Engström PE. Periodontal conditions, oral *Candida albicans*and salivary proteins in type 2 diabetic subjects with emphasis on gender. BMC Oral Health. 2009; 9:12.

16. Pfaller MA, Houston A, Coffmann S Application of CHROMagar Candida for rapid screening of clinical specimens for Candida albicans, Candida tropicalis, Candida krusei, and Candida (Torulopsis) glabrata. J. Clin. Microbiol. 1996; 34:58-61.

17. Willinger B, HillowothC, Selitsch B, Manafi M. Performance of Candida ID, a new chromogenic medium for presumptive identification of Candida species, in comparison to CHROMagar Candida. J. Clin. Microbiol. 2001; 39: 3793-3795.

18. Martinez M, Lopez-Ribot JL, Kirkpatrick WR. Heterogeneous mechanisms of azoleresistance in Candida albicansclinical isolates from an HIV-infected patient on continuousfluconazole therapy for oropharyngeal candidiasis. J Antimicrob Chemother. 2002,49(3): 515-24.

Child Life Program Through Drawing Play Activity as Efforts to Minimize Stress Hospitalization in Children with Leukemia

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ABSTRACT

Background: Leukemia occupies 40% of all malignancies in children. A child who is diagnosed with leukemia will undergo some procedure measures a long and painful. Nurses in nursing care in children with various disorders of the body system of planned activities to minimize the stress of hospitalization that occurs in children. Child Life Program is one of the interventions in nursing care in children to minimize the impact stress of hospitalization and optimize growth and development in children. The purpose of this study was to describe the effect of Child Life Program through drawing play activities to decrease the stress of hospitalization in children suffering from Leukemia.

Method: This study was a quasi-experiment. The study population was children who suffering from leukemia are treated in the pediatric ward Soetomo Hospital.

Result: The result showed there is influence child life program through drawing play activity using "My Activities Book" on the response to the stress of hospitalization of children before and after the intervention with a p-value = 0.001.

Conclusion: Child life program through drawing play activity using "My Activities Book" can affect the stress response of hospitalization in children with leukemia. Child life program through drawing play activity using "My Activities Book" can be an alternative therapy that can be used to minimize the stress of hospitalization in children with leukemia.

Keywords: *Stress, Hospitalization, Child Life Program, Leukemia*

Introduction

[1]Leukemia occupies 40% of all malignancies in children. [1]A child who is diagnosed with leukemia will undergo some procedure measures a long and painful. During the process of hospitalization due to Leukemia, children and parents can experience handling a variety of events or actions that according to various studies demonstrated the experience very traumatic and stressful.[2] Psychological problems experienced by the child is in shock, stress, fear, anger, and depression. Nurses in nursing care in children with various disorders of the body system of planned activities to minimize the stress of hospitalization that occurs in children. Pediatric nurse focuses on the psychosocial development of children,

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and promote effective coping strategies for children and their families who are experiencing stress. Child Life Program is one of the interventions in nursing care in children to minimize the impact stress of hospitalization and optimize growth and development children. In the Child Life Program showed individuality in patients, and use a variety of developmentally appropriate activities, including Implementation of play activities, especially drawing on Pediatric ward Soetomo hospital still has not become routine. Drawing activity is expected to reduce the stress of hospitalization of children but until now the effect of drawing activities to decrease the stress of hospitalization in school-age children still unclear.

Based on the observations of researchers during the month of January 2013 in pediatric ward Soetomo hospital obtained the data that 70% of 10 patients aged 1-12 years who were treated at Soetomo Hospital during the month, indicating negative behavior and most of the children showed maladaptive behavior, namely: 100% of children are bored, lonely 75%, 62.5% to be withdrawn 25% whine and complain wants to go home, 25% is angry. From the above data, it was concluded that each preschool and school-age children who were treated in pediatric ward Soetomo hospital experience stress of hospitalization.

Stress hospitalization is very dangerous for the survival of the child if not addressed can lead to impaired growth and development for children. Due to sick and hospitalized, the child will lose the freedom of view egocentric in developing autonomy. This will lead to regression and will eventually withdraw from interpersonal relationships.[3] Increased cortisol in times of stress can inhibit antibody formation and reduce the formation of white blood cells.[4]Decrease in antibody will reduce the body's immunity. As a result, the healing process becomes obstructed, a longer treatment time, and increase the risk of complications during treatment.

There are various efforts in the Pediatric ward Soetomo hospital to reduce the stress of hospitalization, one of them by implementing rooming-in. Activity has also been given to play, but its implementation is still not routine. The flurry of nurses and the lack of equipment is a reason for non-performance play activities. Drawing is one type of play activities that do not require special attention from health workers.

Grown-up children can be asked to draw on their likes and dislikes of hospitalization. Then children were asked to tell the picture and clarification child's sense of the picture Companion more passive, listening, and paper facilities and equipment. Let children draw and repeat this activity for days, until the child unknowingly issuing its cargo amygdala, which express sadness, depression, stress, creating images that make them come back happy, and stir good times ever experienced with their loved ones. Based on the above phenomenon researchers interested in developing the Child Life program through play activities in childhood leukemia as efforts to reduce the stress of hospitalization that occurs in children is leukemia.

Material and Method

The design of the study is quasi-experimental which consists of treatment group and control group. The study population was children who were diagnosed with leukemia are treated in the pediatric ward Soetomo hospital. Criteria for inclusion of children include 1) school-age children diagnosed with Leukemia, 2) get hospitalization over 2 x in the pediatric ward Soetomo hospital and 3) not in a critical condition. The independent variable in this study is child life program through drawing play ("My Activities Book"). The dependent variable is a response to the stress of hospitalization in children diagnosed with Leukemia. The primary data was collected by observing and recording the stress response of hospitalization of children before and after implementing drawing activities. The instruments used in data collection in the form of a checklist observation sheet models and structured interviews. Observation sheet that is used contains 10 points positive response (adaptive) school-age children to the stress of hospitalization modification of the Wong (2009). The questions in the interview had been prepared in advance by researchers. The interview results will help researchers invalidating the results of observations that have been made. The tools used for activities drawing is drawing paper, pencils, and crayons. The process of taking and collecting data in this study carried out after obtaining permission from the Soetomo Hospital to conduct research. As a first step the study, researchers will select respondents based on the predetermined inclusion criteria. After getting approval from the children and parents, carried out preliminary observations in both groups (intervention and control groups) to identify the stress response hospitalization experienced by children (Pre-test). If the pre-test found the child with an adaptive stress response (≥ 50%),

children continue to be included in the study. Later in the treatment group was given intervention in the form of activities drawing made in the "My Activities Book". Themes my activity drawing in the book include the theme of knowledge about animals and plants. At the first meeting of researchers and teams carry out interventions to deliver a game program which is given to children by involving parents. After the first meeting of the researchers provide "activity books" to each respondent to continue doing coloring on "My Activities Book". Independent activity, accompanied by parents was conducted along 2 weeks. At the end of the second-week researchers conducted observations about stress response experienced by the child's hospitalization.

Result and Discussion

Results of the characteristics of respondents by sex show the number of male respondents as many as 6 people (43%) and women of 8 people (57%). Characteristics of respondents by age indicates the number of respondents by age 3 years as many as 6 people (43%), 4 years as many as 8 people (57%). Table 1 shows the characteristics of respondents based on the stress response of hospitalization shows the results of the pre-test assessment maladaptive stress of hospitalization with the interpretation of 8 people (57,14%) and adaptive as many as 6 people (42.8%). While the post-test results of the stress response hospitalization assessment obtained as many as 12 people (85.71%) adaptive response and as many as 2 respondents with interpretation maladaptive (14.28%).

Tabel 1: Hospitalization stress response preschoolers at Hematology Bona II ward

Respondent	Pre Test		Post Test	
	score	Response	score	Response
1.	36.3	Adaptive	9.09	Adaptive
2.	36.3	Adaptive	9.09	Adaptive
3.	81.81	Maladaptive	81.81	Maladaptive
4.	18.18	Adaptive	63.63	Adaptive
5.	81.81	Maladaptive	27.27	Adaptive
6.	90.9	Maladaptive	63.6	Adaptive
7.	27.27	Adaptive	36.36	Adaptive
8.	45.4	Adaptive	9.09	Adaptive
9.	100	Maladaptive	100	Maladaptive
10.	36.3	Adaptive	18.18	Adaptive
11.	72.7	Maladaptive	27.3	Adaptive
12.	72.7	Maladaptive	9.09	Adaptive
13.	81.8	Maladaptive	9.09	Adaptive
14.	81.8	Maladaptive	45.4	Adaptive
Wilcoxon Signed Rank Test p = 0.001				

After the analysis, part of this discussion will be reviewed on the Child Life program through drawing play activities against hospitalization stress response toddler and preschool-aged children with cancer in pediatric ward Soetomo Hospital. Based on statistical tests, there is the effect of play therapy using "My Activities Book" on the response to the child's hospitalization. Statistical tests are showing that there was a significant effect of play therapy using "My Activities Book" on the stress response of children.

Before the play therapy using "My Activities Book" do the pre-test to measure the child's response to the stress of hospitalization. Based on pre-test results showed at most have a maladaptive response category as many as 8 people (57.14%). After the play therapy using "My Activities Book" do post-test to measure the child's response to the stress of hospitalization. Based posttest results in Table 1, the result of 12 respondents (85.71%) had an adaptive response category.

Based on statistical results indicate the value of $p = 0.001$, which means $p < 0.05$, then there is the influence of the child life program with play therapy using "My Activities Book" to the child's response to the stress of hospitalization before and after the intervention.

The above in accordance with the expression Alice D. Domar, about the benefits of the diary as a step to express emotions and feelings as well as helping to take care of our minds. According to Piaget (1962) in Tedjasaputra (2001), preschool children are already using objects as symbols. This symbol is getting to be closer to the fact that the exercise of thinking and directing the child to adjust to the environment (Sari, 2013).

The impact on children aged toddler due to hospitalization include separation anxiety, loss of freedom in the development stage, as well as feeling hurt because of injury due to invasive, often arise due to the child's hospitalization.[5] In the two respondents who have a maladaptive response in pre-test increased to adaptively during post-test. Improved balanced and adaptive response in children because children are given daily intervention play therapy by researchers. In therapeutic play therapy nurse to establish communication with the child, in addition to the nurse also meet the needs of children who play more or less disrupted by the impact of the activity book. The user can increase a child's response to the stress of hospitalization in some aspects, aspects of the evaluation sheet wong unchanged from become maladaptive response adaptive response and retain the adaptive response of children to remain to respond adaptively to the stress of hospitalization.

Another aspect examined in this study is the cognitive, affective, psychomotor and language. Daily observation sheets show attendees on the cognitive aspects, there are several respondents who have a low score, it indicates that the respondents were not able to mention the expression as given intervention, this happens because the participants are still in the stage of trust with researchers, when intervention has been running for more than three days almost all participants demonstrated the ability to express his feelings. In the psychomotor aspects of participants has been good, just on some of the participants have a value lower scores. This is because of the short duration of treatment of patients, so when compared to the other participants with a longer duration of treatment relatively low value of some participants. On one of the participants obtained scores on all aspects of this is due to the low physical condition of participants were less good. On some days the intervention patients had a fever thus decreasing the willingness of participants to take part.

Aspects of language have the lowest value among other aspects, the average participant is unable to utter his willingness to follow the activities. There are several things that can affect this, such factors preschool age children who are still in the stage of development and a sense of initiative versus guilty. Children to be afraid and shy to express its readiness to follow the therapy. In addition, the ability of researchers to carry out therapeutic communication also need to be increased to stimulate the child express feeling. The increasing of adaptive response in children given treatment in accordance with the theory of Nursalam (2005) in which the player can reduce the pressure or stress on the environment. Through playing children can express emotions and discontent will be something on the social situation and fears that can not be expressed in the real world. Playing well is something that naturally existing in one's children. At the time of play therapy using a book researcher expression and give trust approach to the child so that the child believed to nurses, the nurse then explores the child's feelings and provide play therapy in the form of coloring, writing and reading fairy tales. It is based on the function of play that has therapeutic value in providing a release of stress and tension, encourage experimentation and testing of a scary situation in a safe manner, facilitate direct communication is not verbal and non-verbal about the needs of fear and desire. Another thing that affects children, namely frequency adaptation response of children with hospitalization average more than 3 times, so that children tend to be more familiar and easier to adapt to the hospital environment. Children become more easily increase their adaptive behavior against the stress of hospitalization.

The results of observations of the children who are given treatment, children tend to be more reliant on nurses. Children are also more cooperative after the play therapy using expression books. According to interviews with the parents of patients, children are given play therapy also became more cheerful and rarely cried. Thus the play therapy with the use of media expression books has an influence on children's level of adaptive responses to the stress of hospitalization.

Conclusion & Recommendation

Conclusion: Child Life program through play activities draw with media "My Activities Book" can affect the stress response of hospitalization in children with leukemia.

Recommendation: Based on the results of the research, advice that can be given is 1) Nurse on duty at Space Bona II is expected to implement a media play therapy with "My Activities Book" in children with cancer to minimize the stress of hospitalization in the room, 2) the field of nursing Hospital Dr. Soetomo expected to meet the appropriate human resources in space Bona II in order to carry out the fullest play therapy because of limited power in the chamber. 3) To further study of child life therapy program developed using variables such research other variables in the development of children with cancer.

Conflict of Interest: The authors declare that they have no conflict of interest.

Source of Funding: This research obtained funding from the Faculty of Nursing University of Airlangga Surabaya

Ethical Clearance: This research has obtained the approval of ethical conduct from the Soetomo Hospital's ethical committee of Surabaya with number 385/ PankeKKE/V/2017

REFERENCES

1. Permono, B., Ugrasena, Ratwita, M. Pedoman Diagnosis dan Terapi Bagian Ilmu Kesehatan Anak. Edisi 3. Surabaya: RSUD Dr.Soetomo.2006.
2. Arif S Y. Efektivitas penurunan stress hospitalisasi anak dengan terapi bermain dan terapi musik. Jurnal Ners 2007; 2(2):72-78.
3. Nursalam, Rekha & Utami Asuhan Keperawatan Bayi dan Anak. Jakarta: Salemba Medika. (2005).
4. Niven, N. Psikologi Kesehatan Pengantar untuk Perawat dan Profesional Kesehatan Lain. Jakarta: EGC.2002.
5. Ratwita, M., Ugrasena, I.D.G.&Permono, B. Pengeloaan Medik Anak dengan Leukemia dan Kemungkinan Pengelolaanya di RS Kabupaten. Naskah LengkapI lmu Kesehatan Anak XXXVI. Surabaya: Divisi Hematologi-Onkologi Bagian Ilmu Kesehatan Anak RSUD Dr.Soetomo.2006.
6. Arikunto S. Prosedur Penelitian Suatu Pendekatan Praktik. Jakarta, PT: Rineka Cipta ; 2010.
7. Dharma, K.K. Metodologi Penelitian Keperawatan. Jakarta, JKT: CV. Trans Info Media: 2011.
8. Damanik, E. D. Pengujian validitas dan reliabilitas analisis item dan pembuat norma dass: Penelitian pada kelompok sampel Yogyakarta dan Bantul yang mengalami gempa bumi, 2010. Available at http://www.digilib.ui.ac.id/opac/themes/libri2/detail.jsp?id=94859. Acessed 21 Februari 2012.
9. Hus, M.A. Parents and Children Coping with Pediatric Cancer: Associations Between Parent and Child Anxiety, and Parent-Child Communication. Thesis. Nashville Tennessee: Vanderbilt University; 2009.
10. Kazak, E.A. Evidence-Based Interventions for Survivors of Childhood Cancer and Their Families.Journal of Pediatric Psychology2005. *30(1),* Available at http://jpepsy.oxfordjournals.org. Accessed 8 December 2011.
11. Lovibond, S.H. &Lovibond, P.F. Manual for the Depression Anxiety Stress Scales. (2nd. Ed.). Sydney: Psychology Foundation.1995.
12. Simon, H. Leukemia. 2005. Available at http://healthguide.howstuffworks.com/acute-lymphocytic-leukemia-in-depth.htm/printable). Accessed 12 Oktober, 2010.
13. Supartini. Buku Ajar Konsep Dasar KeperawatanAnak.Jakarta: EGC. 2004.
14. Suparto, Hardjono. Mewarnai Gambar sebagai Metode Penyuluhan untuk Anak: Studi Pendahuluan Pada Program Pemulihan Anak Sakit IRNA Anak RSUD Dr. Soetomo. 2005. Available at *http://www.pediatrik.com/kanal.php?pg=karya_ilmiah&id=2*.
15. Wong, et al. Buku Ajar Keperawatan Pediatric. Volume 1. Jakarta : EGC.2009.
16. Yalug, I.et al. Post-Traumatic Stress Disorder and Post-Traumatic Stress.2011.

The Correlation between Diabetes Status and Hair Loss among Aged Women in Alor Setar Area

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ABSTRACT

The aim of this study was to identify the diabetes among aged women in Alor Setar area and to compare association between diabetes and current hair loss condition. Across sectional study was conducted to study the prevalence between diabetes and hair loss among aged women around Alor Setar area. Primarily data was collected using interviewer-administered questionnare consisting of socio-demographic questions for part A-the aged of the women, employment status and diabetes status. Stress level for part B and the hair loss scale for part C.As a part of population based on cross sectional study, the hair status of 112 aged women range 50-60 years was assessed by answering questionare,56 from them suffered with diabetes and another 56 of them non-diabetes. The aged women with yes diabetes status have a highest prevalence of excessive hair loss which is 93.6% compare to non-diabetes aged women with excessive hair loss is 6.4%.Based on the table aged women who are non-diabetes have high prevalence hair loss in moderate hair loss which is 69.7% compared to women with diabetes status and experiencing hair loss which is 30.3%. Besides, the prevalence of non-diabetic aged women with normal hair loss is high which is 93.8% compared to diabetic aged women who experiencing normal hair loss is 6.3%. The result from this table showed that the P value is 0.000. The P value is less than 0.01. So, the null hypothesis for fifth objective rejected. Thus, there is significant relationship between diabetes status and hair loss. The result supports the hypothesis that aged women with diabetic experiencing hair loss.

Keywords: *Aged women, Diabetes, Hair loss.*

Introduction

Diabetes mellitus is a group of metabolic and chronic disease caused by inherited and/or acquired deficiency in production of insulin by the pancreas. It is characterized by hyperglycemia which in turn damage many of the body's systems, in particular the blood vessels and nerves. (American Diabetic Association, 2009) and On World Diabetes Day 2017, WHO joins partners around the world to highlight women's right to a healthy future. Around 8% of women or 205 million women live with diabetes worldwide, over half in South-East Asia and the Western Pacific. During pregnancy high blood glucose substantially increases the risk to health for both mother and child as well as the risk of diabetes for the child in the future. Almost half of women who die in low-income countries due to high blood glucose die prematurely, before the age of 70 years. (World Health Organisation,2017).

There are other causes of hair loss linked to diabetes that could be an issue here, too. For instance, diabetes can affect your circulatory system, making it less effective [(2)]. As certain nutrients and proteins are essential for hair growth, a decrease in the amount of these reaching hair follicles could result in weaker and slower hair growth[(1)] . A simple way to remedy this is to start taking a nutritional supplement which does not have a sugar coating. This will ensure the body is getting a consistent level of nutrients in case diet alone does not provide a sufficient amount. If you're feeling unwell or have other unexplained symptoms alongside your hair loss, you may be suffering from an infection, as

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diabetes can affect your immune system when the blood contains excess sugar[4]. An infection can disrupt the hair growth cycle, causing hairs to go into their resting phase prematurely, leaving you with weaker hair [22]. (The Belgravian Centre, 2015).

The literature reveals what little is known about nutritional factors and hair loss. What we do know emanates from studies in protein-energy malnutrition, starvation, and eating disorders. In otherwise healthy individuals, nutritional factors appear to play a role in subjects with persistent increased hair shedding [6].

Excessive intakes of nutritional supplements may actually cause hair loss and are not recommended in the absence of a proven deficiency [17]. While nutritional factors affect the hair directly, one should not forget that they also affect the skin [18]. In the management of subjects with hair loss, eliminating scaling problems is important as is good hair care advice and the need to explain fully the hair cycle. Many individuals reduced their shampooing frequency due to fear of losing more hair but this increases the amount seen in subsequent shampoos their fear of going bald and adversely affecting their quality of life[21].(D. H. Rushton,2002).

The research studied 20 premenopausal women with female pattern hair loss and 9 healthy women for serum levels of LH, FSH, estradiol, free and total testosterone, sex hormone binding globulin (SHBG) and dehydroepiandrosterone sulfate (DHEAS) on the first day of their menstrual cycle. it is the estrogen to androgen ratio, as represented by the ratio of estradiol to free testosterone that might be responsible for triggering female pattern hair loss in women[2].(Riedel A,2008).

Materials and Method

Study Design: This is an observational analytical cross-sectional study where all the results are measured concurrently in a given population at a short period of time. This type of study design will be used in determining the diabetic status and hair loss and stress level among Aged women in Alor Setar area.

Sampling Area: This research study had been conducted around the Alor Setar area, from which the data collection will be done, is geographically having a marking of north Malaysia. Alor Setar has some administrative importance, thus it becomes quite busy during weekdays and in the weekends. There are many villages around here and urban area based on the previous research, also they have done. Thus, it had been the solid reason for the study, focusing most intensively on this surrounding area.

Study Population: The option of the calculation formula is based on the objective which is to study the correlation between diabetes aged women and hair loss. The most suitable formula for this objective is "Single Population Proportion" formula. From a previous study by (Jaykaran Charan and Tamoghna Biswas, 2013), the expected prevalence for the results are 50%, so by implicating the formula given, the estimated sample size for this research are approximately 112 people. The sample size is calculated as followed by the formula.

Data Analysis: Data that obtained during the study was entered, sorted and analyzed by using Statistical Package for Social Science (Version 21). The descriptive statistics includes the mean, standard deviation, frequency, and percentage. This descriptive analysis was used to analyze the social demographic, between hair loss and diabetes and between stress level and hair loss among aged women. Later, the results obtained, had been presented in words and depicted in tables as well as graph.

Table 1: Socio-Demographic Studies of Respondents

Variable	Answer	Frequency	
		N	%
Diabetes Status	Diabetes	56	50.0
	Non- Diabetes	56	50.0
Employment Status	Employed	42	38.0
	Unemployed	70	62.0
Stress Level	Normal	96	68.0
	Mild	35	31.0
	Moderate	1	1.0
Hair Loss	Normal	32	29
	Moderate	32	29
	Excessive	47	42

Table II: To Investigate the Correlation between Diabetes Status and Stress Level

diabetes status * stress level Cross tabulation						
Normal mild			stress level			Total
			moderate			
Diabetes status	Yes	Count	33	23	0	56
		% within diabetes status	58.9%	41.1%	0.0%	100.0%
		% within stress level	43.4%	65.7%	0.0%	50.0%
		% of Total	29.5%	20.5%	0.0%	50.0%
	No	Count	43	12	1	56
		% within diabetes status	76.8%	21.4%	1.8%	100.0%
		% within stress level	56.6%	34.3%	100.0%	50.0%
		% of Total	38.4%	10.7%	.9%	50.0%

Table III: To Investigate the Correlation between Stress Level and Hair Loss

stress level * hair loss Cross tabulation						
Absent/normal moderate			hair loss			Total
			Excessive			
Stress level	Normal	Count	26	20	30	76
		% within stress level	34.2%	26.3%	39.5%	100.0%
		% within hair loss	81.3%	60.6%	63.8%	67.9%
		% of Total	23.2%	17.9%	26.8%	67.9%
	Mild	Count	6	13	16	35
		% within stress level	17.1%	37.1%	45.7%	100.0%
		% within hair loss	18.8%	39.4%	34.0%	31.3%
		% of Total	5.4%	11.6%	14.3%	31.3%
	Moderate	Count	0	0	1	1
		% within stress level	0.0%	0.0%	100.0%	100.0%
		% within hair loss	0.0%	0.0%	2.1%	.9%
		% of Total	0.0%	0.0%	.9%	.9%

Table IV: To Investigate the Correlation between Diabetes Status and Hair Loss

diabetes status * hair loss Cross tabulation						
			Hair Loss			Total
			Absent/Normal	Moderate	Excessive	
Diabetes Status	Yes	Count	2	10	44	56
		% within diabetes status	3.60%	17.90%	78.60%	100.00%
		% within hair loss	6.30%	30.30%	93.60%	50.00%
		% of Total	1.80%	8.90%	39.30%	50.00%
	No	Count	30	23	3	56
		% within diabetes status	53.60%	41.10%	5.40%	100.00%
		% within hair loss	93.80%	69.70%	6.40%	50.00%
		% of Total	26.80%	20.50%	2.70%	50.00%

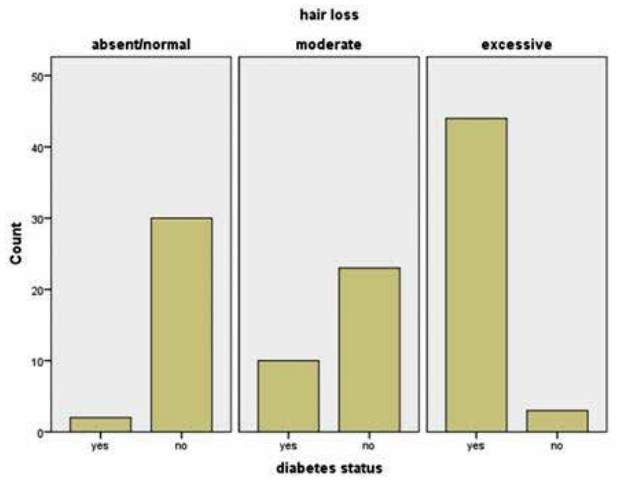


Fig 1: Correlation Between Diabetes Status And Hair Loss Graph

Results

Discussion

Data from this study showed that there was relationship between the correlation of diabetes status and hair loss. These variables associated between diabetes statuses aged women with yes diabetes status have a highest prevalence of excessive hair loss which is 93.6% compare to non-diabetes aged women with excessive hair loss is 6.4%.Based on the table aged women who are non-diabetes have high prevalence hair loss in moderate hair loss which is 69.7% compared to women with diabetes status and experiencing hair loss which is 30.3%. Besides, the prevalence of non-diabetic aged women with normal hair loss is high which is 93.8% compared to diabetic aged women who experiencing normal hair loss is 6.3%The result from this table showed that the P value is 0.000. The P value is less than 0.05. So, the null hypothesis for fifth objective rejected. Thus, there is significant relationship between diabetes status and hair loss.

Furthermore, this research had been proven that this cross-sectional study had linked the diabetes status and hair loss among aged women. Hair usually goes through three phases. During the active growing phase, which lasts for two years or more, hairs grow at a rate of 1 to 2 cm per month. Hair then goes into a resting phase, which lasts for about 100 days. After this phase, some of the resting hair falls out. Diabetes can interrupt this process, slowing down the hair growth. The immune system is affected when blood sugar level rises above normal. As a result, people with diabetes are at an increased risk for developing an infection and the body is less capable of fighting it. (Belgravia Centre, 2011)

To Observe the Correlation Between Employment Status and Stress Level among Aged Women: The results of the analysis confirmed the first hypothesis that the prevalence of employment among aged women is associated with hair loss among aged women. A healthy job is likely to be one where the pressures on employees are appropriate in relation to their abilities and resources to the amount of control they have over their work and to the support they receive from people who matter to them. As health is the absence of disease or infirmity but a positive state of complete physical, mental and social well-being (WHO, 1986). However some abilities, including strength and mental agility decline in most people over a certain age, but much less and much later than many people think.

To Investigate the Correlation between Employement Status and Hair Loss among Aged Women: It was already asked and stated inside the questionnaire where they were prior to answer that question. Therefore, we analyzed the prevalence of each employment status that associated with hair loss. The result is not significant because the respondent that suffers with hair loss not only the employed aged women but also the unemployed experiencing with hair loss. So the result is not significant.

To Investigate the Correlation between Diabetes Status and Stress Level: From this research study, analysis between prevalence of related diabetes status with stress level showed that aged women with non-diabetes status have a highest prevalence of normal stress level compare to diabetes aged women with normal stress level. The result from this table showed that the p-value is 0.056. So, the null hypothesis for third objective failed to reject. Thus, there is no significant relationship between diabetes status and stress level.

To Investigate the Correlation between Stress Level and Hair Loss: The result from this showed that the p-value is 0.286. So, the null hypothesis for third objective failed to reject. Thus, there is no significant relationship between stress level and hair loss because of women with high stress level experiencing hair loss and women with normal stress level also experiencing hair loss.

Conclusion

From this study, it can be concluded that diabetes status had given a variation of results. According to the findings, there was relationship between the correlation of diabetes status and hair loss. These variables associated aged women with yes diabetes status have a highest

prevalence of excessive hair loss which is 93.6% compare to non-diabetes aged women with excessive hair loss is 6.4%.Based on the table aged women who are non-diabetes have high prevalence hair loss in moderate hair loss which is 69.7% compared to women with diabetes status and experiencing hair loss which is 30.3%. Besides, the prevalence of non-diabetic aged women with normal hair loss is high which is 93.8% compared to diabetic aged women who experiencing normal hair loss is 6.3%. Thus, there is significant relationship between diabetes status and hair loss. Furthermore, from this research also, it had been proven that this cross-sectional study had linked the diabetes status and hair loss among aged women. Hair usually goes through three phases. During the active growing phase, which lasts for two years or more, hairs grow at a rate of 1 to 2 cm per month. Hair then goes into a resting phase, which lasts for about 100 days. After this phase, some of the resting hair falls out. (Belgravian Centre, 2011).

Conflict of Interest: We certified that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Source of Funding: Self

Ethical Clearance: No identifying details of the subjects reported here and all the data collected after informed consent.

REFERENCES

1. Finner AM. Nutrition and hair: deficiencies and supplements. Dermatol Clin. 2013;31(1):167-172.
2. Randall VA, Jenner TJ, Hibberts NA, De Oliveira IO, Vafaee T. Stem cell factor/cKit signalling in normal and androgenetic alopecia hair follicles. J Endocrinol. 2008;197:11-23.
3. Sawaya ME, Blume-Peytavi U, Mullins DL, Nusbaum BP, Whiting D, Nicholson DW, et al. Effects of finasteride on apoptosis and regulation of the human hair cycle. J Cutan Med Surg. 2002;6:1-9.
4. Ellis JA, Harrap SB. The genetics of androgenetic alopecia. Clin Dermatol Clin Dermatol. 2001;19:149-54.
5. Ellis JA, Stebbing M, Harrap SB. Polymorphism of the androgen receptor gene is associated with male pattern baldness. J Invest Dermatol. 2001;116:452
6. Calvo RM, Asunción M, Sancho J, San Millán JL, Escobar-Morreale HF. The role of the CAG repeat polymorphism in the androgen receptor gene and of skewed X-chromosome inactivation, in the pathogenesis of hirsutism. J Clin Endocrinol Metab. 2000;85:1735-40.
7. Yip L, Zaloumis S, Irwin D, Severi G, Hopper J, Giles G, et al. Gene-wide association study between the aromatase gene (CYP19A1) and female pattern hair loss. Br J Dermatol. 2009;161:289-94.
8. Randall VA. Androgens and hair growth. Dermatol Ther. 2008;21:314-28.
9. Kuno, Y. *Human Perspiration*. C. C. Thomas, Springfield, IL (1956). Referenced in G. C. White, Handbook of Chlorination, 1st ed. 1972.
10. Lee R, Chang SY, Trinh H, Tu Y, White AC, Davies BS, et al. Genetic studies on the functional relevance of the protein prenyltransferases in skin keratinocytes. Hum Mol Genet. 2010;19:1603-17.
11. Gupta AK, Charrette A. The efficacy and safety of 5alpha-reductase inhibitors in androgenetic alopecia: a network meta-analysis and benefit-risk assessment of finasteride and dutasteride. J Dermatolog Treat. 2014;25:156-61
12. Lee WS, Oh Y, Ji JH, Park JK, Kim do W, Sim WY, et al. Analysis of familial factors using the basic and specific (BASP) classification in Korean patients with androgenetic alopecia. J Am Acad Dermatol. 2011;65:40-7.
13. Gatherwright J, Liu MT, Gliniak C, Totonchi A, Guyuron B. The contribution of endogenous and exogenous factors to female alopecia: a study of identical twins. Plast Reconstr Surg. 2012;130:1219-26.
14. Yip L, Zaloumis S, Irwin D, Severi G, Hopper J, Giles G, et al. Gene-wide association study between the aromatase gene (CYP19A1) and female pattern hair loss. Br J Dermatol. 2009;161:289-94.
15. Whiting DA. Possible mechanisms of miniaturization during androgenetic alopecia

or pattern hair loss. J Am Acad Dermatol. 2001;45:S81-6.

16. Tosti A, Peluso AM, Misciali C, Venturo N, Patrizi A, Fanti PA. Loose anagen hair. Arch Dermatol. 1997;133:1089-93.
17. Jillson OF. Alopecia. III. Diffuse hair loss (nonscarring). Cutis. 1983;31:465, 469, 472 passim.
18. Kaufman KD, Finasteride in the treatment of men with androgenetic alopecia. Finasteride Male Pattern Hair Loss Study Group. J Am Acad Dermatol. 1998;39:578-89.
19. Priego-Recio CM, Rodríguez-Pichardo A, Camacho-Martínez FM. Unusual forms of alopecia areata in a Trichology Unit. J Eur Acad Dermatol Venereol. 2014;28:1394-6.
20. Rakowska A, Slowinska M, Kowalska-Oledzka E, Olszewska M, Rudnicka L. Dermoscopy in female androgenic alopecia: method standardization and diagnostic criteria. Int J Trichology. 2009;1:123-30.
21. Bagatin E, Miot HA. How to design and write a clinical research protocol in Cosmetic Dermatology. An Bras Dermatol. 2013;88:69-75.
22. Mubki T, Rudnicka L, Olszewska M, Shapiro J. Evaluation and diagnosis of the hair loss patient: part I. History and clinical examination. J Am Acad Dermatol. 2014;71(3):415.e1-e415.e15.

Differences in Caries Prediction Test of Cariostat and Plaque Formation Rate Index (PFRI) on Children

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ABSTRACT

Background: Dental caries is an irreversible dental disease. The incidence of dental caries in children was increased by 60-90%. Dental caries can be recognized by various factors. Caries risk status needs to be adjusted so that caries development can be inhibited as early as possible. Methods of caries risk measurement are PFRI and cariostat caries prediction. The aim of this study was looked at the risk factors of childhood caries by using combination of PFRI and Cariostat.

Method: This study was an observational analytic study with laboratory study approach. Based on the time it was the cross sectional study. The samples were 36 children in TK Maryam Jl. Manyar Sambongan Surabaya. This study was used primary data, then the data were analyzed in Microbiology Laboratory of FKG Airlangga University Surabaya. Data analysis was conducted with Kolmogorov-Smirnov and Spearman Correlation.

Results: There were 12 children suffered high dental caries (>5), 12 children suffered moderate dental caries (3-4), 12 children suffered low dental caries (0-2). Measurement of caries risk used Cariostat and PFRI was showed a strong correlation (p>0.05)

Conclusion: The correlation of caries risk test score using Cariostat caries activation test and PFRI that correlated with deft index are has no different results

Keywords: *Dental Caries, Child, Cariostat, PFRI*

Introduction

Dental caries is an irreversible tooth disease. World Health Organization (WHO) in 2007 in Suciari *et al* (2015) states the incidence of dental caries in children increased by 60-90%[10]. The survey conducted by the Ministry of Health of Republic Indonesia on the 3rd and 4th Five-Year Development Plan, shows the prevalence of Indonesian population who suffered dental caries by 80% and 90% whom of them are the group of under-five children. According to Antara News quoted by Maulani and Jubilee (2005), the number of under-five children in Indonesia reaches 30% of 250 million Indonesia's population, so it is estimated that under-five children who suffered dental damages reaches 75 million more[7]. The addition of the sufferer number is really possible. This can be seen from the National Household Health Survey (SKRT) in 1990 by 70% to 90% in 2003[6]. Based on the health survey results, prevalence of dental caries by age group, i.e. 3 years old (60%), 4 years old (85%) and 5 years old (86.4%). Those groups of under-five children are susceptible to dental caries[8].

Prevention of dental caries is more important conducted early. The conducted prevention should be in accordance with the factors that cause dental caries. Factors that cause dental caries in children may come from both of internal and external. Internal factors include plaque quality, caries-causing bacteria such as *Streptococcus mutans*, etc. while external factors such as foods and the ability of children to brush teeth.

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A person's caries risk status is important to conducting measuring so that caries development can be inhibited as early as possible. The available methods to measure the caries risk are various. This shows the existence of development on caries risk measurement method. A measurement method should meet several requirements such as provide accurate results, have high specificity and sensitivity, simple, low-cost, and not require special tools (Hesty, 2007). Methods that can be used in measuring caries risk are Plaque Index, PFRI (Plaque Formation Rate Index), colony calculation of *Streptococcus mutans*, etc. Plaque Index and colony calculation of *Streptococcus mutans* are the calculation of caries risk that are done at any time so they will produce numbers that can be influenced by many things. While the external factors can be controlled by using PFRI. Plaque calculations using PFRI provide an objective number for viewing plaque formation without being influenced by external factors. The combination of caries risk factor measurements PFRI and seeing the amount of *Streptococcus mutans* by using cariostat can provide a more accurate description in determining one's caries risk factors. This study aims to look at risk factors for childhood caries by using combination of PFRI and Cariostat.

Method

The type of research used in this study was analytical observational using cross-sectional research design with laboratory study approach. The research was conducted at Maryam Kindergarten Jl. Manyar Sambongan, Surabaya and the analysis was conducted at FKG Microbiology Laboratory of Airlangga University. The inclusion criteria of respondents consist of children aged 4-5 years, have no permanent teeth, all deciduous teeth have erupted, have no systemic disease, and not consume drugs. Data analysis was done using statistic approach with Kolmogorov-Smirnov normality test, then it continued by correlation test using Spearman Correlation. Statistical data analysis is presented using Statistical Product and Service Solutions (SPSS) 20.0 for Windows.

Results

Clinical examination conducted on 36 children in Maryam Kindergarten Surabaya, it was found 12 children suffering high dental caries (>5), 12 children suffering moderate dental caries (3-4), and 12 children suffering low dental caries (0-2). Measurements of caries risk in 36 children were conducted using cariostat and PFRI. Then the data was tested with normality and correlation analysis test.

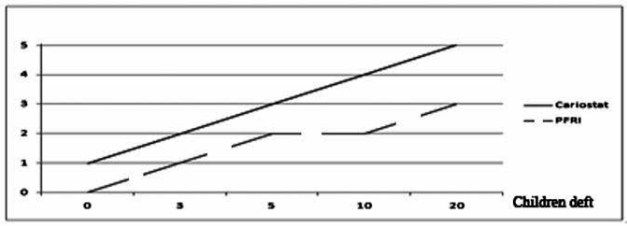
Prior to conduct the correlation analysis test, the normality test of data was performed using Kolmogorov-Smirnov. Table 1 shows that data in Cariostat has value greater than 0.05 ($p>0.05$) which means that the data is normally distributed, while the data on deft index and PFRI are less than 0.05 so that the data is abnormally distributed. Then it was proceeded with Spearman correlation test to see correlation between deft index and both of caries risk test i.e. Cariostat and PFRI.

Table 1: Normality Test of Data using Kolmogorov-Smirnov Test

No.	Group	Mean	Deviation standard	Normality test
1	Deft Index	5.6111	5.8665	0.009
2	Cariostat	1.19	0.920	0.051
3	PFRI	2.17	1.159	0.007

Table 2: Value of Significance and Correlation Coefficient between Deft Index with Cariostat and Deft Index with PFRI

No	Correlation	Significance of Correlation Test with Deft	Coefficient of Correlation Test
1.	Correlation between Deft Index with Cariostat Score	0.000	0.857
2.	Correlation between Deft Index with PFRI Score	0.000	0.818



Graph 1: The Relationships of Cariostat and PFRI with Deft Index of Children's Caries Aged 4-5 Years

Table 2 discloses that the significant value between Cariostat and Deft Index is <0.05 that has value p = 0.000 with correlation coefficient by 0.857. This is indicates that Cariostat has strong correlation value. While the significant value between PFRI and Deft Index is 0.000 with correlation coefficient by 0.818. This is indicates that PFRI also has strong correlation. The above calculations show that caries risk measurements using both of Cariostat and PFRI are have strong correlation values.

Discussion

The caries risk is a person's probabilities to having carious lesions in a given time period while the measurement of caries risk is an important preventive steps to get good dental and mouth hygiene by identifying factors of caries etiology[5]. Measurement of caries risk is done as early as possible so that caries prevention can be done. There are various ways in determining factors of caries risk, there which were using specific materials as the tools, and there which were not using certain materials or tools. The way of measuring caries risk that using plaque samples are Cariostat and PFRI that are easy to do in children.

The correlation tests of Cariostat score with deft index and PFRI score with deft index were performed in this study. The result of this research is the correlation between cariostat score with deft index is stronger than PFRI score with deft index.

PFRI using plaque samples that aim to see the growth of plaque on each individual. This index is useful to see factors of caries risk caused by plaque growth. This index includes plaque throughout the surface of the tooth except occlusal which is seen after 24 hours without any cleaning done. Accurate results will be obtained if the subjects' teeth previously cleaned by professionals [2] .This index has the advantage that is it is not need special tools then it can be done with minimal cost. However, measurement of this index is require the cooperation of patients as well as the patient's parents to keep the patient from performing dental and oral cleansing within 24 hours.

PFRI has objective results because cleaning is done by professionals so that initial plaque of each child is standardized from 0. The resulting PFRI value is purely from the plaque growth pattern of each child without being influenced by children's knowledge, how to brush their teeth, etc.

A longitudinal study has been done by Roxana Vacaru in Romania to look at the factors of caries risk by using PFRI. The study was conducted on 139 children who were in the age of 6-14 years whom examined the value of deft and also the value of PFRI. Researchers divide into 3 groups, those are the low risk group that is PFRI 1-2, the risky group that is PFRI 3 and the high risk group that is PFRI 4-5. After 2 years the deft value of the research sample was calculated and it was correlated with the PFRI value. The results of this study are caries prevalence in children was conforming to factors of caries risk calculated by PFRI. Children with low-risk factors of caries had low-prevalence of caries, while children with high-risk factors had high-prevalence of caries. This was indicates that PFRI is effective for predicting caries incidence in children [9].

A longitudinal study was also performed by Perr Axelsson to look at the caries growth across different age groups. This group is divided into ages of 0-2 years, 5-7 years and 11-14 years. Each group was measured PFRI value and deft value. The result of PFRI and deft value show that there are relationship between the high value of PFRI and the prevalence of caries on children. Then Axelsson created a caries prevention program according to the group of caries risk factor. The results of the program were seen 20 years later and a small prevalence score was found in these children. This was indicates that PFRI is effective for used as a predictor for determining caries prevention steps on children [3].

Cariostat is used plaque samples to determine the caries risk in patients. pH of plaques taken on the patient's teeth, incubated 48 hours so that bacteria in the plaque fermented the sugar on the medium. The acid produced by bacteria on the medium will change the color on the medium so that the degree of acidity in the plaque can be measured.

Acid production on dental plaque is an important caries risk factor because dental caries is initiated by demineralization on teeth surfaces by organic acids that were produced by bacteria in dental plaque. Previous studies reported that after rinsing with sugar, dental plaque acquired in active caries patients showed a lower last pH than inactive caries patients. This suggests that examination of pH on dental plaque is one of the steps to measure caries risk (Shimizu, 2008).

A longitudinal study was conducted by Tsubouchi in Okayama, Japan to evaluate predictive value in Cariostat. The study was conducted on 100 children who participated in routine dental checkups at 18, 24, and 36 months. The results of the study were caries prevalence in children aged 18 months by 9%, children aged 24 months by 21%, and children aged 36 months by 70%. Cariostat scores in each age were correlated with the respective deft index. The Cariostat scores on each age show the good validity. This suggests that Cariostat is effective in predicting caries incidence in children (Berg, 2006).

In this study, both of Cariostat and PFRI are have high correlation coefficient to the deft index. The previous research has also shown that both of PFRI and Cariostat can be a tool for predicting factors of caries risk. However, both of these measuring tools have disadvantages and advantages. Cariostat has the disadvantages of requiring special materials that are costly and requiring special tools such as incubator. The results will be seen after 2 days because they require an incubation time to get the test results (Rodis, 2005). Whereas the advantages of Cariostat is the quick and easy application in patients. So that Cariostat is appropriate for the children who are less cooperative or children with special needs, because it does not take a long time or a certain way to take plaque samples.

PFRI also has its own advantages and disadvantages. The disadvantages of PFRI are the operator should clean the patient's teeth on the first day, ensure the plaque value of patient is 0 and then measure the plaque value 24 hours later and re-clean the patient's plaque. This is less appropriate when conducted for non-cooperative children who do not want to open the mouth in the long time. However, the advantages of PFRI are its low cost because it does not require a certain tool or material. In addition, PFRI is also advantageous for patients due to they get dental cleaning that performed by the operator.

Dental caries is a multifactorial disease. Other factors such as dental and mouth hygiene, carbohydrate intake, and amount of *Streptococcus mutans* bacteria were contributed to dental caries. By combining the measurement of caries etiology factor in the patient, then the determination of caries risk would be more appropriate so that caries prevention can be performed effectively although the high cost will be needed [1].

The conclusion of this study is there was no difference between the results of risk test scores by using caries activity test both of Cariostat and PFRI which is correlated with the deft index.

Conclusion

The conclusion of this study is there was no difference between the results of risk test scores by using caries activity test both of Cariostat and PFRI which is correlated with the deft index. PFRI can use as a cheap and easy tool to predict caries in children. Predicting the risk of caries is important to make free caries teeth.

Ethical Clearance: Taken from ethic committee of faculty of dentistry, Airlangga University.

Source of Funding: Self Funding

Conflict of Interest: There aren't any relevant conflict of interest

REFERENCES

1. Axelsson, Per. 2000. *Diagnosis and Risk Prediction of Dental Caries. Vol 2. Chicago: Ouintessence Publishing Co, Inc.*
2. Axelsson, Per. 2005. *The Effect of a Needs Related Caries Preventive Program in Children and Young Adults-Results after 20 Years*. Seattle, USA: BMC Oral Health.
3. Axelsson, Per. 2006. *The Effect of A Needs Related Caries Preventive Program in Children and Young Adults-Results after 20 Years*. Seattle, USA: BMC Oral Health.
4. Berg, J and Slayton, RL. 2006. *Early Childhood Oral Health, Willey Blackwell*. Singapore.
5. Hausen, H, *et al*. 1994. *Can Caries be Predicted*. Textbook of Clinical Cariology. Copenhagen: Munksgaard.
6. Healthy Department of Republic Indonesia, 1990. *Household Health Survey (SKRT) 1990*. Jakarta: Agency for Health Research and Development.
7. Maulani, Chaerita and Jubilee, Enterprise. 2005. *Tips for Caring Children's Teeth*. p.71,125. Jakarta: Elex Media Komputindo.
8. Riyanti, E, *et al*. 2009. *Prevalence of Nursing Mouth Caries in Children Ages 15-60 Months Based on Frequency of Brushing Teeth*. Bandung: Padjadjaran University.

9. Roxana, S, *et* al. 2003. Clinical Preventive Strategies for Children and Adolescents Identified as at High Risk of Developing Caries. *International Journal of Paediatric Dentistry*. Volume 21, 167-174.

10. Suciari, *et al*. 2015. *The Role of Parents in Guiding Teeth Brushing with Dental Caries Incidence on Preschool Children*. [online] accessed via http://journal.unair.ac.id/download-fullpapers-pmnj5ab2f127c22full. pdf on March 6, 2018 at 08:03 p.m.

11. WHO, 2007. *WHO Oral Health Country/Area Profil Programme.* [online] accessed via http:// www.whocollab.od. mah.se/index.htm on March 6, 2018 at 08:38 p.m.

Using Data Envelopment Analysis to Improve the Hospitals Efficiency in Indonesia : The Case of South Sulawesi Province

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ABSTRACT

Background: The increasing hospital growth in Indonesia provides favorable efforts in increasing public access to health care facilities. However, this condition will give adverse impacts if it is not compatible with efforts to generate hospitals as efficient organizations. The purposes of this research were to formulate appropriate strategies to improve hospital efficiency in South Sulawesi Province, Indonesia.

Method: This research used the Data Envelopment method to measure hospital efficiency. Samples of this research were all public hospitals in South Sulawesi province. The total samples of this research were 26 hospitals in South Sulawesi Province, Indonesia.

Results: Results of the research showed that of the total 26 hospitals assessed, most hospitals in South Sulawesi Province in the current time were still inefficient in which there were 14 hospitals or 53.8% in the inefficient category. The overall mean score of hospital efficiency in South Sulawesi province was 0.91.

Conclusions: The inefficiency estimation results in this study can help in formulating a policy to improve hospital efficiency in South Sulawesi Province by reducing certain inputs or maximizing outputs of hospital according to amount of projection inputs and outputs on DEA Analysis.

Keywords: *Data envelopment analysis (DEA), hospital efficiency, Indonesia.*

Introduction

The increasing hospital growth continually takes place every year in Indonesia. According to the Indonesian Health Profile, there are 1,268 hospitals in 2005 and increase up to 2,833 hospitals during December 2018[(1)]. The increasing hospital growth will give benefits to the improvement of health services access to the community. However, this condition will be a burden if the increasing hospital growth is not compatible with appropriate efforts in generating hospitals as effective and efficient organizations.

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Considering the importance of efficiency, the Indonesian government had formulated regulations that required all hospitals in Indonesia should be managed under the principles of the public service agency (PSA) model. The PSA aims to improve the quality of services to the public by providing flexibility of financial management based on the principles of efficiency, effectiveness and productivity. It is expected that the quality of hospital services and financial performance can be improved through the implementation of flexibility in financial management.

To date, the current method used to estimate hospital efficiency in Indonesia is the ratio method that includes ratio of patient and hospital staff, Bed Occupancy Rate (BOR), Average Length of Stay (ALOS) and Bed Turn Over (BTO) respectively[(2)]. Efficiency is a ratio of produced output over used input. Hence, the used inputs should be able to describe the entire resource of a particular hospital. However, the indicators formulated by the government only considers inputs in the form of human resources alone, without consideration of the

capital inputs. In addition, correlations between input and output are measured based on only the ratio of one input to one output. Therefore, a more precise assessment method is needed to address those weaknesses. According to Hollingsworth (2008), the most common approach used to measure hospital efficiency is the frontier analysis approach, and one of the types of this approach is the Data Envelopment Analysis (DEA) method[3-4].

In Indonesia, a study of hospital efficiency found out that only 35% of the total hospitals in Indonesia were technically efficient with an average technical efficiency rate of 80%[5]. Another study in East Java province indicated that of the total 39 hospitals assessed, only 8 hospitals were efficient[6]. South Sulawesi province is one of the provinces in Indonesia that shows the significant growth of hospitals in recent years. As recorded in 2010, there are only 10 public hospitals in the PSA status and increase up to 26 hospitals in 2017. The increase of amounts of hospitals is expected compatible with the improvement of quality and efficiency of services as stated in the objectives of implementation of the PSA policy.

The standard of bed occupancy rate in hospital is 60%-85% but only 8 regencies/municipalities of the total 24 regencies/municipalities in South Sulawesi fulfill that standard. This indicates that the efficiency of Bed Occupancy Rate remains a problem in South Sulawesi province[1]. In addition to that, bed distribution is disproportionate in South Sulawesi province. Of the total 24 regencies/municipalities, 9 regencies/municipalities have the ratio of number of bed to number of population is less than 1 (the standard ratio of number of bed to number of population is 1). This leads the inefficiency of health services due to the excessive quantity of beds in some districts but lack of beds in other districts. Based on these reasons, this research aims to measure hospital efficiency using the DEA approach and formulate strategies to improve the level of hospital efficiency in South Sulawesi Province in Indonesia.

Materials and Method

Hospital Efficiency: Efficiency is a widely used term in economics, generally referring to the best utilization of resources in production. In another term, efficiency can also be interpreted as an optimum use of inputs provided by a particular hospital to produce outputs at a maximum level by utilizing its own resources. The efficiency assessments were divided into several sub-dimensions that include service accuracy, relationship between input and output of health treatment, and the utilization of technology to gain the best care[7].

Efficiency is divided into two types. Firstly, technical efficiency refers to the choice of production processes to produce certain outputs by minimizing resources. This technical efficiency is illustrated by points along the isoquant curve. Secondly, economic efficiency/cost efficiency refers to the choice of certain techniques used in production activities that should minimize costs. At economic efficiency, the company's activities are limited by the budget line owned by the company (isocost). The selected production efficiency should bear both technical efficiency and economic efficiency[8].

The assessment of efficiency rate using the DEA method is widely used to measure the technical efficiency of hospitals and other health services, and it is not only applied in America but also worldwide. Several studies have found out the advantages of the DEA method to improve hospital efficiency[9-12]. A number of researchers apply this method because its simplicity in dealing with inputs and outputs. This method can accommodate a number of inputs and outputs in various dimensions. By using DEA, the assessment of efficiency will be more accurate because a particular hospital has many inputs and outputs and they are interconnected each other.

Data Envelopment Analysis: The DEA is a linear programming technique used to measure the efficiency of organizational units which called Decision Making Units (DMUs). DMUs are organizations or entities in which their efficiency rates are measured relative to a group of other homogeneous entities. Homogeneous entities signify that inputs and outputs of the evaluated DMUs should be similar. DMUs can be in the form of either commercial or public entities, such as commercial or government banks, private or public schools, hospitals, and so on[13]. DEA is used to compare a particular efficiency rate of a decision-making unit with similar DMUs by scoring various inputs and outputs. The calculation of efficiency using the DEA provides a value range from 0 to 1 (most efficient). DMUs with values less than 1 are classified as inefficient units. There are various types of DEA models that may be used depending on the conditions of the problem encountered[9].

Data Source: This research used secondary data collected from the online hospital database reporting system of the Ministry of Health of the Republic of Indonesia in the year 2017. Samples of the research were all public hospitals in

the status of PSA in South Sulawesi Province, Indonesia. The total samples were 26 hospitals.

Input and Output Variables: In determining the input and output indicators, this research considered two things: results of the previous studies and the availability of data indicators in the hospital online database reporting system. Input indicators were hospital area (m^2), numbers of doctors, nurses, other health workers and non-health workers[14-18]. Output indicators were numbers of outpatients, inpatient, emergency care, Bed Occupancy Rate (BOR) and Average Length of Stay of Patients (ALOS)[19-23].

Findings

The results showed that the overall mean hospital area in South Sulawesi Province was 51,842m^2 with the overall mean number of 240 beds, 39 doctors, 207 nurses, 113 health workers and 90 non-health workers. The overall mean output produced by the hospitals were 46,071 outpatients, 19,843 inpatients, 8,771 emergency patients, BOR were 64% and ALOS were 3.9 days. The measurement of inputs and outputs of the hospitals that include the minimum, maximum, mean and standard deviation values are shown in Table 1.

Table 1: Descriptive Statistics of Inputs and Outputs

Inputs/outputs	Minimum	Maximum	Mean	Std. Deviation
Hospital Area (m^2)	5,500	400,000	51,842	75,973.860
Hospital Beds	107	919	240	150.580
Doctors	10	134	39	24.418
Nurses	65	951	207	173.002
Other Health Workers	27	557	113	118.319
Non-Health Workers	9	433	90	89.616
Inpatients	3,205	180,782	46,071	33,304.636
Outpatients	1,689	239,917	19,843	45,108.158
Emergency Patients	700	28,488	8771	6,256.949
BOR	16%	91%	64%	15.64052
Av-LOS	2.3	9	3.9	1.33523

Efficiency Scores

By using an output-oriented model with the Variable Returns to Scale, the technical efficiency rates of the hospitals were scored, as shown in Table 2. The overall mean score of hospital efficiency was 0.91 or 91%. The most hospitals (53.8%) are technically inefficient, but the overall efficiency rate of the hospitals in South Sulawesi province already achieved the good performance compared to other provinces. As indicated in a study conducted by Hafidz et.al (2018), the overall mean score of hospital efficiency in Java and Bali Provinces of Indonesia was only 61%[24] and another study found that the overall mean score of hospital efficiency in Indonesia was 80%[5] or still lower compared to the overall mean score of hospital efficiency in South Sulawesi province that achieved up to 91%.

Table 2: Hospital Efficiency Scores in South Sulawesi Province

Efficiency	Frequency	Percent	Minimum	Maximum	Mean
Efficient	12	46.2	0.61	1.00	0.91
Inefficient	14	53.8			
Total	26	100.0			

Strategies to Improve Efficiency

Improving the hospital efficiency is crucial since hospitals represent a high share of overall health expenditure while providing key services to improve population health. Hospitals represent the largest share of health care spending. Indonesian hospitals account for 55 percent of the total public health expenditures[25]. Between 2005 and 2014, the share of hospitals' expenditures increased by 22%[25-26]. However, the average hospital BOR in Indonesia is only above 60 percent, which is lower than the recommended occupancy levels of 85%-90%[27-28].

Table 3: Initial and Estimated Mean Scores of the Hospitals

Inputs/Outputs	Mean		Differences
	Initial Scores	Estimated Scores	
Hospital Area (m^2)	51,842	31,759	-39%
Beds	240	219	-9%
Doctors	39	32	-18%
Nurses	207	153	-26%
Other Health Workers	113	89	-21%
Non-Health Workers	90	58	-36%
Inpatients	46,071	55,685	21%
Outpatients	19,843	23,766	20%
Emergency Patients	8771	11056	26%
BOR	63.7%	76.7%	20%
Av-LOS	3.9	3.4	-13%

The strategies to improve the efficiency rate of hospitals can be pursued by the policy makers by conducting two approaches: reducing inputs or maximizing outputs. In reducing inputs, the initial mean score of hospital building area in South Sulawesi Province is 51,842m^2 and the estimated mean score for hospital building area to achieve efficiency rate should be reduced by -39%. In addition, Table 3 shows that the initial mean scores of beds at hospitals are 240 beds and to achieve an optimum level of efficiency, the current amounts of beds at hospitals should be only 219 beds or it should be reduced by -9%. Other inputs that should be reduced by the hospitals to achieve the efficiency level are numbers of doctors by -18%, nurses by -26%, and other health workers by -21% and other non-health workers by -36% respectively.

Another strategy that should be conducted by the management to improve hospital efficiency is increasing the hospital productivity. By increasing the productivity, it is expected that a particular hospital can achieve an optimal output. Referring to the current number of inputs, the estimated mean outputs that should be achieved by the hospitals in South Sulawesi province in one-year health service are 55,685 outpatients, 23,766 inpatients and 11,056 emergency patients. Furthermore, the hospital's BOR needs to be increased by 20% from the initial score of 63.7% to 76.7%. The quality of services at hospitals also needs to be improved, especially the quality of patient care services. By improving the quality of patient treatment services, it is expected that the mean length of stay of patients can be reduced by 13% or will decrease from 3.9 days to 3.4 days to achieve the level of optimum hospital efficiency.

Conclusions

This research can provide some valuable inputs for the policy makers. By considering the needs of public health services in the hospital work area, the estimation of inefficiency can assist them to formulate appropriate policies to improve hospital efficiency level by maximizing the hospital input productivity. Productivity of hospital inputs should be improved to achieve optimal output levels. In addition, the policy makers need to pay more attentions to the efficiency of hospital inputs due to the numbers of inputs are not compatible with outputs, in which the policy makers need to formulate appropriate strategies such as reallocating hospital inputs, especially in hospitals in the category of inefficient. Strategies of resource relocation from hospitals with excessive inputs by reducing resource inputs can be implemented to achieve hospital efficiency in South Sulawesi Province.

Conflict of interest: The authors declare that they have no competing interests

Source of Funding: We received no funding support in this study.

Ethical Clearance: This research was approved by ethics committee of Public Health Faculty, Universitas Indonesia.

REFERENCES

1. Dirjen Yankes. Indonesia Hospital Online [Internet]. Ministry of Health, Indonesia. 2018. Available from: http://sirs.yankes.kemkes.go.id/rsonline/login.php

2. Kemenkeu. Guidelines for Assessment of Performance of the Public Service Agencies in Health Services Division. 2013.
3. Hollingsworth B, Peacock SJ, Hollingsworth B, Peacock SJ. Efficiency Measurement in Health and Health Care [Internet]. Taylor & Francis or Routledge's. 2008. 1-157 p.
4. Hussey PS, Vries H De, Romley J, Wang MC, Chen SS, Shekelle PG, et al. Health Care Efficiency A Systematic Review of Health Care Efficiency Measures. Heal Res Educ Trust. 2008;784–805.
5. Chalidyanto D. Factors relating to the efficiency of government hospitals in Indonesia. Universitas Indonesia; 2013.
6. Cahyani N, Akbar MS, Susilaningrum D. Review on Health Service Efficiency General Hospital In East Java. J Sains dan Seni ITS. 2012;1(August 2016).
7. Veillard J, Champagne F, Klazinga N, Kazandjian V, Arah OA, Guisset A. A performance assessment framework for hospitals: The WHO regional office for Europe PATH Project. Int J Qual Heal Care. 2005;17(6):487–96.
8. Haryadi A. Technical Efficiency Analysis of Education Sector (Application of Data Envelopment Analysis). Universitas Indonesia. Depok.; 2011.
9. Shahhoseini R, Tofighi S, Jaafaripooyan E, Safiaryan R. Hospitals Efficiency measurement in developing countries: application of data envelopment analysis for Iranian. Heal Serv Manag Res. 2011;24(75).
10. Hatam N. The role of Data Envelopment Analysis (DEA) pattern in the efficiency of social security hospitals in Iran. Iran Red Crescent Med J. 2008;10(7):211.
11. Sheikhzadeh Y, Roudsari A, Vahidi R, Emrouznejad A, Dastgiri S. Public and Private Hospital Services Reform Using Data Envelopment Analysis to Measure Technical, Scale, Allocative, and Cost Efficiencies. Heal Promot Perspect. 2012;2:28–41.
12. Yasar A Ozcan. Health Care Benchmarking and Performance Evaluation: An Assessment using Data Envelopment Analysis. Second Edi. Richmond, VA, USA: Springer Science & Business Media; 2014.
13. Ramanathan R. An Introduction to Data Envelompment Analysis; A Tool for Performance Measurement. India: Sage Publications Ltd.; 20013.
14. Karagiannis R. A system of equations two stage DEA approach for explaining capacity utilization and technical efficiency. Ann Oper Res [Internet]. 2015 Apr;227(1):25–43.
15. Nicola A De, Gitto S, Mancuso P, Tor R. A two-stage DEA model to evaluate the efficiency of the Italian health system [Internet]. Italia; 2012. Report No: 39126.
16. Varabyova Y, Schreyögg J. International comparisons of the technical efficiency of the hospital sector: Panel data analysis of OECD countries using parametric and non-parametric approaches. Health Policy (New York) [Internet]. 2013 Sep;112(1–2):70–9.
17. Chang H, Cheng M-A, Das S. Hospital ownership and operating efficiency : Evidence from Taiwan. Eur J Oper Res. 2004;159:513–27.
18. Cellini R, Pignataro G, Rizzo I. Competition and Efficiency in Health Care an Analysis of the Italian Case. 1999. p. 2–18.
19. Hsin-hui H, Qinghui Q, Chih-hai Y. China Economic Review Analysis of hospital technical efficiency in China : Effect of health insurance reform. China Econ Rev [Internet]. 2012;23(4):865–77.
20. Rezaee MJ, Karimdadi A. Do Geographical Locations Affect in Hospitals Performance? A Multi-group Data Envelopment Analysis. J Med Syst [Internet]. 2015 Sep;39(9):1–11.
21. Sulku SN. The health sector reforms and the efficiency of public hospitals in Turkey: Provincial markets. Eur J Public Health. 2012;22(5):634–8.
22. Hofmarcher MM, Paterson I, Riedel M. Measuring Hospital Efficiency in Austria – A DEA Approach. Heal Care Manag Sci 5,. 2002;5:7–14.
23. Mahate A, Hamidi S. Frontier efficiency of hospitals in United Arab Emirates: An application of data envelopment analysis. J Hosp Adm [Internet]. 2015;5(1):7–17.

24. Hafidz F, Ensor T, Tubeuf S, Building W, Hospital SA. Assessing Hospital Performance in Indonesia: An Application of Frontier Analysis Techniques. Leeds; 2018. Report No.: WP18_1.

25. CHEPS, PPJK, AIPHSS. Indonesia National Health Accounts 2014. Jakarta, Indonesia; 2016.

26. Soewondo, P., Nadjib, M., Sari, K., Yunita & Afdhila N. Sha-based health accounts in the asia-pacific region: Indonesia 2005-2009. Seoul, Republic of Korea.; 2011.

27. Mahendradhata, Y., Trisnantoro, L., Listyadewi, S., Soewondo, P. M, T., Harimurti, P. & Prawira J. The Republic of Indonesia Health System Review. India; 2017.

28. Chisholm D, Evans DB. Improving health system efficiency as a means of moving towards universal coverage. 2010;

Customers' Service Expectations in Dental Hospital: Using Servqual Model

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ABSTRACT

Background: In the health care industry, customer observations are a focal point of service quality. To improve quality, service marketers have to identify the expectation of targetted customers. Pediatric dentistry is well positioned to help ameliorate the Early Childhood Caries (ECC) disease burden. As stated in the Surgeon General's 2000 report, ECC is the most common chronic childhood disease, with a prevalence five times that of asthma. The key to prevention is early intervention and regular preventive dental care based on risk and disease management. In disease management, if perceived service exceeds expected service, the customers are apt to use the service provider again.

Purpose: This study aims to identify factors that affect customers' service expectations using the SERVQUAL model.

Method: The sample was selected using accidental sampling. Service expectations were measured using the five SERVQUAL dimensions questionnaire. A total of 93 participants completed the questionnaire.

Results: The highest customers' service expectations from five SERVQUAL dimensions was reliability (3.97). The relationship of reliability service quality with education level of customers was 2.039 times that of others service quality (OR = 2.039, CI = 0.429 to 9.686). The relationship of reliability service quality with customer has visited other health cares was 2.141 times that of others service quality (OR = 2.141, CI = 00.451 to 10.178).

Conclusion: To make the customers to use the services and improve the quality of service in the department of pediatric dentistry in Airlangga dental hospital, reliability must be provided based on customers' service expectations.

Keywords: *Service Quality; Customers' Expectations; Dental Hospital.*

Introduction

In the 21st century, all successful organizations adopt customer focus as the central pillar of their strategic planning[1]. Top service companies recognize that outstanding quality gives them a potent competitive advantage that leads to superior sales and profit performance[2].

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A service is any activity or benefit that one party can offer to another which is essentially intangible and does not result in the ownership of anything[2]. To evaluate a service is more complex than to evaluate a product. To evaluate a product is tangible and its defects can be detected, its functioning assessed and its durability compared. To evaluate a service, it is first purchased and then produced and consumed simultaneously, then the possible nonconformities are produced and experienced, characterizing their inseparability[3].

Similar to other service industries, health care has become a highly competitive and rapidly growing industry worldwide[1]. In the health care industry, customer observations are a focal point of service

quality. To improve quality, service marketers have to identify the key determinants of service quality (that is, the key criteria customers use to judge quality), what target customers' expectations are, and how customers rate the firm's service in relation to these criterias against what they expected[2].

Airlangga Dental Hospital is the first sophisticated hospital in Indonesia and serves patients from all parts of eastern Indonesia. Airlangga dental hospital is required to provide high quality services with adequate facilities. One of the facilities in Airlangga dental hospital is the department of pediatric dentistry.

Pediatric dentistry is well positioned to help ameliorate the Early Childhood Caries (ECC) disease burden. As stated in the Surgeon General's 2000 report, ECC is the most common chronic childhood disease, with a prevalence five times that of asthma. And ECC is an entirely preventable disease. The key to prevention is early intervention and regular preventive dental care based on risk and disease management, but many families only seek dental care when problems occur[4].

Grönroos (1984), defined service quality as matching the expected service towards the perceived service[5]. Parasuraman et al. (1988), defined service quality (SERVQUAL) as the difference between consumers' perceptions and expectations along the 5 dimensions of quality[5]. Kotler et al. (2005), defined service quality as the result of a comparison of what they expect with what they experience. Customers' service expectations are formed from past encounters and experiences, word-of-mouth and the firm's advertising. If perceived service of a given firm exceeds expected service, customers are apt to use the service provider again[2].

Accordingly Parasuraman et al. suggested SERVQUAL's five dimensions, which are described as follows[6]:

1. **Tangibles:** physical facilities, equipment, and appearance of personnel
2. **Reliability:** ability to perform the promised service dependably and accurately
3. **Responsiveness:** willingness to help customers and provide prompt service
4. **Assurance:** knowledge and courtesy of employees and their ability to inspire trust and confidence
5. **Empathy:** caring and individualized attention that the firm provides to its customers

This study aims to identify factors that affect customers' service expectations in the department of pediatric dentistry in Airlangga dental hospital using the SERVQUAL model. To make the customers use the service provider, most hospitals should improve the quality of their services.

Materials and Method

The data was collected in February, 2013. Sampling was done by non-probability sampling with accidental sampling. Samples were taken accidentally, if there have been found visitors who minimum three visits to the the department of pediatric dentistry in Airlangga dental hospital Surabaya, then they will become participants. The participants were asked to participate in a study that measured service expectations towards Pediatric dentistry of dental hospital Surabaya and they were given the expectations of the SERVQUAL questionnaire. The study instrument was based on statements measuring five SERVQUAL dimensions. These dimensions included tangibles (4 items), reliability (3 items), responsiveness (3 items), assurance (4 items), and empathy (3 items). All statements were measured on a 4-point Likert scale from 1 for "strongly disagree" to 4 for "strongly agree." A total of 93 participants completed the questionnaire.

Results

Customers' Demographic Characteristic: According to the survey results, the specific customers' demographic characteristics are shown in Table 1.

Table 1: Result of Demographic Characteristics

Demographic Characteristics	N	%
Gender		
Male	31	33.3
Female	62	66.7
Age (years)		
21-30	6	6.5
31-40	40	43.0
41-50	47	50.5
Education Level		
School	38	40.9
University	55	59.1

Conted…

Has visited other health care		
Yes	37	39.8
No	56	60.2

Customers' Service Expectations of SERVQUAL Dimensions: The specific customers' service expectations of SERVQUAL dimensions are shown in Table 2.

Table 2: Results of SERVQUAL Dimensions

SERVQUAL Dimensions	Mean	Standard Deviation	Rank
Tangibles	3.93	0.11	2
Reliability	3.97	0.08	1
Responsiveness	3.88	0.16	3
Assurance	3.59	0.23	5
Empathy	3.81	0.19	4

Mean Customers' Service Expectations of SERVQUAL Dimensions According to Customers' Demographic Characteristic: The specific result of mean customers' service expectations of SERVQUAL dimensions according to customers' demographic characteristic are shown in table 3.

Table 3: Result of Mean Service Expectations of SERVQUAL Dimensions and Demographic Characteristics

Demographic Characteristics Tangibles		Mean Service Expectations of SERVQUAL Dimensions				
		Reliability	Responsiveness	Assurance	Empathy	
Gender	Male	3.90	3.97	3.83	3.63	3.77
	Female	3.94	3.98	3.90	3.58	3.83
Age (years)	21-30	3.90	4.00	3.82	3.54	3.79
	31-40	3.97	3.96	3.96	3.62	3.82
	41-50	3.75	4.00	3.67	3.75	3.83
Education Level	School	3.93	3.98	3.87	3.61	3.81
	University	3.92	3.97	3.89	3.56	3.81
Has visited other health cares	Yes	3.90	3.98	3.85	3.61	3.81
	No	3.96	3.97	3.92	3.56	3.81

Relationship Customers' Demographic Characteristic with Customers' Service Expectations of SERVQUAL Dimensions: The specific results of relationship customers' demographic characteristic with customers' service expectations of SERVQUAL dimensions are shown in Table 4.

Table 4: Result of Relationship Customers' Demographic Characteristic with Customers' Service Expectations of SERVQUAL Dimensions

Demographic Characteristics Tangibles		Service Expectations of SERVQUAL				
		Reliability	Responsiveness	Assurance	Empathy	
Gender	OR	1.979	1.554	2.292	-	-
	CI	0.783-5.003	0.325-7.418	0.939-5.596	-	-
Age (years)	OR	-	-	-	-	-
	CI	-	-	-	-	-
Education Level	OR	1.231	2.039	0.747	-	-
	CI	0.498-3.044	0.429-9.686	0.312-1.791	-	-
Has visited other health cares	OR	0.323	2.141	0.429	-	-
	CI	0.115-0.902	0.451-10.178	0.171-1.074	-	-

Discussion

This study aims to identify what target customers' expectations are in the department of pediatric dentistry in Airlangga dental hospital. Based on the results of this study, the customers' service expectations from five SERVQUAL dimensions in the department of pediatric dentistry in Airlangga dental hospital were ranked as follows (high to low): reliability (3.97), tangibles (3.93), responsiveness (3.88), empathy (3.81) and assurance (3.59). Reliability as the most important dimension, and assurance as the least important dimension. These results differ from patients' expectations of service quality in China which were ranked as follows (high to low): assurance, empathy, responsiveness, reliability, economy, and tangibles[7]. In Eastern Saudi Arabia, the highest and lowest means of patients' expectations were related to empathy and responsiveness dimensions[8]. In Iranian, the highest and lowest expectation score was related to the assurance (4.7) and reliability (4.43)[9]. This is likely due to the differences in political, economic, and cultural factors between countries and statistical methods used by the researchers, all of which contribute to differences in the demand for medical services[7].

The highest customers' service expectation from five SERVQUAL dimensions was reliability on female (3.98), within 21-30 and 41-50 years old (4.00), on education level being school and on customers who have visited other health cares (3.98). The relationship of responsiveness service quality with the gender customers was 2.292 times that of others service quality (OR = 2.292, CI = 0.939 to 5.596). The relationship of reliability service quality with education level of customers was 2.039 times that of others service quality (OR = 2.039, CI = 0.429 to 9.686). The relationship of reliability service quality with customer has visited other health cares was 2.141 times that of others service quality (OR = 2.141, CI = 00.451 to 10.178). These results differ from patients' expectations in Eastern Saudi Arabia, the female expectations are statistically significantly higher compared with male expectations in tangibility (p=0.001) and reliability dimensions (p=0.01). And university graduate patients have statistically significantly higher expectations in tangible (p=0.002) and reliability (p=0.000) dimensions[8]. Reliability includes doing duties in accordance with the commitments, interesting employees in doing tasks and service provision, doing services correctly at the first visit of patients, providing the services on promised time, maintaining records of clients accurately. Hospitals should improve the reliability of their services to increase patients' loyalty[10].

Conclusions

In conclusion, according to the study results, to make the customers use the services and to improve the quality of service in department of pediatric dentistry in Airlangga dental hospital, the department of pediatric dentistry in Airlangga dental hospital have to provide reliability based on customers' service expectations. Reliability refers to dependability and steadiness of service. Thus, the department of pediatric dentistry in Airlangga dental hospital can help prevention and ameliorate the ECC disease.

Ethical Approval: Health Research Ethics Committee, Faculty of Dental Medicine, Airlangga University, number 1564/KKEPK.FKG/IX/2012.

Conflict of Interest: The authors report no conflict of interest.

Source of Funding: Self

REFERENCES

1. Shafiq, M., Naeem, M. A., Munawar, Z. & Fatima, I., 2017. Service Quality Assessment of Hospitals in Asian Context: An Empirical Evidence From Pakistan. *The Journal of Health Care Organization, Provision, and Financing,* Volume LIV, pp. 1-12.
2. Kotler, P., Veronica, W., Saunders, J. & Armstrong, G., 2005. *Principles of Marketing.* 14th ed. Europan: Pearson Education Limited.
3. Pena, M. M., Santos da Silva, E. M. & Rizatto, D. M., 2013. The use of the quality model of Parasuraman, Zeithaml and Berry in health services. *Rev Esc Enferm USP,* XLVII(5), pp. 1227-1232.
4. Ramos-Gomez, F., Askaryar, H., Garell, C. & Ogren, J., 2017. Pioneering and Interprofessional Pediatric Dentistry Programs Aimed at Reducing Oral Health Disparities. *Frontiers Public Health,* A, Volume V, pp. 1-7.

5. Grönroos , C., 1984. A Service Quality Model and Its Marketing Implications. *European Journal of Marketing,* XVIII(4), pp. 36-44.

6. Parasuraman, A., Zeithaml, V. A. & Berry, L. L., 1988. SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Retailling,* Volume LXIV, pp. 12-40.

7. Fan, L.-h.et al., 2017. Patients' perceptions of service quality in China: An investigation using the SERVQUAL model. *PLoS ONE,* XII(12), pp. 1-13.

8. Al Fraihi, K. J. & Latif, S. A., 2016. Evaluation of outpatient service quality in Eastern Saudi Arabia. *Saudi Med J,* XXXVII(4), pp. 420-428.

9. Rezaei, S. et al., 2016. Measurement of Quality of Educational Hospital Services by the SERVQUAL Model: The Iranian Patients' Perspective. *Electronic Physician ,* VIII(3), pp. 2101-2106.

10. Qolipour, M., Torabipour, A., Khiavi, F. F. & Malehi, A. S., 2018. Assessing Medical Tourism Services Quality Using SERVQUAL Model: A Patient's Perspective. *Iran J Public Health,* XXXXVII(1), pp. 103-110.

The Nurse's Work Culture Relationship with the Quality of Nursing Service Between the Government Hospital and Private Hospital: Comparative Study in 2018

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ABSTRACT

Quality nursing care is something that the patient wants and it is promised by the nurse. However, at this time there are still many complaints of the community, the patient's family and patients on the quality of services provided by the nurse. This study aims to see differences in the relationship of work culture with the quality of nursing service in Muhammad Sani Karimun hospital as a public hospital and Bakti Timah Karimun hospital as a privat hospital in 2018. Design of this research is *Comparative design.* Samples were taken *stratified random sampling* with total of 60 nurses for Muhammad Sani Karimun hospital and 60 nurses for Bakti Timah hospital. The result of statistical test at Muhammad Sani Karimun hospital shows there is a relationship of work culture of nurse (p *value* = 0,006). Likewise in Bakti Timah hospital found a relationship of work culture nurse (p *value* = 0,005) with quality service nursing. Furthermore *Mann Whitney* test obtained service quality variables (p *value* = 0.006) has a difference between Muhammad Sani Karimun hospital and Bakti Timah Karimun hospital. However, for nurse work culture variable (p *value* = 0,570) there is no difference. This research is expected to be an input for the related hospitals so as to improve the quality of nursing service in particular.

Keywords: *Work culture, supervision, quality of nursing service, private hospital, public hospital*

Introduction

Hospital as a health care organization is a part of health resources that are needed in supporting the implementation of health services. One of the health services provided is nursing service. The Institute of Medicine defines the quality of nursing care as the extent to which health services are provided to individuals and communities in improving healthcare with the latest science[(1)].

Ordem Dos Enfeimeiros which presents six categories to determine the quality of nursing service based on nurse perception that are patient's satisfaction, health promotion, prevention of complication, welfare and self-care, and functional adaptation and organization of nursing[(2)].

The inability to inculcate a good work culture will affect the ability to maintain the quality of health care and will negatively impact patient satisfaction and productivity among staff [(3)]. A poor work culture also reduces the involvement of employee and can increase in unplanned absences as well as stress-related occupational health and safety claims, it is alsowill decrease the productivity and quality of service[(4)].

Purpose of his research is to discern relationship and differences of work culture and supervision with the quality of nursing service in Muhammad Sani Karimun hospital and Bakti Timah Karimun Hospital in 2018.

Materials and Method

This research is a kind of quantitative research. The method or design used is Comparative. This study is a research designed to determine the differences and effects of different variables in a population.

The populations in this study were all nurses at the Muhammad Sani Karimun hospital, it is about 170 people and all nurses in Bakti Timah hospital amount to 129 people. So the total number of population from both hospitals amounted to 299 people. Sample of the study in public and private hospitals respectively are 60 respondents. Sampling technique in this research is stratified random sampling.

Additional data to complete the data will be conducted questionnaires about the work culture of nurses and the quality of nursing services. To measure the quality of nursing services, the researchers used the Quality of Nursing Care questionnaire [2]. The researchers modified from several questionnaires to describe the nurse's work culture of Work Of Meaning Inventory (WOMI) by Lee, Attitude Scale Toward Nursing Profession (ASNP), Environment Scale Od The Nursing Word Index (PES - NWI), Nurse- Nurse Collaboration Behavior Scale [5].

Research Finding

The frequency distribution of nursing service quality variable, nurse work culture and supervision as much as 41.7% nurses stated that the quality of nursing service in Muhammad Sani Karimun hospital is good and 66.7% of nurses stated the quality of nursing service at Bakti Timah Karimun hospital is good.

While for nurse work culture variable is 61,7% nurse stated that work culture of nurse in Muhammad Sani Karimun hospital good and equal to 66,7% nurse stated nurse work culture at Bakti Timah Karimun hospital is good.

Table 1: The Relationship of nurse working culture with quality of nursing service in Muhammad Sani Karimun Hospital

Nursing work culture	Quality of nursing service				Total n %		p value
	Not Good		Good				
	n	%	n	%	n	%	
Not Good	19	82,6	4	17,4	23	100	0,006
Good	16	43,2	21	56,8	37	100	

Table 1 can be seen that of 37 respondents who have good work culture as many as 21 people (56.8%) with good nursing service quality and 16 people (43.2%) with poor service quality. While from 23 respondents with bad work culture as much as 4 (17,4%) nurse with good service quality and 19 (82,6%) with poor service quality.

Chi-Square test results obtained p *value* = 0.006 (p <0.05) which means there is a relationship between nurse work culture with the quality of nursing service.

Table 2: The Relationship of the nursing work culture with the quality of nursing service in Bakti Timah Karimun Hospital

Nursing work culture	Quality of nursing service				Total n %		p value
	Not Good		Good				
	n	%	n	%	n	%	
Not Good	12	60	8	40	20	100	0,005
Good	8	20	32	80	40	100	

Table 2 can be seen that 40 respondents who have a good work culture as much as 32 people (80%) with good nursing service quality and 8 people (20%) with poor quality nursing service. While from 20 respondents with bad work culture as much as 8 (40%) nurses with good services quality and 12 (60%) with poor service quality.

Chi-Square test results obtained p *value* = 0.005 (p <0.05) which means there is a relationship between nurse work culture with the quality of nursing services in Bakti Timah Karimun hospitals.

Table 3: The Differences in Quality of Nursing Cares between RS.Bakti Timah and Muhammad Sani Karimun hospital Karimun District

Variables	Hospital Status	n	p value
Quality of nursing services	Muhammad Sani Karimun hospital Bakti Timah Karimun Hospital	60	0,006
Nursing work culture	Muhammad Sani Karimun hospital Bakti Timah Karimun Hospital	60	0,570

The results of the analysis in Table 3 shows that the variable quality of nursing care with respondents from hospitals M. Sani Karimun numbered 60 nurses and the number of respondents from the RS. Bakti Timah Karimun amounted to 60 people got value p *value* = 0.006 (<0.05) means there is a difference in quality of nursing service between Muhammad Sani Karimun hospital with RS. Bakti Timah Karimun.

The results of the analysis in Table 5.3 shows that nurses work culture variable with the number of respondents from hospitals M. Sani Karimun numbered 60 nurses and the number of respondents from the RS. Bakti Timah Karimun amounted to 60 people got p *value*

= 0,570 (> 0,05) means there is no difference of work culture of nurses between Muhammad Sani Karimun hospital with RS. Bakti Timah Karimun.

Discussion

A. Picture of Quality of Nursing Service at Muhammad Sani Karimun and Bakti Timah Karimun hospital.

The results of the research showed the quality of nursing service in RSUD M. SaniKarimun in 2018 that is equal to 41.7% nurses stated good. While the results of research in Bakti Timah Karimun hospital Karimun showed that the quality of nursing services in hospitals. Bakti Timah Karimun in 2018 that is equal to 66.7% nurses stated good.

Davis defines quality as a dynamic condition that deals with products, services, people, processes, and environments that meet or exceed expectations. Research conducted in Muhammad Sani Karimun hospital 19 statements about the disseminated through questionnaires on the quality of nursing services found that all nurses (100%) stated not knowing the hospital policy about minimum service standards to improve the quality of service. Furthermore, more than half (98.3%) of nurses said they were unable to handle a situation that was less conducive for patients who could help improve patients' welfare and daily activities.

The research conducted in Bakti Timah Karimun hospital Karimun where 19 statements about the quality of nursing service based on the questionnaire distributed found that as many as 28.3% nurses said did not improve the ability of patients and invite family members closest to provide therapy that has been prepared for patients. Similarly, as many as 21.7% of nurses said they did not evaluate interventions that help improve patient health and daily activities.

Based on the analysis of questionnaires in Muhammad Sani Karimun hospital can be seen that all nurses as samples in the study did not know the hospital policy about hospital minimum service standards caused by lack of socialization from management related to hospital policy. Lack of nurse knowledge about the policy in Muhammad Sani Karimun hospital about the quality of nursing service is one of the items of the organization of health services.

Based on Law No. 69 of 2014 on hospital obligations in Indonesia which are obliged to provide safe, quality discrimination and effective health services by prioritizing the interests of patients in accordance with hospital service standards. In addition, the hospital is also obliged to formulate a policy conducive to health services in accordance with the code of ethics Hospital

Based on the analysis of questionnaires at Bakti Timah Karimun Hospital it was found that less than half the nurses stated the nurse's ability to improve the patient and family's ability to provide ready-made therapy for patients who were part of functional adaptation. In functional adaptation there are several items used to measure the continuity of the process of providing nursing services, maximizing the use of resources of the patient's family and optimizing the increased capacity of patient and family knowledge of the patient to manage self-care .

B. Work Culture and Its Relation to Quality of Nursing Service at Muhammad Sani Karimun and Bakti Timah Karimun hospital.

The result of research on the correlation between the working culture and the quality of nursing service in Muhammad Sani Karimun hospital illustrates that a good work culture has more proportion for the improvement of good nursing service quality by 21 people (56,8%) and 16 people (43,2 %) results in poor service quality. Statistical test results can be seen that there is a significant relationship (p *value* = 0.006) between the work culture of nurses with the quality of nursing service

The results of the research in Bakti Timah Karimun hospital. Results concerning the relationship of work culture with the quality of nursing service in Bakti Timah Karimun hospital illustrates that a good work culture has more proportion to improve the quality of good nursing service as much as 32 people (82%) and as many as 8 people (20%) produce poor service quality. Statistical test results can be seen that there is a significant relationship (p

value = 0.005) between the work culture of nurses with the quality of nursing service.

The results of this study are in accordance with the concepts put forward [6] where poor culture generally manifests as disruptive behavior, factionalism, or the emergence of counter-culture, actively working against the best interests of the organization as a whole. A poor work culture also erodes employee engagement and may lead to an increase in unplanned absenteeism and occupational health and safety claims related to stress. It can not be denied, the productivity and quality of services will decrease.

The results of the questionnaire analysis found that the lack of cooperation among staff, inflexible work schedules and the lack of *caring* nurses is part of the attitude and behavior of nurses when working as well as the factors causing the nurse's work culture is not good so the quality of nursing service becomes less good. Humans show a variety of attitudes toward work. Attitude is the tendency of the soul to something. This tendency ranges from taking full acceptance or refusing to the utmost. Zulkifli (2014) states that attitudes toward work can also be interpreted as a joy of work compared to other activities or simply to gain satisfaction from his own work or feel compelled to do something just for his life [7] .

However, if nurses are not satisfied with their work and who have less good attitude toward their profession will experience more problems such as stress, tension, and high anxiety. This will deter them in their work. Nurses' attitudes toward their work, profession, organization, and administration will predict the behavior they will show in it [8].

C. Differences in quality of nursing care between hospitals. Bakti Tin with Muhammad Sani Karimun hospital Kab. Karimun 2018.

The results of the analysis in Table 5.3 shows that the variable quality of nursing care with respondents from M. Sani Karimun hospitals numbered 60 nurses and the number of respondents from the RS. Bakti Timah Karimun amounted to 60 people got value p *value* = 0.006 (<0.05) means there is a difference in quality of nursing service between Muhammad Sani Karimun hospital with Bakti Timah Karimun hospital.

These differences shows that private hospitals play a significant role in society, and higher perceived service quality will only increase demand for their services [9].

The result of bivariate data of difference shows that mean value of Bakti Timah Karimun hospital is bigger than Muhammad Sani Karimun hospital. The statistic shows that there is a difference of the quality of nursing service of Muhammad Sani Karimun hospital and Bakti Timah Karimun hospital is caused by the ineffective nurse in giving nursing care which we can see in the distribution of questionnaire answers where as many as 66,7% nurses stated no intervention to prevent complication because nurses are more waiting for therapy from doctors so as to prevent more complications delegated to medical personnel such as doctors.

D. Differences of nurse working culture between RS. Bakti Tin with RSUD M. SaniKarimunKab. Karimun2018.

The results of the analysis in Table 5.3 shows that nurses work culture variable with the number of respondents from hospitals Muhammad Sani Karimun numbered 60 nurses and the number of respondents from the Bakti Timah Karimun hospital amounted to 60 people got p *value* = 0,570 (> 0,05) means there is no difference of work culture of nurses between Muhammad Sani Karimun hospital with RS. Bakti Timah Karimun.

Based on the questionnaire analysis can be seen many similarities between Muhammad Sani Karimun hospital and Bakti Timah Karimun hospital Karimun. The same thing is seen between Muhammad Sani Karimun hospital and Bakti Timah Karimun hospital, where 71% of nurses stated that they have an inflexible work schedule. Many people work long hours, consequently they face conflict between family and work. Especially for women, do not have the time they want for the family because of working hours long and uncomfortable [10].

Working in flexible working hours allows people to manage their daily lives better and reduce family conflicts. Results of research conducted by [10] showed that the flexibility of work has a

positive and significant effect on job satisfaction, work flexibility has a positive and significant effect on employee performance.

Recommendation

This research is very important for management in Muhammad Sani Karimun hospital and Bakti Timah Karimun hospital which is in the scope of nursing service as an effort to improve the quality of nursing service.

Relevance of the Study

This research will produce an overview of the application of nurse work culture, supervision on the quality of nursing services in hospitals, especially in riau islands and Indonesia in general.

Conclusion

Culture work evidently have a significant relationship with quality service nursing in Muhammad Sani Karimun hospital and Bakti Timah Karimun hospital . There is difference quality service nursing between Muhammad Sani Karimun hospital and Bakti Timah Karimun hospital there is difference nurse work culture between two hospitals. The next researchers next could dig factor others that affect quality service nursing and factor cause existence difference quality service nursing between private hospital and government hospital.

Conflict of Interest: No conflict of interest arose in this study

Sources of Funding: This study was conducted using a source of funds derived from the researcher himself

Ethical Clearance: This study has passed of the medical reseach ethics of the Dr. M. Djamil Hospital Padang Indonesian.

REFERENCES

1. Aron S. Relationship between Nurses â€™ Job Satisfaction and Quality of Healthcare They Deliver. 2015;
2. Manuela M, Pereira F, Narcisa M, Ii G, Maria O, Lopes P, et al. Quality of nursing care : instrument development and validation. 2016;69(5):864–70.
3. Tillott S. The importance of staff engagement to the development of positive workplace cultures. 2013;3(1):1–7.
4. Ng JL, Johnson A, Nguyen H, Groth M. Workplace Culture Improvements: A Review of the Literature. 2014;(June):1–93.
5. Liao C, Qin Y, He Y, Guo Y. ScienceDirect The Nurse e Nurse Collaboration Behavior Scale : Development and psychometric testing. Int J Nurs Sci [Internet]. 2015;2(4):334–9. Available from: http://dx.doi.org/10.1016/j.ijnss.2015.10.005
6. Ali NM, Jangga R, Ismail M, Mat SN. Influence Of Leadership Styles In Creating Quality Work Culture. Procedia Econ Financ [Internet]. 2015;31(15):161–9. Available from: http://dx.doi.org/10.1016/S2212-5671(15)01143-0
7. Djumlani A. Hubungan Budaya Kerja Dengan Komitmen Sakit Jiwa Daerah Atma Husada Mahakam. 2014;2(2):1316–27.
8. Coban GI. Analysis of Nurses ' Attitudes about the Nursing Profession in Southern. 2015;8(3):665–72.
9. Yousapronpaiboon K. A Comparison of Service Quality between Private and Public Hospitals in Thailand. 2013;4(11):176–84.
10. Surakarta UM, Nuraini D. Pengaruh fleksibilitas kerja dan spesialisasi pekerjaan terhadap kinerja karyawan dengan kepuasan kerja sebagai variabel mediating pada pt. daya manunggal salatiga. 2017;

Relationship of Hand-Hygiene Compliance Score with Nurse's Engagement in Intensive Care Unit

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ABSTRACT

Background: Infectious diseases are still the main cause of the high rate of morbidity and mortality in the world. Hand-hygiene behavior is one factor that has a major influence on prevention of nosocomial infections (INOS) in the hospital.

Objective: the aim of this research is to find the correlation of nurse engagement with the level of compliance of hand-hygiene ICU nurse activity in Surabaya Islamic Hospital.

Method: This research is a quantitative analytic research and use descriptive design with cross sectional research method. The sampling technique used in this research is total sampling technique that is taking data of all nurses who are in ICU.

Result: The results of this study indicate that nurse engagement has a correlation with the compliance of nurses in implementing hand-hygiene.

Keywords: *Compliance, Engagement, Hand-Hygiene, Nurse*

Introduction

Act Number 44 year of 2009 on Hospital states that hospitals must apply the patient safety standards[1]. Patient Safety Program is to ensure patient safety in the hospital through prevention of errors in the delivery of health services. Hospitals are required to provide quality and transparent health services to the public, especially for assurance of patient safety, so hospitals need to improve the services quality, especially in the prevention and control of infections[2].

The prevention and control of infections is become particular concern due to the incidence of infections in hospitals are considered as a serious problem because they threaten the health and safety of patients and health workers globally. In addition, the incidence of these infections are also impacted on the quality of health services and on increased healthcare financing[3]. According to WHO (2011) HAIs are the patient-acquired infections during treatment procedures and medical procedures in health services that occurred after ≥48 hours of treatment and ≤30 days after released from health facility. Based on the French National Prevalence Survey, the frequent locations of nosocomial infections include urinary tract, airway, surgical wound, skin and tissue, ears, nose and throat, eyes, locations of catheter put in and other locations[4].

According to the data from Indonesian Ministry of Health, nosocomial infections rates which occurring in some countries of European and American are low, approximately 1% if it is compared with the incidence in the countries of Asia, Latin America and Sub-Saharan Africa which are high, reaching more than 40%, and according to the data of WHO (2009), the incidence rate of infection in the hospital are about 3-21% (mean of 9%). By seeing these data, the hospital should anticipate to prevent nosocomial infections incidences in the future. One of the efforts is through the application of hand-hygiene 5-moments that are before contact with

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patients, before administer aseptic action, after exposure of patient's body fluid, after contact with patient, after contact with the environment around patient.

Data of hand-hygiene compliance score of nurses at ICU in August 2017 was 80% and in September 2017 was 80%. These are still lower than the standards set by the hospital that is 85%. There are many factors that influence nurse compliance in applying hand-hygiene 5-moments, one of them is nurse's engagement to the organization[5].

To evaluate the relationship of nurse's engagement with nurse's compliance of hand-hygiene at ICU of RSIS, it is conducted the scientific approach in order to find the relationship between variables so that the nurse's engagement at ICU of RSIS can be measured through the implementation of hand-hygiene 5-moments. The results obtained will be useful for RSIS management in planning the best strategies for improving or maintaining excellent performance through improvement or enhancement of appropriate infection prevention and control. It is necessary to develop a performance-based nursing policy so as it can improve the nurse's performance in Infectious Diseases Prevention against the prevention of nosocomial infections at RSIS. As a result, the number of nosocomial infections can be decreasing so that RSIS can provide the best service for the patient. This study is aims to analyze the relationship between nurse's engagements with hand-hygiene compliance at ICU of RSIS.

Method

This study is a quantitative analytic research and using descriptive design with cross-sectional method of research. Cross-sectional method of research is one form of the most frequently observational (non-experimental) study. In a broader meaning, the cross-sectional study includes all types of research whose variable measurements were performed only once at one time [6]. This study is to determine the correlation of nurse's engagement with hand-hygiene behavior by means observation approach or data collection, which the data was taken in the form of questionnaire to measure nurse's engagement by using Gallup Survey. The research was conducted at Surabaya Islamic Hospital with the time research was conducted from December 20 until December 27, 2017. The number of respondents used as many as 12 nurses of ICU who the total sampling.

Results and Discussion

Based on surveys given to nurses using Gallup Survey to measure nurse's engagement and secondary data of Committee on Infection Prevention and Control of Surabaya Islamic Hospital, then the following data are obtained.

Table 1: Frequency Distribution of Respondents Based on Nurse's Engagement at ICU Room of Surabaya Islamic Hospital in 2017

Engagement	Frequency (n)	Percentage (%)
Not engaged	5	41.7
Engaged	7	58.3
Total	12	100.0

Source: Primary Data, 2017

Based on Table 1 it can be learned that most of the implementer nurses (58.3%) at ICU Room of Surabaya Islamic Hospital include engaged employees.

Table 2: Frequency Distribution of Respondents Based on Nurse's Compliance in Implementing Hand-Hygiene at ICU Room of Surabaya Islam Hospital in 2017

Hand-Hygiene Compliance	Frequency (n)	Percentage (%)
Non comply	7	41.7%
Comply	5	58.3%
Total	12	100.0

Source: Primary Data, 2017

Based on Table 2 it can be learned that from 12 implementer nurses, most of the nurses at ICU of Surabaya Islamic Hospital are non-comply to implementing hand-hygiene, those are 7 peoples (58.3%).

Table 3: Relationship of Nurse's Engagement with Nurse's Compliance in Implementing Hand- Hygiene at ICU Room of Surabaya Islamic Hospital in 2017

Engagement	Hand-Hygiene Compliance				Total	
	Non-comply		Comply			
	n	%	N	%	N	%
Not engaged	5	100.0	0	0.0	5	100.0
Engaged	2	28.5	5	71.4	7	100.0
Total	7	58.3	5	41.6	12	100.0

Source: Primary Data, 2017

According to Table 3, it can be learned that the more not engaged of implementer nurses at ICU of Islamic Hospital Surabaya, the higher the tendency of the nurse to non-comply in implementing hand-hygiene at ICU of Surabaya Islamic Hospital. The results of cross-tabulation in this study indicate that nurse's engagement are tends to have relationship with the nurse's compliance in implementing hand-hygiene.

Discussion

Based on the observation at ICU of Surabaya Islamic Hospital by using observation sheets and check list, the implementation of hand-hygiene 5-moments has not implemented well that is 80% while the standard set by the hospital is 85%. This is in line with a study of 40 hospitals that reported health worker compliance to hand-hygiene before and after contact to patient are vary between 24% to 89% (mean of 56.6%). The study was conducted after the promotion of WHO program in infection control[7].

From hand-hygiene 5-moments, these are before contact with patient, after contact with patient, before aseptic action, after exposure of patient's body fluid, after contact with patient, after contact with area around patient, then the most often missed is the moment before contact with patient. This is in line with previous study that calculated the value of compliance at the momen 1 is the lowest point by 0% before conducting the training and it was increased to 25% after conducting training [8]. However, contrasting with that study, ICU nurses are had accepted regular training on hand-hygiene so that unreached target of hand-hygiene is not due to low level of education.

Increasing the value of job characteristics, hospital support, supervisor support and rewards and recognitions for the nurses can significantly increase nurse's engagement. Leaders and management of hospital need to consider the importance of growing and improving engagement to increase nurse's productivity and loyalty by giving rewards and recognitions to the nurses through hospital and supervisors support and adjusting job characteristics with nurse's job placements[9].

There are many causes of noncompliance in hand-hygiene, in this study is looking at the relationship with nurse's engagement level. Based on Table 1 shows that 58.3% of nurses are not engaged, this is caused by a lack of supervisor supports at ICU.

Employees' engagement is essential in improving employees' initiatives to implementing hand-hygiene 5-moments. When it is compared to forcing employees through regulations, by improving engagement is proved more successful in increasing employees' compliance score in hand-hygiene[10]. This was support the results of Table 3, where the more nurses are not engaged, the more nurses are non-comply in hand-hygiene.

Conclusions and Suggestions

The results of this study indicate that nurse's engagement tends to have relationship with nurse's compliance in implementing hand-hygiene.

Lack of compliance in hand-hygiene of nurse at ICU is more due to lack of supervisors. To increasing hand-hygiene scores at ICU it can be started by modeling with pear group method. From this pear group then they can remind each other to implement hand-hygiene 5-moments well.

Giving non-monetary rewards can also be done to improve nurse's engagement. Giving rewards to the best employees in this month, giving bonus for achieving the target can be one of steps that can be done.

Ethical Clearance: Taken from ethic committee of the hospital

Source of Funding: Self Funding

Conflict of Interest: There aren't any relevant conflict of interest

REFERENCE

1. Undang–Undang Republik Indonesia No. 44 tahun 2009 Tentang Rumah Sakit.
2. Kementrian Kesehatan Republik Indonesia, Petunjuk praktis Surveilans Rumah Sakit, Jakarta, 2010
3. Turkan Toka Ozer, Nosocomial Infections in a District Hospital In Turkey, Biomedical Research ,Volume 26, Issue 2, 2015
4. WHO, Prevention of hospital-acquired infections A PRACTICAL GUIDE 2nd edition, 2002
5. Centre Of Disease Control and Prevention, Health, United States, 2011

6. Sastroasmoro S, Ismael S. Dasar-Dasar Metodologi Penelitian Klinis. Jakarta: Sagung Seto; 2011.
7. Aiello AE, Larson EL ; Againts disease : the impact of hygiene and cleanliness on health ; 2008
8. Jamaludin J., Sugeng S., Wahyu I., Sondang M. ;Kepatuhan cuci tangan 5 momen di Unit Perawatan Intensif.; Jakarta: Majalah Kedokteran Terapi Intensif. Volume 2 nomor 3 Juli 2012
9. Supardi, Faktor – factor yang berhubungan dengan keterlekatan (Engagement) perawat di Rumah Sakit Umum Provinsi Nusa Tenggara Barat; Yogyakarta. 2014
10. The Joint Comitee, MEASURING HAND HYGIENE ADHERENCE: OVERCOMING THE CHALLENGES, Philadelphia, 2009
11. Dempsey, Nurse Engagement : What are the contributing factor for success. Online J Issues Nurs. 2016.
12. Dwi Bagus Susilo, KEPATUHAN PELAKSANAAN KEGIATAN HAND HYGIENE PADA TENAGA KESEHATAN DI RUMAH SAKIT X Surabaya. 2015
13. Becker. Strategies to Achieve Hand Hygiene Compliance
14. Nursalam, PENGEMBANGAN KINERJA PERAWAT TERHADAP PENCEGAHAN INFEKSI FLEBITIS DI RUMAH SAKIT, Surabaya 2016
15. Sisca Kusumaningtyas, Faktor – Faktor yang mempengaruhi Cuci Tangan Perawat di RS Talangrejo Semarang, 2014
16. Kadek Herna, Hubungan Tingkat Pengetahuan Dengan Perilaku Mencuci Tangan Petugas Kesehatan Di Rumah Sakit Umum Daerah Badung Tahun 2013, 2014
17. Joko Jamaluddin, Kepatuhan Cuci Tangan 5 Momen di Unit Perawatan Intensif, 2013

Development of Management Skills Head of Public Health Center Based on Analysis of Management Skills Theory of Cameron and Quinn

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ABSTRACT

Head of Puskesmas as manajer, is required to have managerial skill. This study to assess management skills Head of Puskesmas then develop recommendations based on the description of the results of the assessment. The type of descriptive research, sampling technique total sampling, data retrieval techniques obtained from the instrument that has been filled by the boss, peers, subordinates and yourself. Data analysis techniques using Cameron and Quinn›s Management Skills Assessment Instrument (MSAI). The variables studied are the type of culture in organization and management skill in each organizational culture as sub variable. Used Likert type as a questionnaire scale. Using the total population as respondents. Results from the assessment of superiors, peers, subordinates, show that the culture of adhocracy is more dominant. The next sequence is the clan culture and then the hierarchy culture and market culture. The implementation of management skills is very strong. In sequence, the strength of managing innovation is at the top, followed by energizing employees, managing team, control system, coordination, interpersonal relationship, continuous improvement, managing the future, managing customer service, the development of others, acculturation and competitiveness. As a recommendation, efforts were made to develop management skills in 12 managerial competencies, with a primary focus on the development of lower-level managerial competencies.

Keywords: *Management Skills, Assessment, Instrument*

Introduction

Head of Public Health Center is a manager. To place a person as Head of Public Health Center, it takes lot of consideration. It is necessary a Head of Public Health Center as a manager who can bring Public Health Center to be the means to achieve the goal as well as possible. Head of Public Health Center was appointed by Pasuruan City Government based on proposal from Pasuruan City Health Office. In the proposed names was appointed as head of the Public Health Center, Health Office do not make spesific assessment of the management skills of each candidate.

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The purpose of this study to assess the management skills of Public Health Center Head and make recommendations on the development of management skills of Public Health Center Heads in Karangketug Public Health Center.

Culture is a shared perception shared by all members of the organization.[1] Organizational culture emerges as a shared assumption held by an organization, as well as a differentiator or a special feature for the existence of an organization. Cameron and Quinn formulate the types of culture within the organization called The Competing Value Framework.[2] Futhermore, Cameron and Quinn develop two quantitative survey instruments called with the Organizational Culture Assessment Instrument (OCAI) and the Management Skills Assessment Instrument (MSAI). Within the OCAI, identified employee perceptions and aspirations about the current and desired organizational culture, which can be categorized into the following four types:

1. **Clan Culture:** The main task of management is to control and nurture employees to make it easier for them to participate.
2. **Adhocracy Culture:** The main task of management is to support and encourage the creation of entrepreneurial spirit and creativity.
3. **Market Culture:** The main task of management is to control the organization to achieve productivity, results and objectives and benefits.
4. **Hierarchy Culture:** The main task of management is to produce goods and services efficiently so as to achieve prosperity in the company.

Management Skills Assessment Instrumen are tools an assessment that helps managers identify the strengths and weaknesses of organizations realize their desired culture.[2] In this article used the MSAI method because there is more division of management skills criteria which will be combined with OCAI as a complement of management skills analysis for the development of managerial capabilities Head of Public Health Center at Karangketug Public Health Center.

Methode Analisis

Types of research: The type of research used is a descriptive method that aims to collect facts, describe, analyze and interpret data into a clear and precise information. The information obtained is a systematic and factual review of management skills Head of Public Health Center at Karangketug Public Health Center.

Sampling Technique: The sampling technique used in this study is total sampling. This means that the entire population in the Karangketug Public Health Center will be taken as respondents.

Data Retrieval Techniques: Data taken from the instrument that has been filled by the boss (Head of Health Office, Secretary of Health Service, Head of Field), peers (Head of Others Public Health Center in Pasuruan City), subordinate (employee of Karangketug Public Health Center), and self (Head of Karangketug Public Health Center)

Data Analysis Technique: Data analysis technique used is descriptive analysis which started with calculation using Management Skill Assessment Instrument (MSAI) which formulated by Cameron and Quinn that is :

1. Grouping the questionnaire items follows the variable operational table above.
2. Calculate the value of each questionnaire item by :

$$Ni = \frac{\text{The total weight of the respondent's answer}}{\text{Number of Respondents}}$$

Information : Ni = value per item

The weight for each respondent's answer is as follows :

Strongly Agree : 5
Agree : 4
Enough : 3
Less Agree : 2
Disagree : 1

3. Calculate the average value of five items representing each managerial skill
4. Plot the average value of each managerial skill to the MSAI diagram
5. The higher the average value indicates that the managerial skills are stronger by following the rules:
   a. 1,00-1,80 (very weak)
   b. >1,80-2,60 (weak)
   c. >2,60-3,40 (enough)
   d. >3,40-4,20 (strong)
   e. >4,20-5,00 (very strong)
6. Comparing the results of judgment in self with others (superiors, peers, subordinates)

Results Analysis

Table 1: Results of Managerial Skill From Superiors, Peers, Subordinates and Self Assessment

Culture	Managerial Skill	Item	Value		Average	
			Others	Self	Others	Self
Clan	Managing Team	12	4,67	4	4,630	4,6
		18	4,70	5		
		21	4,60	5		
		22	4,63	4		
		49	4,55	5		
	Managing Interpersonal Relationship	1	4,82	5	4,598	4,8
		13	4,65	5		
		23	4,48	4		
		48	4,51	5		
		50	4,53	5		
	Managing The Development Others	5	4,55	4	4,584	4,8
		20	4,56	5		
		24	4,58	5		
		25	4,60	5		
		47	4,63	5		

Conted…

Adhocracy	Managing Innovation	2	4,75	5	4,644	4,6
		8	4,62	5		
		26	4,67	5		
		51	4,62	5		
		59	4,56	3		
	Managing The Future	14	4,74	5	4,586	4,6
		27	4,63	5		
		28	4,51	5		
		45	4,60	5		
		46	4,45	3		
	Managing Continous Improvement	9	4,74	5	4,590	5
		29	4,62	5		
		44	4,53	5		
		52	4,58	5		
		53	4,48	5		
Market	Managing Competitiveness	7	4,25	2	4,482	4
		15	4,60	5		
		30	4,53	5		
		42	4,48	3		
		43	4,55	5		
	Energizing Employees	3	4,77	5	4,640	5
		6	4,72	5		
		31	4,53	5		
		32	4,53	5		
		60	4,65	5		
	Managing Customer Focus	33	4,51	3	4,586	4,6
		35	4,67	5		
		41	4,65	5		
		54	4,50	5		
		55	4,60	5		
Hierarchy	Managing Acculturation	10	4,70	5	4,568	5
		11	4,50	5		
		34	4,62	5		
		40	4,53	5		
		56	4,41	5		
	Managing Control System	4	4,70	3	4,626	4,6
		6	4,72	5		
		36	4,60	5		
		39	4,56	5		
		57	4,55	5		
	Managing Coordination	17	4,70	5	4,612	5
		19	4,62	5		
		37	4,55	5		
		38	4,63	5		
		58	4,56	5		

From table 1 it shows that superiors, peers, subordinates assess that the ability to innovate is the most powerfull ability, while the ability to compete get the lowest rating. While from the assessment itself, Head of Public Health Center is very capable of performing managing continuous improvement, energizing employees, managing acculturation and managing coordination. While the ability to compete relatively less than optimal.

Mapping and Managerial Skill Analysis Based on Cameron and Quinn Theory

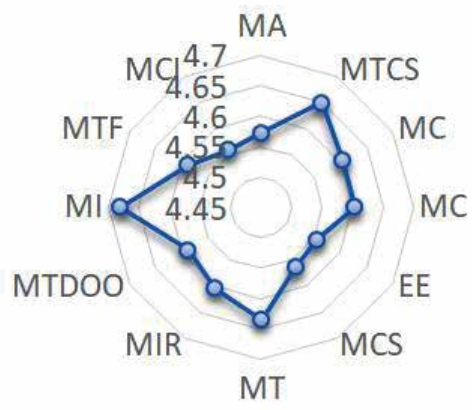
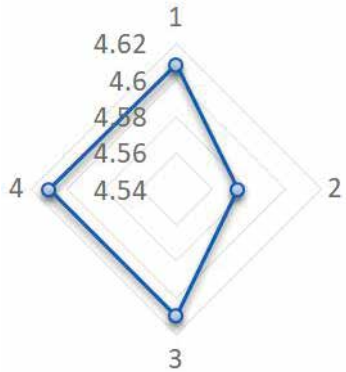


Figure 1: Managerial Skill Mapping from Assessing Superiors, Peer Associates, Subordinates

Information: Value for MA (Managing Acculturation) of 4,57241, MTCS (Managing The Control System) of 4,64828, MC (Managing Coordination) of 4,60345, MC (Managing Competitiveness) of 4,60345, EE (Energizing Employees) of 4,55517, MCS (Managing Customer Service) of 4,56207, MT (Managing Teams) of 4,63448, MIR (Managing Interpersonal Relationship) of 4,60345, MTDOO (Managing The Development of Others) of 4,58966, MI (Managing Innovation) of 4,68276, MTF (Managing The Future) of 4,58966, MCI (Managing Continous Improvement) of 4,55862.



Information: Value for hierarchy culture of 4,608, market culture of 4,574, clan culture of 4,609, adhocracy culture of 4,610.

From the mapping above shows that the culture which is dominant is adhocracy followed by clan culture, hierarchy, market. Karangketug Public Health Center has put forward innovation and initiative and also apply family culture in operation of work team culture and needed development in the field of structuring and increasing competition and increasing income.

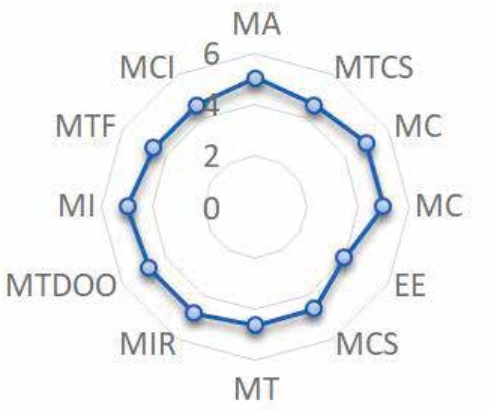
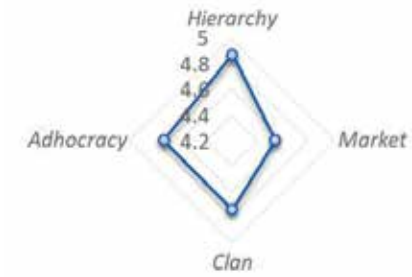


Figure 2: Managerial Skill Mapping from Self Assessment

Information: Value for MA of 5, MTCS of 4,6, MC of 5, MC of 5, EE of 4, MCS of 4,6, MT of 4,6, MIR of 4,8, MTDOO of 4,8, MI of 5, MTF of 4,6, MCI of 4,6.



Information: Value for hierarchy culture of 4,86, market culture of 4,53, clan culture of 4,73, adhocracy culture of 4,73.

From the above mapping shows that the culture which is dominant is hierarchy then followed by the culture of adhocracy then clan terminated market.

There is a clear distinction. Her associates assess the manajer as the weakest in quadrant where managers assess themselves performing quite effectively. The might suggest areas for targeted self-improvement. Most managers judge themselves higher than they are rated by their peers. At present, the assessment is sufficient to help managers gain an overall picture of her managerial streghts and weaknesses. Managers use the feedback data in the report is to identify the competencies that require improvement and competency where changes could facilitate the desired cultural shift.

To improve skills generate employee's energy, Head of Public Health Center need to learn to motivative employees. Motivating employees can be through the provision of incentives, rewards, appreciate what the employee has done.[3] The commitment and the support from the leader is ways to appreciate the contribution, loyalty, dedication and effort of the employees. Motivation to gain training and development opportunities affect employee performance.[3] Managers need to provide working environment, working conditions, interpersonal relationships, organizational policies that are conducive to improving employee performance.[4]

To improve the acculturation capability the Head of Public Health Center needs to use organizational culture as a control management mechanism and to install a trust system among employees.[5]

The Head of the Public Health Center needs to ensure that activities are in line with the plan, objectives are achieved, human and financial resources and material resources are used effectively and efficiently. Therefore the Head of Public Health Center needs to improve her control management. A good management control system should generate motivation for employees.[6]

Head of Public Health Center need to make various innovations for customer. The innovation is a follow up in the competition of health care services. Customer Relationship Management (CRM) includes the methods and technologies companies use to manage their relationships with customers.[7] The information stored for each customer and prospect analyzed and used for personalized automatically based on customer information stored in the system. Rational Unified Process (RUP) is a software development approach that is done repeatedly, focus on the architecture, more directed based on use case (use case driven).[8] The purpose of making use cases is to communicate what is required from the user's perspective. Users who have CCM positions use a management system to perform a reminder that is in the system. Users who have administrative positions CCM use management system to follow up customer after done reminder.

Need to improve managerial skill in managing interpersonal relationships. Management can play a role in promoting friendship and a climate of openness in the workplace, initiate social activities, build a sustainable team, involving employees in the recruitment process, interact with members on a regular basis, talking to everyone, not shouting at one of the employees in public, talking to a team member directly, sit down with the team and help them plan their day.[9] Manager must be accessible to a team member, direct intervention in cases of conflict between subordinates, sitting with the individual, present in informal meeting with subordinates, present for picnic, delegate responsibilities and ask them to take individual responsibility, rewarding employees who perform well, not arrogant, not hurt the team members.

Head of Public Health Center need to improve the future management skills. The development of visionary leadership by motivating employees to produce innovative work, learning to understand about politics, sociology and general managerial techniques, difficult learning, maximize energy to issue quality decisions, thinking and simple logic, dare to take risks.[10]

The Head of Public Health Center need to improve the skill of managing innovation. When innovation is not perceived by the organization as a challenge, there will be no innovation.[11] Innovation should be part of agency activities, must be interesting and useful, the best way to preserve and perpetuate the organization. The importance of the need for innovation and the time frame must be defined and elaborated. There needs to be an innovation plan, with a specific purpose.

The Head of Public Health Center need to improve the skill of managing the competition. Management is actively taking advantage of opportunities and strategically controlling the effectiveness and effectiveness of its activities, observing new trends and will occur in the future, observe and evaluate the economic trends, maximize information technology to strengthen the effectiveness and efficiency of marketing and services, improve employee productivity.[12]

The Head of Public Health Center need to improve skill of continuous improvement. Continuous improvement requires management support,[13] provide evidence of its commitment to the development and implementation of the quality management system and continue to improve its effectiveness, should be included in the quality policy. Also the management review to be done at planned intervals should include assessments of opportunities for improvement and the need for changes to the quality of the management system including quality policy and quality objectives.

The Head of Public Health Center need to improve the coordination management skill. The success of organizational activities depens on the division of labor, how the work will be designed, how the delegation of authority works, every member of the organization must be clear who does what, divided tasks are certainly running toward the goals of the organization.[14] Organize work, coordinate the entire process by dividing it into smaller operations, through work instructions, schedules, specification procedures.

The Head of Public Health Center need to improve the self managing team skill. The role of a leader is crucial to the organization's progress when it comes to providing support for the team's success.[15] The leader must be to build relationships and political awareness among members of the team or organization, guide information and keep up with activities by monitoring both inside and outside the team, invites team members or organization to always attend a meeting of the organization, empowering team.

Conclusion

(a) The implementation of managerial skill for all cultures into the category is very strong.

(b) Application of hierarchy culture managerial skill need to be limited because it will hamper the optimization of the application of market and adhocracy culture.

Suggestion: It takes an increasing application of market culture in order to increase competition and increase revenue.

Ethical Approval: Related departments should be assured about the confidentiality of the results of questionnaires.

Conflict of Interest: The authors report no conflict of interest.

Source of Funding: Self

REFERENCES

1. Robbins, Stephen P. (2005). *Organizational Behavior. Elevant Edition.* New Jersey. Pearson Education, Inc.
2. Cameron, Kim S. & Robert E Quinn. (2006). *Diagnosing and Changing Organizational Culture.* United States of America : Addison-Wesley Publishing Company, Inc.
3. Elizabeth B.K., Mensah & Kwesi A, Tawiah (2016). *Employee Motivation & Work Performance : A Comparative Study on Mining Companies in Ghana. Journal of Industrial Engineering and Management,* 9 (2), 255-309.
4. Wanjau Mary Ngima & Joanes Kyongo (2013). *Contribution of Motivational Management to Employee Performance. International Journal of Humanities and Social Science Vol. 3 No. 14 [Special Issue - July 2013.*
5. Chandana Rathnasiri Hewege (2011). *Acculturation as an Organizational Control Strategy. Journal of Contemporary Management Research,* Vol. 7, No. 1, 3-20.
6. Eliza Christiani & Saarce Elsye Hatane (2014). Pengaruh *Management Control System* terhadap *Firm Performance* Melalui *Employee Motivation* sebagai Variabel Intervening (Studi Kasus pada Sektor Non Manufaktur di Surabaya). *Business Accounting Review,* Vol. 2, No. 2, Juli 2014: 64-74.
7. Adi Putra Irawan, A., Faryzki Ade PB., Edin S. Djatikusuma. (2013). Sistem Informasi Customer Care Management pada PT. Citra Lestari Mobilindo Palembang. *Jurnal Sistem Informasi Customer Care Management*, 2008240291.
8. Rosa AS - M. Shalahuddin. (2011). Modul Pembelajaran Rekayasa Perangkat Lunak. Bandung : Modula.
9. Obakpolo Patricia (2015). *Improving Interpersonal Relationship in Workplaces. OSR Journal of Research Method in Education (IOSR-JRME)* e-ISSN: 2320-7388,p-ISSN: 2320-737X Volume 5, Issue 6 Ver. II (Nov. – Dec. 2015), PP 115-*125*
10. Triyono (2012). *Visionary Leadership* : Gaya Kepemimpinan untuk Organisasi Masa Depan. http://jurnal.unimus.ac.id value added, vol. 8, no. 2, Maret 2012 – Agustus 2012.
11. Eynstein Abraham Ganggali, David Paul Elia Saerang, Peggy Adeline Mekel (2013). *Analysis of Entrepreneurial Management and Innovation.* Jurnal EMBA,Vol. 1, No. 4, Desember 2013, hal 2335-2342
12. Ronny Herowind Mustamu (2000). Mempersiapkan Ritel Farmasi untuk Menghadapi Persaingan Masa Depan. Jurnal Manajemen dan Kewirausahaan, Vol. 2, No. 1, Maret 2000:19-32.
13. Jir Plura (2000). *Neustale Zlepsovanie V Systemoch Kivitas Manazerstva. K Valita I Nov'cia P rosperita* IV / 1 2000 (13-22)
14. Ramunas Vanagas & Janina Stankevic (2014). *Impact of Coordination For Organization Process. Intelectual Economics Journal,* 2014, Vol. 8, No. 2 (20), p.112-125.
15. Mufti Afif (2015). Peran Strategi *Self Management Team* dalam Organisasi. Jurnal Ekonomi Islam, Vol.1 , No. 2, Desember 201, 261-272.

Assessment of the Anatomical Causes of Persistent Nasal Obstruction after Primary Septorhinoplasty

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ABSTRACT

Background: Septorhinoplasty is an operation for improving the appearance of the nose and nasal breathing, but persistent nasal obstruction may occurs and may require revision surgery.

Objectives: To determine the incidence and significance of persistent nasal obstruction after septorhinoplasty with different external nasal deformities. To recognize the anatomical structures that cause persistent nasal obstruction and their surgical correction.

Patients and Method: A prospective case study of 39 patients who have persistent nasal obstruction from a total 230 patients who underwent closed septorhinoplasty at Tikrit Teaching Hospital and Private practice between January 2014 and June 2017. The nasal obstruction was subjectively graded by using Nasal Obstruction System Evaluation (NOSE)scale.

Results: Persistent nasal obstruction was found in (17%) after a minimum one year post operatively. It was common in patients with deviated nose (20.6%). The nasal septal deviation was the common anatomical cause (69.2%),surgical interference was indicated in (66.7%), and revision septoplasty was the common surgical procedure used (66.4%).

Conclusion: There was no statistically significant association between external nasal deviation with occurrence and severity of nasal obstruction,and between severity of nasal obstruction and type of external nasal deviation after septorhinoplasty. The surgical planning for septorhinoplasty must be taken in consideration the improving nasal air way, as well cosmetic outcome, to avoid revision surgery that are challenging operation with risk of septal perforation.

Keywords: *Deviated nose, Nasal obstruction, Septorhinoplasty.*

Introduction

Septorhinoplasty is a cosmetic nasal surgery done to improve the appearance of the nose and nasal breathing. The correction of nasal septum plays a vital role in straighten the deviated nose and improve nasal respiration[1,] Nasal obstruction may be persistent in some patients who have had septoplasty or rhinoplasty [2,3].Despite the cause of the persistent nasal obstruction commonly multifactorial [4], the inadequate correction of the deformities would be the main cause[7]. The reduction rhinoplasty decreases the cross-sectional area of the nasal valve by 25% and the piriform aperture by 13% [2].This is due to hump removal,lateral osteotomy and over resection of the lower or upper lateral cartilage that resulting in nasal valve collapse, So that septoplasty indicated even for simple asymptomatic septal deviation.

This study was designed to determine the incidence and significance of persistent nasal obstruction after septorhinoplasty with different external nasal deformities. To recognize the anatomical structures that cause persistent nasal obstruction and their surgical correction.

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Patients and Method

A prospective case study of 230 patients who underwent closed septorhinoplasty during the period from January 2014 –June 2017 in Tikrit Teaching Hospital and private practice in Salah-Eldin Governorate,Iraq. The patients who had persistent nasal obstruction were 39. They were collected when they visited the clinic for follow up or by telephone contact follow-up surveys, when the patient tells us that he has a nasal obstruction, ask him to attend the clinic for clinical examination. All patients are clinically evaluated includes history, date of primary surgery, external nasal examination, anterior rhinoscopy, nasal endoscopy and CT scan for nose and paranasal sinuses. All patients the primary surgery had been done at least since one year ago, and the nasal obstruction was secondary to anatomical nasal deformities. The patients who have nasal obstruction due to nasal mucosal disease alone like (rhinosinusitis, allergic rhinitis,non-allergic rhinitis) were excluded from the study. Preoperative photograph and operative notes of primary septorhinoplasty were reviewed for side and site of anatomical causes for septal deviation, turbinate, nasal valve area, and the operative procedure.

The patients were divided into two groups. Patients who had external nasal deviation were 165 (71.7%), and patients with no external nasal deviation were 65(28.3%).

The subjective sensation of patient about his or her postoperative nasal breathing was assessed by using Nasal Obstruction Symptom Evaluation(NOSE) scale(Table1).The questionnaire was administered to the patient to answer on the items. The NOSE survey consists of 5 items, each have score on a scale ranging from 0 to 4, and these scores were multiplied by 5, generating a balanced scale from 0 to 100. Patients were categorized as having mild (range, 5-25), moderate (30-50), severe (55-75), or extreme (80-100) nasal obstruction[5].

Table 1: Nasal Obstruction Symptom Evaluation (NOSE) scale

Item	Not a problem	Very mild problem	Moderate problem	Fairly bad problem	Severe Problem
1.Nasal congestion or stiffness.	0	1	2	3	4
2.Nasal blockage or obstruction.	0	1	2	3	4
3.Trouble breathing through my nose.	0	1	2	3	4
4.Trouble sleeping.	0	1	2	3	4
5.Un able to get enough air through my nose during exercise or exertion.	0	1	2	3	4

Findings

The study showed that 39 patients (17 %) presenting to the author with complaint of persisting nasal obstruction despite prior septorhinoplasty since more than one year ago. 22 (56%) were males and 17(44%) were females. Patients age ranged from 23-38 years, with a mean of 25.3 years.

The grading of nasal obstruction according to (NOSE)scale was : Patients with mild nasal obstruction 12 (5%), moderate nasal obstruction 23 (10%),and severe nasal obstruction 4 (2 %). No patient with extreme nasal obstruction.

The post septorhinoplasty nasal obstruction were common in patients with deviated nose 34/165 (20.6%) , in S-shape nasal deviation was 7/19 (37%) ,C-shape was 22/110 (20%) , and in deviation to one side was 5/36 (14%) (Figure 1) (Table 2) Patients without external nasal deviation the nasal obstruction was 5/65 (8%) (Table 3).

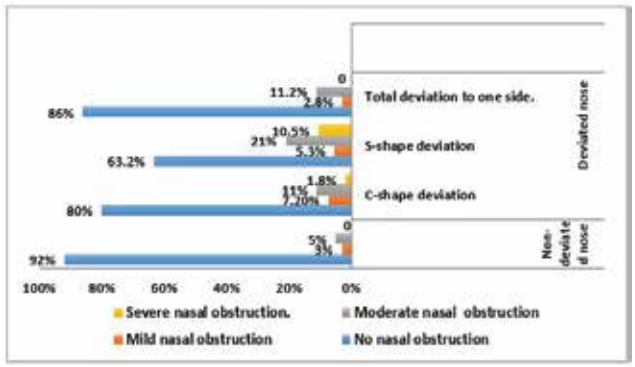


Figure 1: Bar chart shows the severity of nasal obstruction post septorhinoplasty related to the external nasal deviation

Table 2: The relation between type of deviated nose and severity of nasal obstruction

Nasal obstruction	Type of external nasal deviation						Total	
	C-shape deviation		S-shape deviation		Deviation to one side			
	Number	%	Number	%	Number	%	Number	%
No nasal obstruction	88	80	12	63.2	31	86	131	79.4
Mild nasal obstruction	8	7.2	1	5.3	1	2.8	10	6
Moderate nasal obstruction	12	11	4	21	4	11.2	20	12.2
Severe nasal obstruction	2	1.8	2	10.5	0	0	4	2.4
Total	110	66.7	19	11.5	36	21.8	165	100

Chi square(χ^2) = 9.36, d.f.=6, P-value= 0.01, Correlation=0.231

Interpretation: There is no significant association between severity of nasal obstruction and type of external nasal deviation.

Table 3: The relation between external nasal deviation and severity of nasal obstruction

Nasal obstruction	Non deviated nose		Deviated nose		Total	
	Number	%	Number	%	Number	%
No nasal obstruction	60	92	131	79.4	191	83
Mild nasal obstruction	2	3	10	6	12	5.2
Moderate nasal obstruction	3	5	20	12.2	23	10
Severe nasal obstruction	0	0	4	2.4	4	1.8
Total	65	28.3	165	71.7	230	100

Chi square(χ^2)= 5.93, d.f. =3, P-value =0.01

Correlation: There is no significant association between external nasal deviation with occurrence and severity of nasal obstruction.

From a total 39 patients with nasal obstruction,26(66.7%) was treated surgically and 13 (33.3%) with medical treatment (Table 4).

Table 4: Options of treatment of nasal obstruction

Treatment options	Number (n = 39)*	(%)
Medical treatment	13	33.3
Revision Septorhinoplasty	4	10.2
Revision endonasal septoplasty	11	28.2
Extracorporeal septoplasty	3	7.7
Reduction of inferior turbinates.	11	41
Endoscopic resection of lateral border of concha bullosa.	2	5.1
Placement spreader graft.	6 (on 9 sides)	15.4
Division of synechiae.	1	2.6

*The total number of patients in the column is 51 instead of 39,because multiple treatment modalities are implemented in many patients.

The 26 patients who underwent surgical treatment for their nasal obstruction the endoscopic examination and CT scan has been showed that 18 (69.2%) had nasal septal deviation, 11(42.3%) had hypertrophied inferior turbinate ; 6 (23%) had nasal valve collapse; 2(7.7%) had concha bullosa; and one patient (3.8%) had synechiae between septal mucosa and inferior turbinate.(Table 5)

Table 5: Anatomical pathology of persistent nasal obstruction in 26 patients who treated surgically

Obstructive Anatomical pathology	Number (n = 26)*	Percentage (%)
Septal deviation	18	69.2
Hypertrophied inferior turbinates	11	42.3
Nasal valve collapse	6	23
Concha bullosa	2	7.7
Synechiae	1	3.8

*Total number of patients in the column is 38 instead of 26,because several patients have multiple pathologies.

The anatomical locations of septal deviation in 18 patients who underwent revision septoplasty, were caudal septal deviation 6 patients (33.3%), Mid septum bony-cartilaginous junction 4 (22.2%), Dorsal septum deviation 3(16.7%), Bony septum spur 2 (11.1%) (one vomerine spur and one maxillary crest spur),and Multiple sites was in 3 patients (16.7%).

The surgical techniques performed were revision septoplasty for 14 patients (53.9%){ Endonasal septoplasty for 11 and extracorporeal septoplasty for 3 },revision septorhinoplasty for 4 (15.4%),reduction of inferior turbinate in 11 (42.3%), spreader graft placement in 6 patients(23%) on 9sides, Endoscopic resection of lateral border of concha bullosa 2 (7.7%),and synechiolysis in one patient (3.8%) (Table 4).

There were no statistically significant association between severity of nasal obstruction and type of external nasal deviation(Table 2), and no association between external nasal deviation with occurrence and severity of nasal obstruction (Table 3).

Follow up for a minimum 6 months, the nasal obstruction was relieved in all cases. Asymptomatic septal perforation was occur in 2/18 patients (11.1%) who underwent revision septal surgery.

Discussion

The current study is considered the first on persistent nasal obstruction follows closed septorhinoplasty, that compares between the different types of deviated nose and non-deviated nose. Most studies have only focused on persistent or recurrent nasal obstruction after septoplasty or rhinoplasty alone[1,6,7,8].

The nasal septum deviation in the deviated nose is commonly of traumatic cause [9], where multiply fractured bony and cartilaginous septum, and abundant scar tissue,this made septoplasty to be quiet difficult[7]. The patient who have a grossly deviated septum, the persistent septal deviation may be due to failure of correction of original anatomical cause. Sometimes despite a perfectly straight nasal septum was achieved in primary surgery, it may be different one year later [10]. The cartilage memory and scar contracture predispose to recurrence of the deviation [11], if the cartilage memory is not altered sufficiently, it often returns over time to its initial curvature.[4]

However, the observed difference in the occurrence of persistent nasal obstruction between deviated nose than non- deviated nose and between the types of external nasal deviation. (Table 2,3),(Figure 2), these results Interestingly were not statistically significant

Persistent nasal obstruction is one cause that made patients seeking revision surgery. Kathy Yu.(2010) noticed (62%) of patients seeking for revision rhinoplasty were experienced nasal obstruction [12]. Thomson (2007) demonstrated that the Major indication for revision rhinoplasty was air way obstruction in (59.2%) then cosmetic causes [13].Gerhard (2007) reported that breathing problems are the main complaint in 70% of the patients for revision rhinoplasty, and 10% of the patients complain about residual or new breathing problems after primary rhinoplasty[3].

Deviated nose is mostly due to caudal and dorsal cartilaginous deviation.Therefore the surgeon who concentrate on the cosmetic outcomes, may be missed inferior bony spur, hypertrophied turbinate or large concha bullosa. Other reason for missing anatomical nasal obstruction is that the CT scan for the and paranasal sinuses was not routinely performed as pre operative preparation for septorhinoplasty, that may results in a defect nose in preoperative assessment.

The patient's satisfaction about his or her nasal obstruction after septorhinoplasty has variable results according to surgeon's experience from (84%)[14] (90%)[15]and (91.5%)[16]. Foda (2013) [17] was demonstrated that 76% of the patients with crooked nose were reported improved breathing post septorhinoplasty.

The medical treatment includes steroids, decongestants, and antihistamines, that was found to improve nasal obstruction in (33.3%) of patients with mild and moderate nasal obstruction. Despite there are no medications correct anatomical obstruction,but medication can decreasing mucosal swelling due to rhinosinusitis, allergic or non -allergic rhinitis to maximize nasal opening.

The defective nasal septum due to aggressive septoplasty that may be indicated for severely deformed nasal septum, with an unknown amount of cartilage or bone present, and disrupted tissue planes all made revision septoplasty is a challenging procedure as difficult dissection in compromised nasal septum with subsequent septal perforation that occurs in (11.1%). It

is important that in revision septoplasty to palpate the septum to find the areas of excised septal bones and or cartilage before attempting any septal flap elevation. Extracorporeal septoplasty was performed in 3 patients, when the author found that it is difficult to get stable and straight nasal septum by endonasal septoplasty.

Revision functional septorhinoplasty was performed to 4 from 230 patients who underwent septorhinoplasty (1.73%). Emily (2016) reported (2.5%) of revision functional septorhinoplasty was performed because of nasal airway obstruction[18].

Adjunctive turbinate reduction is advisable in patients underwent septorhinoplasty[9],this will increase the cross-sectional area at the nasal valve [7] and will be improve nasal breathing The author used (Out-fracture of the turbinates with microdebrider assisted submucosal turbinoplasty). Although the proper treatment of underlying causes for turbinate hypertrophy are important to obtain good long term results after turbinate surgery[19].

The internal nasal valve obstruction in deviated nose was frequently caused by caudal septal deviation [20],and should be considered in patients with a severe dorsal deflection and a narrowed middle vault [21],if it is not recognized and corrected during the operation, will contributes to post-septorhinoplasty nasal obstruction[4]. Serhan (2016) report alar collapse was seen in 6% of the patients with persistent nasal obstruction follows septoplasty [8]. Khosh (2004) found (79%) of patients who underwent nasal valve reconstruction for nasal valve collapse was due to previous rhinoplasty [22]. The author was used closed (endonasal) approach for all revision septoplaty or septrhinoplasty. The spreader graft has been inserted in 5 sides between upper lateral cartilages and septal cartilage when not divided them, and secured in a tunnel, when the septal cartilage has been separated from upper lateral cartilage,the graft fixated with transcutaneous and transseptal sutures was placed on 4 sides.

A limitation of this study is that many patients encounter difficulty in responding accurately on the NOSE scale survey. The (NOSE)Scale is a valid, reliable, and responsive instrument [23],but the questionnaire required intelligent respondents to give information, the simple patient has difficulty particularly to determine the differences from the very mild, moderate, fairly bad and severe problem for each item on the questionnaire (Table 1), this has made it difficult to determine the grade of nasal obstruction accurately. If the symptoms of each problem have been clarified the answer will be accurate. In this study used the closed septorhinoplasty approach, our future perspective of this study to compare our results with open septorhinoplasty approach.

Conclusion

The study has found that most of patients with nasal obstruction were relieved by septorhinoplasty. There was no statistically significant association between external nasal deviation with occurrence and severity of nasal obstruction ,and not between severity of nasal obstruction and type of external nasal deviation after septorhinoplasty. It was observed that nasal septal deviation was the common anatomical cause of persistent nasal obstruction. The surgical planning for septorhinoplasty must be taken in consideration the improving nasal air way, as well cosmetic outcome, to avoid revision septal surgery that are challenging operation with risk of septal perforation.

Ethical Clearance: from research ethic committee in Tikrit university/college of medicine

Source of Funding: Self

Conflict of Interest: None

REFERENCES

1. P Persichetti, V Toto, et al. The correction of nasal septal deviations in rhinoplasty. Annals of Oral & Maxillofacial Surgery 2013 Mar ; 01:1(2):13.
2. ThomasRomo, MD, FACS.Postrhinoplasty Nasal Obstruction Rhinoplasty.Otolaryngology and Facial Surgery.Oct 25, 2018:Available from:https://emedicine.medscape.com/article/841574.
3. Ozan Kuduban, FatihBingol, et al. The Reason of Dissatisfaction of Patient after Septoplasty. EurasianJof Medicine; Avialable from "https://www.eajm.org/sayilar/196/buyuk/6"
4. Michael J. Sillers, ArtemusJ,et al. Revision Septoplasty.Otolaryngol Clin N Am 42 (2009) 261–278.

5. Michael J. Lipan,; Sam P.Most. Development of a Severity Classification System for Subjective Nasal Obstruction. *JAMA Facial Plast Surg*. 2013;15(5):358-361)

6. Hong Ryul Jin, Dae Woo Kim,et al.Common Sites, Etiology, and Solutions of Persistent Septal Deviation in Revision Septoplasty; *Clinical and Experimental Otorhinolaryngology* 2018 July:Availabefrom:https://www.e-ceo.org/journal/view.php?number=586.

7. Samuel S. Becker,Eric J.et al. Revisionseptoplasty: Review of sources of persistent nasal obstruction. Am J rhinol 2008; 22:440-444.

8. Serhan Derin, MuratSahan, et al. The Causes of Persistent and Recurrent Nasal Obstruction After Primary Septoplasty; The Journal of Craniofacial Surgery. 2016; Vol 27, Number 4, P: 828–830.

9. Ter Konda RP, Sykes IM. Repairing the twisted nose. Otolaryngology Clin North Am.1999;32:53-64.

10. Gerhard Rettinger. Risks and complications in rhinoplasty.Otorhinolaryngol Head Neck Surg. 2007;Avialable from "https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3199839

11. Ali Gurlek,AyseErsoz-Ozturk,et al. Correction of deviated nose using custom made high- density porous polyetylene extended spreader grafts. Aesthetic Plastic Surgery.2006,Vol.30(2):141-149.

12. Kathy Yu; Alyn Kim, et al.Functional and Aesthetic Concerns of Patients Seeking Revision Rhinoplasty.*Arch Facial Plast Surg.* 2010;12(5):291-297.

13. Thomson, Christopher; Mendelsohn,et al.Reducing the Incidence of Revision Rhinoplasty. Journal of Otolaryngology. Apr2007, Vol. 36 Issue 2, p130-134. 5p.)

14. P.borges Dinis, M.Dinis,A.Gomes. Psychological consequences of nasal aesthetic and functional surgery: A controlled prospective study in an ENT setting.Rhinology,36,32-36,1998.)),

15. Lisandra Megumi Arima, Etal; Crookednose: outcome evaluations in rhinoplasty.Braz j otorhinolaryngol.2011; 77(4): 510-5.

16. Assem H. Kamel, Mohamad A., etal; State of art in management of the twisted nose. Egypt ,J. Plast. Reconstr. Surgery., Vol.29, No.1, January: 13-19, 2005.

17. Hossam M.T. Foda, Septal Surgery in the Crooked Nose.In:M.A. Shiffman, A. Di Giuseppe (eds.), *Advanced Aesthetic Rhinoplasty*,Chapter 44.Publisher Springer-Verlag Berlin Heidelberg 2013;p.679-688.

18. Emily Spataro, Jay F. Piccirillo,et al. Revision Rates and Risk Factors of 175 842 Patients Undergoing Septorhinoplasty. JAMA Facial Plast Surg. 2016;18(3):212-219.)

19. Christoph Matthias. Surgery of the nasal septum and turbinates.Otolaryngol Head Neck Surg.2007; avialablevisit"https://www.ncbi.nlm.nih.gov/pmc/articles/PMC 3199838.

20. Daniel G.Becker,Evan Ransom, et al.Surgical Treatment of Nasal Obstruction in Rhinoplasty. Aesthetic Surgery Journal . 2010; Vol 30, Issue 3, Pages 347–378.

21. Kyle J. Chambers,et al. Evaluation of Improvement in Nasal Obstruction Following Nasal Valve Correction in Patients With a History of Failed Septoplasty. JAMA Facial Plast Surg. 2015;17(5):347-350.

22. Khosh MM, Honrado C, Pearlman (1 SJ. Nasal Valve Reconstruction. *Arch Facial Plast Surg*. 2004. 6:167-171.

23. Stewart MG, Witsell DL, et al. Development and validation of the Nasal Obstruction Symptom Evaluation (NOSE) scale. Otolaryngol Head Neck Surg. 2004 Feb;130(2):157-63.

Diagnosis of *Trichomonas Vaginalis* Infection by Detection of Glutaminase (*Glut*) Gene by Nested PCR

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ABSTRACT

Trichomonas vaginalis (*T. vaginalis*) is a common pathogen with a cosmopolitan distribution. Trichomoniasis is associated with vaginitis, cervicitis, low birth weight, preterm delivery, and infertility. Glutaminase (glut) p3 gene which is a housekeeping gene increases the detection of *T. vaginalis* efficiency when used as a marker of Trichomoniasis. In this study (glut) P3 gene was depended for parasite detection by nested PCR and compared with conventional methods like wet mount and culture in the detection of *T. vaginalis* in vaginal discharge. Two vaginal swab specimens were obtained from 157 cases, of **(**mean age = 31.79 ± 9.21 years), both symptomatic and symptomatic females attending Gynecology OPD of Al-Emamayn Al-Kadhimayn Medical City in Baghdad and Maternity Teaching hospital in Erbil province, Iraq. One swab was immediately examined by wet mount microscopy and then placed in CPLM medium for cultivation, and another swab is placed in PBS buffer for PCR method. A total of 100 samples positive in one or more tests were identified: 20 (12.7%) infections were detected by wet mount microscopy, and 30 (19.1%) positives in culture. P3 nested PCR was positive in 100 (63.7%) samples. PCR appears to be the most sensitive method with high detection rate and method of choice. Furthermore nested PCR increases the sensitivity and specificity of PCR, and Glutaminase (*glut*) p3 gene can be efficiently used for detection of *T.vaginalis*.

Keywords: *T.vaginalis; Glutaminase (glut) p3 gene; nested PCR*

Introduction

T. vaginalis is a globally occurring anaerobic/ microaerophilic protist parasite which settles down the epithelium of the human urogenital tract [1]. *T.vaginalis* infections can cause inflammation in the cervix, the vagina, and the urethra [2]. Based on estimates of the World Health Organization (WHO) from 2016 [3], trichomoniasis constitutes the most prevalent non-viral sexually transmitted disease (STD) worldwide, affecting approximately 160 million people every year. Males and females are infected with comparable frequency, but in male's symptoms are normally mild, and infections are cleared by the host's immune system within weeks [4]. In females, however, infections can persist for many years, and symptoms, mainly pruritus caused by inflammation and odorous vaginal discharge, can attain a severity which is debilitating [5-7]. A large number of studies from the last 30 years or so, however, have shown that underlying T.V. infections increase the risk of adverse pregnancy outcomes and contagion with HIV virus (2 to 2.5) [8]. Diagnosis of trichomoniasis cannot be made solely on the basis of clinical presentation, because the clinical symptoms may be synonymous with those of other STDs [9], so various laboratory methods have been employed for the detection of *T. vaginalis* in vaginal discharge which varies in their sensitivity and specificity [10]. Wet mount microscopy is a simple, rapid, and inexpensive while culture in a microaerophilic condition is more sensitive [11]. There are many cultures used for *T. vaginalis* isolation and detection such as Kupferberg's medium Diamond medium, Feinberg's medium. Cysteine/Peptone/Liver infusion/Maltose (CPLM) and In-pouch TV system. Culture techniques have not been readily available but would be the most effective way

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of establishing the true epidemiology of *T vaginalis* [12]. Molecular assays provide distinct advantages over other types of diagnostics because screening for Trichomonas has a high potential for identifying previously missed infections. PCR is based on DNA amplification and detection using known primers to *T.vaginalis* specific genes. In addition, Multiplex PCR appeared more useful for simultaneously detect coinfecting pathogens. Real-time PCR assays were used in a number of studies to test for *T. vaginalis* DNA, targeting the β-tubulin genes, revealed that the sensitivity of this technique was more than culture and wet mount [13]. A nested PCR is one in which the product of a PCR is subjected to the second round of amplification using primers internal to those employed for the first round. Nested strategies increase the sensitivity of the assay enormously[14].

Patients and Method

Samples: High vaginal swabs (157) were collected from symptomatic and asymptomatic women (mean age = 31.79 ± 9.21 years) suspected to trichomoniasis and referred to out- patient's gynecology ODP at Al-Emamayn Al-Kadhimayn Medical City in Baghdad and maternity Teaching hospital in Erbil province, Iraq. Clinical manifestations of infected women included purulent vaginal discharge, purities, dyspareunia, leucorrhoea, and dysuria. At the time of per-speculum examination, two vaginal swabs from the posterior fornix and also touching both lateral fornices and middle third of the vaginal wall were taken, using sterile cotton swabs. Specimens collected prior to disinfection or local antibiotic used for routine microscopic examination and to inoculate culture medium, while the second one was placed in 0.5ml of PBS and submitted to the molecular laboratory for PCR testing.

Wet mount preparation: The swab inoculated with vaginal discharge for each patient was gently agitated in one drop of normal saline on a clean slide and then covered with a coverslip. The wet mount was examined with 40 objectives, and the presence of motile *T. vaginalis* was detected by the characteristic twitching motility (Fig.1).



Fig. 1: Wet mount method in detection of T. vaginalis (arrow)

Cultivation: Trichomonas modified cysteine/peptone/ liver-infusion maltose Culture Medium (CPLM).

This medium was prepared as follow:

Fifty-six gram of medium was suspended with 900 ml of distilled water, and then the mixture was sterilized using autoclave at 121 ºC for 15 minutes. The medium cooled down to 50ºC, then 10 ml of inactivated horse serum and 1 ml of antibiotic solution (50 µg of gentamicin/ml, 40 µg of ciprofloxacin/ml, and 50 µg of miconazole/ml) were added before the medium was dispensed into glass containers. Then two of these prepared medium containers were incubated overnight at 37 ºC for sterility testing. Before inoculation of the medium, the culture universal bottles were warmed up to 37C° for 15min. The vaginal swabs were placed into the medium and left to incubate at 37 C° for 7days. The cultures were examined microscopically on days 2, 5 and 7 after inoculation. A positive result is defined as the presence of motile *T. vaginalis* at any time; a negative result was defined as the absence of motile *T. vaginalis* at all readings.

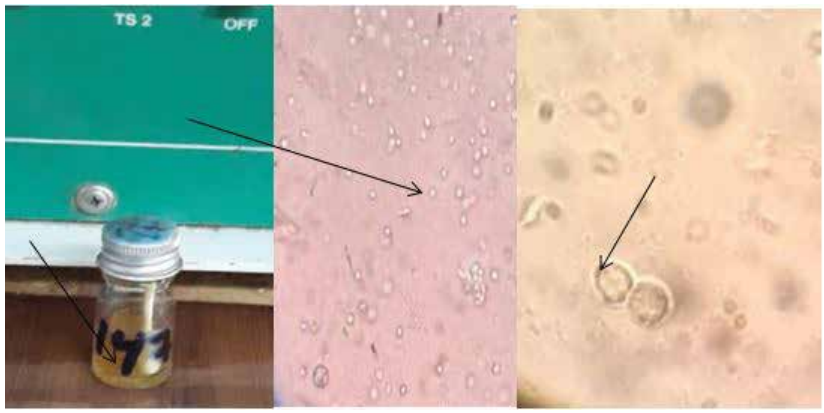


Fig. 2: Culture method in the detection of *T. vaginalis* (arrows)

DNA Extraction: A ready gSYNC™ (Geneaid England) DNA kit (Catalog no. GS100) was used for DNA extraction (according to the manufacturer instructions).

Nested PCR primers: The primers based on *T. vaginalis* (*glut*) p3 gene for PCR identification were used. The sequences of primers were as follows:

Glutaminase (*glut*)P3 (outer):	F	AAACGCTGGTGCCATTACAAC
	R	AAGGTTCTTGCCACGGATTG
Glutaminase (*glut*) p3 (inner):	F	TCGTTAATAGTGGGTAAGGACG
	R	CCAAGTATAGCTCCGCTGAC

PCR protocol: PCR reactions for the first rounds were performed with an automated thermocycler. The total volume of PCR reactions was 25µl, 12.5 µl of the master mix, 3µl of the DNA extracted, 3µl of forward and reverse outer primers and 6.5µl were added to the PCR tube. The amplification was performed in the PCR tubes, and the procedure is as follows:

The first round program

Initial Denaturation: 95°C- 5 minutes.1 cycle.

Subsequent denaturation: 93 C°- 30 seconds.35 cycles.

Annealing: 57C°-30 seconds.

Extension: 72 C°- 1.0 minute.

Final Extension:72C°-10 minutes.1 cycle.

Termination: 4 C° to time end.

The second round program:

Initial Denaturation: 95C°- 5 minutes.1 cycles

Subsequent denaturation: 95 C°- 1.0 minutes.40 cycles.

Annealing: 57C°-1.0 seconds.

Extension: 72 C°- 1.5 minute.

Final Extension:72C°-10 minutes.1 cycle.

Termination: 4 C° to time end.

Gel electrophoresis: PCR amplification products were visualized under UV light (trans illuminator) after electrophoresis on 1.5 % agarose gels in Tris-acetate-EDTA buffer pH 8.5 (30 min at 5 V/cm) and staining with ethidium bromide (0.5µg/ml). The size of the amplified products 451 (bp) was assessed by comparison with a commercial weight marker 100-1000 (bp), Smart Ladder (Bioneer|Korea) and photographed by the digital camera.

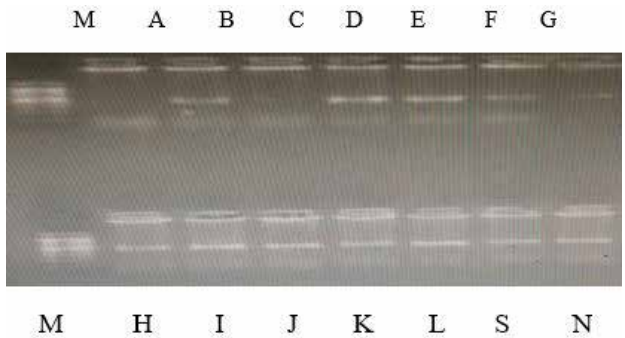


Fig. 3: Gel electrophoresis of glutaminase (*glut*) P3 gene amplified with specific primers. Lane A, negative result while lanes B,C,D,E,F,G,H,I,J,K,L,S and N were positive (451 bp). M: molecular marker.

Sequencing: Gene sequences were analyzed to ensure that the sequences were from *T. vaginalis*. Amplicons

(20 µl) were sent for purification and sequencing to Macrogen (South Korea), using the Big Dye Terminator method. Sequencing was performed bi-directionally using the same primers used in PCR amplification of the (*glut*) p3 gene.

Results

Three laboratory methods were utilized for detection of *T. vaginalis* in this study (Table. 1). PCR positivity for *T. vaginalis*, was considered a gold standard to compare the other methods. Culturing came second with an overall efficiency of 32%. Finally, wet mount came last with an overall efficiency of 20% Accordingly the sensitivity and specificity of culturing, staining and wet mount were 32% and 100%; 26% and 100%; 20% and 100% respectively.

Table 1: Sensitivity and specificity of wet mount and culture in comparison with PCR

Investigation		Total
Wet mount	Sensitivity	20.0%
	Specificity	100%
Culture	Sensitivity	32.0%
	Specificity	100%

Discussion

Rapid and sensitive diagnosis of *T. vaginalis* infection is important for appropriate treatment and to reduce the spread of the disease. Although wet mount is routinely performed for this purpose, this technique has a low sensitivity [15]. The present study showed low sensitivity of wet mount method; it was 20% when compared with PCR, whereas 80 positive samples would have been missed if PCR not had been used. The false-negative test can result from many variables include low parasite load, the time interval between specimen collection and microscopic examination (>10 minutes), and clinician skill [16]. *T. vaginalis* is perishable in external conditions; it loses its motility, retracts its flagella and change its morphology by becoming rounder (may call pseudocysts) and then becomes difficult to be distinguished from similar structures, such as leucocytes [17,18]. Although culture method is more sensitive than wet-mount microscopy, the main limitations for its routine use include the cost, contamination with bacteria (major problem), even with broth cultures spiked with antibiotics to eliminate vaginal flora, causing the transmission from fast growing to slow growth of the parasites [19]. Incubation periods ranging from 2-7 days are required to identify *T vaginalis* in culture, and the need to delay treatment until the results are available [20]. In the present study, nested PCR rather than culturing was considered the gold standard for *T. vaginalis* detection. Accordingly, the sensitivity and specificity of culture, and wet mount were 32% and 100%; 20% and 100% respectively. These results partially agree with the different studies in this regard. In a local study, Kareem M. (2017) [21], investigated 200 women (age range 15-54 years) with abnormal vaginal discharge using two laboratory methods: wet mount, and real-time PCR. The detection rate of *T. vaginalis* was 12.5% and 17% respectively. Similarly, Merdaw M. (2016) [22] used wet mount and culturing method for *T. vaginalis* detection in vaginal swabs from 154 women (age range 15-54 years). Culturing had a priority in the detection of this protozoon (34.41%) compared with wet mount (13.63). In the present study the single copy housekeeping gene, Glutaminase (*glut*) p3 [23], were subjected to two successive rounds of nested PCR, furthermore, the outer and inner sets of primers used in the annealing step of amplification process were retested by NCBI for specificity to *T.vaginalis* Glutaminase (*glut*) p3 gene and not to human, other trichomonads, nor any organisms registered in Genbank. The detection rate was very high, diagnosing one hundred positive *T.vaginalis* infection in (non-cultured) clinical samples obtained from symptomatic and asymptomatic women in comparison to only [7] seven isolates of Merdaw or the 17% detection rate of Kareem. Globally, many studies reported that, PCR appears to have high sensitivities and excellent specificities for vaginal samples than wet mount and culture and it requires expertise and availability [17]. Dr. Kiranmai and Dr. A. Neelima (2016) [24] in India, they analyzed a number of clinical samples by wet mount, culturing in Whittington medium, and conventional PCR based on amplification of *T. vaginalis* β-tubulin gene in 200 females, concluded that none of the diagnostic assays could detect all positive samples, but PCR showed a higher detection rate than others in the detection of *T. vaginalis* in vaginal swab samples. Culha *et al*. (2015) compared the efficiency of three methods (wet mount, culturing on trypticase-yeast extract-maltose (TYM), and conventional PCR) for detection of *T. vaginalis* in clinical samples from 200 symptomatic Turkish women (age 20-50 years). Surprisingly, the detection rate of wet

mount and PCR was equal (42.8%), while the detection rate for culturing method was 32.1%. The authors demonstrated that there was no statistical superiority for PCR over the wet mount. In accordance with the present result is a recent study conducted in an STD clinic in Alabama in which the prevalence of *T. vaginalis* was 19.6% by wet mount and 27% by NAATs (Muzny *et al.,* 2014) [25]. Furthermore, Nathan *et al.* (2015) [26], stated that wet mount is only 40-60% sensitive even among symptomatic women, and the nucleic acid amplification tests (NAATs) became the golden standard for screening and diagnosis of *T. vaginalis.* Thus, it is obvious, that most studies have considered molecular detection as the gold standard for detection which is in accordance with the current study.

Conclusion

The incidence of *T. vaginalis* infection was quite high in symptomatic and asymptomatic infected women. Diagnosis of *T. vaginalis* can be efficiently made by detecting Glutaminase (*glut*) p3 gene other than Actin or Beta-tubulin genes and nested PCR test in this study provides an efficient diagnostic tool for detection of *T. vaginalis* in direct (non-cultured) clinical samples.

Conflict of Interest: The author declares no conflict of interest.

Source of Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical Clearance: Each patient included in this plan signed an informed consent form, detail of the method and agent used with the possible failure of this option and approved by the Ethics Committee of the Medical Research Institute (ECMRI).

REFERENCES

1. Ochsendorf F.R. Sexually transmitted infections: Impact on male fertility. Andrologia. 2008; 40:72–75.doi:10.1111/j.1439-0272.2007. 00825.
2. Schwebke JR, Burgess D. Trichomoniasis. Clin Microbial Rev, 2004; 17:794-803.
3. WHO (2018) Report on global sexually transmitted infection surveillance.
4. Benchimol M, de Andrade Rosa I, da Silva Fontes R, et al. Trichomonas adhere and phagocytose sperm cells: adhesion seems to be a prominent stage during the interaction. Parasitol Res. 2008; 102: 597-604
5. Pellati D, Mylonakis I, Bertoloni G, Fiore C, Andrisani A, Ambrosini G, Armanini D. Genital tract infections and infertility. Eur J Obstet Gynecol Reprod Biol. 2008; 140:3-11.
6. Shiadeh MN, Niyyati M, Fallahi S, Rostami A. Human parasitic protozoan infection to infertility: A systematic review. Parasitol Res. 2016; 115:469-477.
7. Soper D. Trichomoniasis: Under control or under-controlled? Am J Obstet Gynecol. 2004; 190:281-290.
8. Kissinger P: Trichomonas vaginalis: a review of epidemiologic, clinical and treatment issues. BMC Infect Dis.2015; 15: 307.
9. Passos M, Camposarze W, Mauricio C, et al. Is there an increase in STDs during carnival? Time series of diagnoses in an STD clinic,Rev. Assoc. Med. Bras. 2010; 56(4): 420-427.
10. Radonjic IV, Dzamic AM, Mitrovic SM, et al. Diagnosis of Trichomonas vaginalis infection: The sensitivities and specificities of microscopy, culture and PCR assay, Eur. J. Obstet. Gynecol. Reprod. Biol. 2006; 126(1):116-120.
11. Can J Infect Dis Med Microbiol. Jan-Feb; The laboratory diagnosis of Trichomonas vaginalisGary E Garber, MD FRCPC16(1): 2005; 35–38. PMCID: PMC2095007 PMID: 18159526.
12. Loo SK, Tang WY & Lo K. Clinical significance of Trichomonas vaginalis detected in Papanicolaou smear: a survey in female Social Hygiene Clinic, Hong Kong Med. J. 2009; 15(2):90-93.
13. Elsherif RH. & Youssef MA. Real-time PCR improves detection of Trichomonas vaginalis compared to conventional techniques. Comparative Clinical Pathology 2013; 22(2): 295-300.
14. Laboratory Diagnosis of Rabies Cathleen A. Hanlon, Susan A. Nadin-Davis, in Rabies.2013; (Third Edition).
15. Pattullo L, Griffeth S, Ding L, et al. Stepwise diagnosis of Trichomonas vaginalis infection

in adolescent women. J. Clin. Microbiol.2009; 47(1):59–63.

16. Roth AM, Williams JA, Li R, et al. Changing sexually transmitted infection screening protocol will result in improved case finding for **Trichomonas** among high-risk female populations, Sex. Transm. Dis. 2011; 38(5):398-400.
17. Hirt RP. Trichomonas vaginalis virulence factors: an integrative overview Sex Transm Infect 2013; 89(6):439–443.
18. Thomason JL, Gelbart SM, Sobun JF, et al. Comparison of four methods to detect T. vaginalis. J. Clin Microbiol.1988; 26:1869-72.
19. Upcroft JA. Collect and compare isolates of the most common sexually transmitted protozoan parasite, *Trichomonas vaginalis,* from South Africa, USA, and Papua New Guinea. 2002; Ph.D. thesis. Queensland Institute of Medical Research. The Winston Churchill Memorial Trust Churchill Fellowship.
20. Kaya OA, Silfeler DB, Kurt RK, et al. Investigation of the presence of Trichomonas vaginalis in infertile Turkish women. Asian Biomed 2017;9(5):659-663.
21. Kareem M. ‘’Prevalence and Diagnosis of sexually Transmitted pathogens in a sample of Iraqi women «molecular study’’: 2017; Thesis for Ph.D. in microbiology Al-Nahrain university.
22. Merdaw M.Abdul Zahra; Genetic Variation of Trichomonas vaginalis Isolated From Iraqi Women. 2016; A Thesis for Ph.D. in microbiology Al-Nahrain university.
23. Conrad MD, Gorman AW, Schillinger JA, Fiori PL, Arroyo R, Malla N, et al. Extensive Genetic Diversity, Unique Population Structure and Evidence of Genetic Exchange in the Sexually Transmitted Parasite *Trichomonas vaginalis*. 2012; PLoS Negl Trop Dis 6(3): e1573.
24. Dr. Kiranmai, Dr. A. Neelima Evaluation of PCR in the molecular diagnosis of Trichomonas vaginalis infection in comparison with other conventional methods. 2016; IJMM pISSN 2309-4796 Vol. 4, No. 1, p. 1-8.
25. Muzny CA, Blackburn RJ, Sinsky RJ, Austin EL, Schwebke JR. An added benefit of nucleic acid amplification testing for the diagnosis of Trichomonas vaginalis among men and women attending a sexually transmitted diseases clinic. Clin Infect Dis 2014; Sep; 59(6):834-41.
26. Nathan B, Appiah J, Saunders P, et al. Microscopy outperformed in a comparison of five methods for detecting *Trichomonas vaginalis* in symptomatic women. Int J STD AIDS 2015; 26(4):251-256.

Burnout Syndrome among Physicians Working in Primary Health Care Centers in Baghdad, Al-Rusafa Directorate, Iraq

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ABSTRACT

Introduction: Burnout syndrome has been one of the most widely discussed mental health problems.

Subjects and Method: A cross-sectional analytic survey conducted in a primary health care centers.

Results: Most of the respondents who had high burnout were working at primary health center (33.3%), General Practitioner (33.3%).

Keywords: *Burnout, Exhaustion, Job stress*

Introduction

The phenomenon of "burnout" emerged as a major social issue in the United States in the mid-1970. Burnout is a potential problem within a wide range of occupations such as medical staff, teacher, and social worker [(1)].

In recent years, burnout syndrome has been one of the most widely discussed mental health problems in modern societies. In a world that faces major socioeconomic challenges people experience ever-increasing pressure in their daily lives, particularly at the workplace [(2)(3)].

Globally many studies had been conducted addressing burnout among "Medical Professionals" like the one conducted in United State [(4)], and in Europe [(5)]. Regionally in Qatar [(6)], in Saudi Arabia [(7)], and in Iran [(8)].

Nationally a study conducted among physicians had documented moderate emotional exhaustion (EE), high depersonalization (DP), and moderate personal accomplishment (PA) [(9)].

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Rationale: In Iraq we believe that physicians are over whelmed by the daily workload during the formal working hours this may lead to frustration and psychological distress; in addition, many social and cultural issues contribute to the negative effect of being overloaded by work. And because little is known about professional burnout, job satisfaction, and motivation among physicians working in primary health care centers.

The current study was sought to shed the light on the extent of burnout among physicians working in the primary health care centers, and to find out factors associated with occurrence of burnout syndrome among the selected sample group.

Subjects and Method

A cross-sectional analytic survey. The study was conducted in Primary Health Care Centers (PHC) of six sectors that constitute the central region of Al-Rusafa Health Directorate/Baghdad. Fifty percent of PHCs were selected randomly from a list of each sector. Data were collected from first April till the end of June 2017.

A convenient sample of 134 physicians from the randomly selected PHCs was asked to participate in this study. Six physicians refused to participate in the study gave a response rate of (95.7%). All physicians who had at least one-year work at the center, and available during period of study represented the targeted study population.

Data Collection tool: The data was collected by researchers through previously prepared and validated self-administered questionnaire. The questionnaire used consisted of two Parts: **First part:** concerned with informations about socio-demographic and educational characteristics of study participants; **Second Part:** using Maslach Burnout Inventory (MBI) to assess the burnout status which consisted of three domains: Emotional exhaustion (9 questions); Personal accomplishment (8 questions); Depersonalization (5 questions). Each question is rated according to the frequency of occurrence on seven points Likert scale from zero (never), one (few/year), two (monthly), three (few/month), four (weekly), five (few/week) to six (daily). Burnout syndrome is multidimensional construct therefore the sub-scales are combined to reveal one burnout ultimate score. As a final result the high burnout in this study was defined as high scores of emotional exhaustion high depersonalization and high reversed personal accomplishment. Eventually the scale of burnout was categorized as low when the total score (1-33), moderate (34-66) and high (67-99.9)[10].

Pilot study: was carried out on 10 physicians (who were not included in final study).

Ethical Consideration: A formal clearance was taken from the Ethical Committee of Al-Rusafa Health Directorate/Baghdad, and additional consent was taken from the chosn six health sectors. Moreover, the researchers obtained verbal consent of all participants.

Statistical Analysis: Data were imported to statistical package for social sciences (SPSS) version (23). Assuming that our data was approximating normal distribution, for that we use parametric test of significance but not non-parametric test used usually with data obtained by this scale. Chi-square test was used to explore the existence of a statistically significant relationship between the categorical variable. P value ≤ 0.05 were considered statistically significant. Various multilevel logistic regressions with cross effects to investigate the connection between having burnout and the factor associated with burnout syndrome.

Results

The socio-demographic characteristics of participants are shown in (table 1). The majority of the participants were between (30-39) years of age (47.7%), mostly female (64.8%). Also 82.8% of the study group was married and those who had 1-3 children constituted 79.3% of study group, 64.9% of participants were working at PHC and 83.6% of them had no managerial position. Most of the participants were holding the Bachelor educational level (59.7%). and the majority was nonsmokers (86.6%). More than two third (73.1%) of respondents had no chronic illness.

Table 1: Essential characteristics of respondents

Characteristics		N	%
Age group	<30	12	9.0
	30-39	64	47.7
	≥40	58	43.3
Gender	Male	47	35.1
	Female	87	64.8
Marital status	Single	23	17.2
	Married	111	82.8
No of children	1-3	88	79.3
	≥4	23	20.7
Education level	Bachelor	80	59.7
	Diploma	15	11.2
	Doctorate	38	28.4
Work place	Primary health center	87	64.9
	Family health center	47	35.1
Job title	General practitioner	81	60.5
	Family physician specialist	46	34.3
	Other specialty	7	5.2
Managerial position	No	112	83.6
	Yes	22	16.4
Smoking	No	116	86.6
	Yes	18	13.4
Chronic disease	No	98	73.1
	Hypertension	16	11.9
	Ischemic Heart Disease	12	9.0
	Diabetes Mellitus	8	6.0

Table 2 shows the average scores of subscales of the MBI human service survey (MBI-HSS). Mean scores showed high EE, high PA, and low DP (31.01, 33.17, and 8.66) respectively. Cronbach alpha coefficient for three MBI subscales indicates the reliability of the instrument for measuring burnout syndrome among physicians.

Table 2: Average score of the MBIs subscales

Burnout Domains	Mean	Standard Deviation	Median	Cronbach alpha
Emotional exhaustion	31.01	14.441	31.0	0.895
Personal accomplishment	33.17	10.285	35.0	0.848
Depersonalization	8.66	6.536	8.5	0.701
Burnout syndrome	54.50	23.148	56.0	0.702

Prevalence of burnout based on each subscale of MBI showed that the majority of participants had high EE, high PA and low DP score (68.7%, 41.1% and 45.5%) respectively. On other hand half of participants had moderate burnout (50.0%) (table 3).

Table 3: Prevalence of burnout based on each subscale of MBIS

Burnout domains (N = 134)	Level of burnout		
	Low n (%)	Moderate n (%)	High n (%)
Emotional exhaustion score	26(19.4)	16(11.9)	92(68.7)
Personal accomplishment score	44(32.8)	35(26.1)	55(41.1)
Depersonalization score	61(45.5)	38(28.4)	35(26.1)
Burnout syndrome score	26(19.4)	67(50.0)	41(30.6)

Table 4 illustrates the association between demographic characteristics and burnout syndrome. There were significant association between burnout syndrome and age, marital status. (p = 0.03, p = 0.012) respectively, but no significant association were found with work place, job title, and managerial position.

Table 4: Relationship of burnout syndrome with some essential characteristics of the study group

		Burnout				
		Low	Moderate	High	Total	Test* p-value
		n(%)	n(%)	n(%)	n(%)	
Age groups	<30	2(16.7)	2(16.7)	8(66.7)	12(100)	10.736 **.030****
	30-39	12(18.8)	31(48.4)	21(32.8)	64(100)	
	=>40	12(20.7)	34(58.6)	12(20.7)	58(100)	
Gender	Male	9(19.1)	23(48.9)	15(31.9)	47(100)	.060 .971
	Female	17(19.5)	44(50.6)	26(29.9)	87(100)	
Marital status	Single	3(13.0)	7(30.4)	13(56.5)	23(100)	8.803 **.012****
	Married	23(20.7)	60(54.1)	28(25.2)	111(100)	
Education level	Bachelor	12(15.0)	41(51.3)	27(33.8)	80(100)	5.317 .256
	Diploma	5(31.3)	5(31.3)	6(37.5)	16(100)	
	Doctorate	9(23.7)	21(55.3)	8(21.1)	38(100)	
Work place	Primary health center	14(16.1)	44(50.6)	29(33.3)	87(100)	2.025 .363
	Family health center	12(25.5)	23(48.9)	12(25.5)	47(100)	
Job title	General practitioner	13(16.0)	4150.6)	27(33.3)	81(100)	1.846 .764
	Family medicine specialist	13(24.5)	26(49.1)	14(26.4)	53(100)	
Managerial position	No	24(21.4)	52(46.4)	36(32.1)	112(100)	3.716 .156
	Yes	2(9.1)	15(68.2)	5(22.7)	22(100)	
Total		26(194)	67(50.0)	41(30.6)	134(100)	

* Chi-square test with Bonferroni correction, ** Significant test

Multinomial logistic regression analysis is expressed in table 5; the reference category is the low burnout group. When age increased by one year both moderate and high burnout scores, tend to be decreased by 0.022 and 0.091 (2.2%, 9.1%) respectively.

Job title affected the moderate burnout by a reduction of 0.14 but has no effect on high burnout group.

Age significantly affect high score burnout in relation to low score level when all other variables are set at zero level. Other variables have got p-value more than 0.05, which indicate uncertain role in prediction of getting moderate and high burnout compared to low burnout.

The odds ratio of marital status indicates that being married had about twice more relative risk than single to had moderate burnout score but had no effect on high burnout score.

The highest effect on relative risk to develop moderate burnout score in relation to low score was for the participants who attend managerial position with odds ratio of (3.013). While smoking had odds ratio of 3.8 with nearly four times increase in relative risk to develop high burnout.

Those with chronic diseases have about one and a half relative risk to develop moderate burnout state and nearly three times to develop high burnout in comparison to low burn out as referral categories.

Table 5: Multiple logistic regression analysis for predictors among the study sample

Burnout *		B	SE	Wald	df	P-value	Exp (B)	95% CI	
								Lower Bound	Upper Bound
Moderate burnout	Age	-.022	.028	.624	1	.430	.978	.926	1.033
	Gender	.255	.588	.188	1	.664	1.290	.408	4.083
	Marital status	.672	1.039	.418	1	.518	1.959	.255	15.015
	Number of children	-.424	.591	.515	1	.473	.654	.205	2.084
	Type of work	-.418	1.006	.173	1	.678	.658	.092	4.731
	Jobs	-.136	.987	.019	1	.891	.873	.126	6.038
	Managerial position	1.105	.856	1.666	1	.197	3.018	.564	16.149
	Smoking	.599	.951	.397	1	.529	1.82	.282	11.736
	Chronic disease	.550	.640	.738	1	.390	1.733	.494	6.071
High burnout	Age	-.091	.036	6.586	1	.010	.913	.851	.979
	Gender	-.071	.698	.010	1	.919	.932	.237	3.662
	Marital status	-.088	1.174	.006	1	.940	.916	.092	9.146
	Number of children	-.700	.781	.803	1	.370	.497	.107	2.295
	work place	-.726	1.241	.343	1	.558	.484	.042	5.505
	Job title	.005	1.217	.000	1	.997	1.005	.092	10.920
	Managerial position	.177	1.017	.030	1	.862	1.194	.163	8.755
	Smoking	1.326	1.034	1.646	1	.200	3.766	.497	28.549
	Chronic disease	1.026	.779	1.736	1	.188	2.790	.606	12.837

B: regression coefficient, SE: standard error, Exp (B): odd ratio, CI: confidence interval *The reference category is: Low burnout.

Discussion

Occupational-related burnout is increasingly nowadays recognized as a serious problem affecting particularly health-care workers [11]. Burnout has been associated with absenteeism from work, interpersonal conflicts, lower productivity, job dissatisfaction [12].

The current study showed that prevalence of high burnout syndrome was more than one-quarter this is

close to a study conducted by Oumaya among primary care doctors who found that burnout prevalence was (33%) [13]. While a study conducted among primary health care physicians by Al Dubai and Rampal, who found that burnout was at a rate of (11.7%) [14], another study conducted in Qatar in 2011 concluded that (12.6%) of the physicians experienced burnout [6]. Also study conducted in Saudi Arabia in 2013 showed that the prevalence of burnout syndrome among physicians was (7.3%) [7]. This difference in results between Iraq and other countries may be due to overburdened health-care system in Iraq, lack of resources, difficult work schedules with long hours of work and inadequate security.

In the current study the large share of participants described themselves as high EE (68.7%), high PA (41.1%) and low DP (45.5%). These results are similar to study conducted in Yemen in 2010 [14]. But different from a study conducted among physicians working in Medical City teaching complex Baghdad/Iraq by Mohammed in 2016 who found moderate EE, high DP and moderate PA [9]. Again similar to other study conducted by Hasan et al in Bahrain in 2015 [15]. The difference in the prevalence of burnout syndrome and level of burnout domains can possibly be explained by variation in career aspirations among physicians, the nature of the health systems, patient's attitudes and the role of physicians as health-care providers. It may also be attributed to different assessment scales used, and the study designs used in the various studies.

In the current study the relationship between age group and total burnout was statistically significant. Physicians who were in the age group ≥40 years old had low level burnout (20.7%). Contrary a study by Al Dubai and Rampal in 2010 showed that low level burnout syndrome was significantly associated with age group below 40 years old [14]. This difference may be due to increase in financial security and cultural factors, in our country patients look to older age with more respect and trust.

This study showed no significant relationship between burnout and gender, yet male was more prone to burnout than female which is against the result of a study done in Qatar in 2011 where the female was more prone than male [9]. The variation in result of the two studies may be due to geographical factors, different attitude toward female, and discrepancy in practice toward gender.

Significant association was found between marital status and burnout in current study. Rate of burnout among single is more than its rate among married. These findings were different from the findings of a study conducted in Suez land/Egypt [16]. The result in our study may be attributed to the social support of the spouse which might play buffering effect to protect against burnout.

Burnout among physicians working at primary health care center is slightly higher than that reported among physicians working at family health center. This is similar to the finding of a study conducted by Abdulghafour in 2011 [17]. This result may be related to workload in primary health care centers in our country.

No significant association was found between burnout and Job title in this study which is in congruence with a study conducted by Abdulghafour in 2010 [17]. Also similar to a study conducted among PHC physician in Egypt [16]. This difference in results may be related to different possible stress factors among general practitioner and family physician.

The relationship between having burnout and engagement in managerial position was also not significant. However, there is lower burnout among physicians who had managerial position (22.7%) than those who had no managerial position (32.1%). This unexpected results probably can be explained by that some doctors who work efficiently and believe that they are qualified to take up managerial positions, but they are not assigned to these positions are exposed to burnout at higher rate. On the other side those physicians who had managerial positions may have some privileges such as travels, dispatch, and some financial returns making them happier with their jobs hence lower burnout rate.

Recommendation: Measures should be taken to overcome the stressor in workplace through, occupational training programs, and providing necessary resources.

Conflict of Interest: We declare that there was no conflict of interest.

Source of Funding: Self

REFERENCES

1. Maslach C, Schaufeli WB, Leiter MP. Job burnout. Annual Review of Psychology 2001; 52(1): 397-422
2. Ahola K, Honkonen T, Isometsa E, Kalimo R, Nykyri E, Aromaa A, et al. The relationship between job related burnout and depressive disorders Results from the Finnish Health Study. Journal of Affective Disorders. 2005; 88(1): 55-62

3. De Oliveira GS, Ahmed S, Stock MC, Harter RL, Almeida PC, Fitzgerald PC, et al. High incidence of burnout in academic chairpersons of anesthesiology Journal of American Society. 2011;114 (1):181–93

4. McCray LW,Cronholm P F, Bonger H R,Gallo J J.Resident physician Burnout. Family Medicine. 2008;40(9):626-63

5. Soler JK, Yaman H, Esteva M, Dobbs F, Asenova RS, Katic M, et al Burnout in European Family doctors the EGPRN study. Family Practice. 2008;25(4):245-65

6. Abdulla L, AL-Qahtani DM, AL-Kuwari MG. prevalence and determinants of burnout syndrome among primary healthcare in Qatar. South African Family practice. 2011;53:(4):380-383

7. Selaihem A. Aprevalence of burnout amongst physicians working in primary care in Riyadh military hospital Saudi Arabia. International Journal of Medical Science and public health. 2013;2(2):410-419

8. Ashtari Z, Farhady Y Khodaee MR. Relationship between job burnout and work performance in a sample of Iranian mental health staff. African Journal of Psychiatry. 2009;12:71-74

9. Mohmmed SB. Prevalence of burnout among physicians working in Medical City Teaching Campus. 2016; 1:34

10. Abdo S, El-Sallamy R, El-Sherbiny A, Kabbash I. Burnout among physicians and nursing staff working in the emergency hospital of Tanta University, Egypt. Eastern Mediterranean Health Journal. 2015; 12(21): 906-915

11. Sqrgaard KW, Ryan P, Hill R, Dawson I. Sources of stress and burnout in acute Sqrgaard psychiatric care inpatient vs. community staff. Social Psychiatry and Psychiatric Epidemiology. 2007; 42(10):794–802

12. Knudsen HK, Ducharme LJ, Roman PM. Clinical supervision, emotional exhaustion, and turnover intention a study of substance abuse treatment counselors in the Clinical Trials Network of the National Institute on Drug Abuse. Journal Substance Abuse Treatment. 2008; 35(4):387–95

13. Oumaya M, Ghanm L, Baccar Y, Khédira B. Burnout or professional exhaustion syndrome among primary care Tunisian doctors. European Psychiatry. 2009; 24(1): 1258

14. Al-Dubai SA, Rampal KG. Prevalence and associated factors of burnout among Doctors in Yemen. Journal Occupational Health. 2010; 52(1):58-65

15. Hasan H I, Nooh Y, Alsayyad A. Prevalence and factors affecting burnout among secondary care doctors in Bahrain International Journal of Medical Research and Health Sciences. 2015 ;4(2):401-406

16. Farahat T, Hegazy N, Mohamed H. Burnout and quality of life among physicians in primary healthcare facilities in Egypt. Menoufia Medical Journal. 2016; 30(3): 789

17. Abdulghafour A, Bo-Hamra M, Al-Randi S, Kamel I, El-Shazly K. Burnout syndrome among physicians working in primary health care centers in Kuwait. Alexandria Journal of Medicine. 2011; 47(4):351-357

Influence of Low Power He-Ne Laser on the Skin Thickness of Swiss Mice

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ABSTRACT

The application of laser in dermatology and skin therapy is a key issue for numerous developments in future. The helium–neon laser at 632.8nm wavelengths, with the power of 2 and 1.31 mW was applied on the mouse's skin at various time 10, 20 and 30 min for 20 days. The animals were divided into two groups; control group, which didn't radiate while the other group was divided in to three groups each one has two mice where it exposed to the laser. The histological analysis was used only for those groups and studied microscopically. Histological analysis showed a significant effect of laser and numerous differences between the two groups. The thicknesses of the epidermis layer for the control group comparing with other groups showed noticeable increasing. In addition the skin presents enhancing of the features and architecture of layers. So, the low power laser has a good effect and amazing tool to enhance skin layer and cells on it.

Keywords: *low power laser, He-Ne laser, skin enhancing.*

Introduction

The attractive properties of laser make it a useful tool for several applications. Most of lasers are using in biology, medicine and dermatology depends on advanced technology and innovative laser systems for diagnosis and therapy. Therapeutic laser is very special and has a clear picture to illustrate how the radiation interacts with tissues [(1)]. Numerous current therapeutic treatments can be quantified which means simply producing a beam of radiation different from ordinary light in several ways [(2)].

The skin is the largest organ in the human body and comprises about 16% of body weight. The average person can have about (1.8) meter squares of the skin-encased body, which may be introduced to harsh conditions [(3)]. Which shows the low-Powerful lasers effect on the cell. This vitro study focuses on the biostimulation fibroblasts by a low-Power Ga–As-Pulsed laser

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Light can be scattered or absorbed when it penetrates the tissue, and the extension of both processes depends on the type of tissue and the excitation wavelength. Absorption is mainly due to endogenous chromospheres, such as haemoglobin, myoglobin, and cytochromes. Scattering is generally the most relevant factor in the determination of light penetration into the tissue. Laser-tissue interaction is interesting due to it's the significant application in biomedical optics in both diagnostic and treatment purposes. Major aspects of the laser-tissue interaction, which has to be considered in biomedical studies, are the thermal properties of the tissue and the thermal changes caused by the interaction of light and tissue. These effects depend on the peak power and wavelength of the laser as well as the thermal properties of biological tissues. The laser can increase the temperature of cells. It results in denaturation of proteins, and collagen that leads to coagulation of tissue and it can necrotic cells [(2)]. Here we present photo-optical method that enables stimulation of skin cells by the low power laser (He-Ne laser, 632.8nm).

Materials and Method

Animals: This study is carried out in physics laboratories from the period of February to June 2018. Fourteen white Swiss mice (four males and ten females) conducted in this work of 14 weeks, were kept in animal house of College of Sciences under condition (25–28 C

°) temperature and control light (12–12 hour) supplied with food and water ad libitum. Mice were maintained in cages (4 mice/cage), after 7 days of acclimatization, the animals were divided randomly into six experimental groups (n=2 of each group) and tow control group. As shown in the table below (2.1).

He-Ne Laser Exposed: Laser system that used in this work was manufactured by Lambda Scientific, class I visible laser (I-Laser, Austerely), as shown figure (1).

Before laser exposed, the animals anesthetized by an injection of ketamine (80 mg/kg body weight). Then the hair of animals has been shaved to increase the power strike the skin. The region was exposed to the He-Ne laser beam (wavelength 632.8nm, power output = 2, 1.31 mW) with a 1mm diameter. The exposure time was 10, 20 and 30 min to achieve the preferred doses at present in table (1). The intensity of the laser was tuned and reduced by a red filter.



Fig. 1: The helium neon laser device 632.8 nm, red filter and laser power meter device (LP1)

Table 1: He-Ne laser (632.8 nm) parameters used for irradiation of the mice skin

Spot size or exposure (cm^2)	Spot diameter (cm)	Energy of laser beam E (ev) x 10^{+13}	Energy density or Dose (J/cm^2)	Power density DE (W/cm)	Exposure time (min)	Power (mW)	Groups
X	X	X	X	X	X	X	Control
0.0079	0.1	2.0833	2.548	0.2548	10	2	Group 1
0.0064	0.09	1.3644	2.047	0.2047	10	1.31	Group 2
0.0064	0.09	0.6825	4.094	0.2047	20	1.31	Group 3
0.0064	0.09	0.4549	6.141	0.2047	30	1.31	Group 4

Histological Procedures: The histological technique done according to Bancroft and Steven [4]. Throughout several steps to form tissue paraffin blocks and sectioning the steps as the following:

1. Fixation
2. Dehydration
3. Clearing
4. Impregnation and embedding
5. Sectioning and cutting

Results

The microscopic examination of the skin tissue for the control group is expected to complete by a light microscope at different magnification (X 40 & x 100). The results show the typical structures of the mice's skin. The sections show the epidermis of skin compose of stratified squamous keratinized epithelium which composed of typical stratum includes from base to apex, which are stratum basale, stratum spinosum, stratum

granulosum and stratum corneum, respectively illustrated in figures (1a). It show also the second layer of skin, the dermis below the epidermis compose of dense connective tissue include collagen fibres and rich blood vessels & nerve supply as showed in figure (1a). There are several hair follicles and sweat glands observed clearly in the dermis of skin as showed in figure (1c).

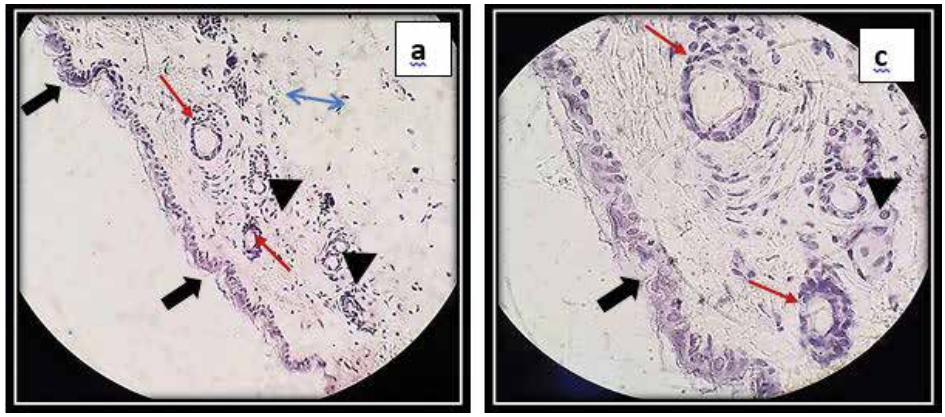


Fig. 1: General view of the skin cross section of the control group. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),►(hair follicles),→(blood vessel). H & E stain, a (X 40) & c (X 100)

After skin exposed to laser it shows change in the different layers, but that change never effect on the size of cells and the wall between cells still apparent. So, these test group shows increase the thickness of the epidermis layer comparing with different proportion for the control group, this effect clearly appears in the figure (2a). The first group is illuminate by laser at 2 mW and time 10 minutes, the epidermal thickening on the rate of proliferating cells of superficial layer, with increase the mitotic activity of cells and large size cells appeared different area of epidermis; refer to hyperkeratosis of epidermal layer as show in figure (2a, 2b and 2c).

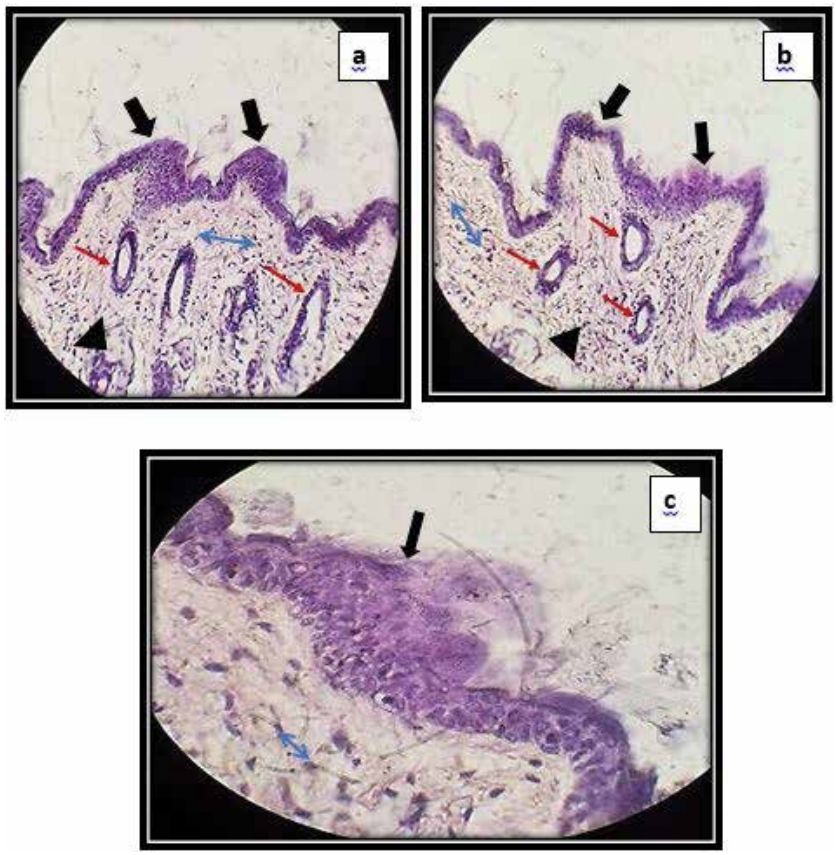


Fig. 2: General view of the skin cross section of the first test group. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),►(hair follicles),→(blood vessel). H & E stain, a,b (X 40) & c (X 100)

After reducing the laser power to 1.31 mW and time of exposure 10 minutes (i.e. the second group). The results illustrate slightly modify on epidermal layer and showing increase the thickness of these layer which noticeably in figure (3b), stratum corneum revealed a thickening with deattached cells of superficial layer of epidermis as shown figure (3a) and, a high rate of mitotic activity of epidermal cells at stratum besale as shown figure (3b). Despite of the thickness increase of the epidermis but, the cells kept the same and get a good adhesion between of them of a different stratum. The epidermis and dermis appeared in firm attachment of together as showed in figure (3c).

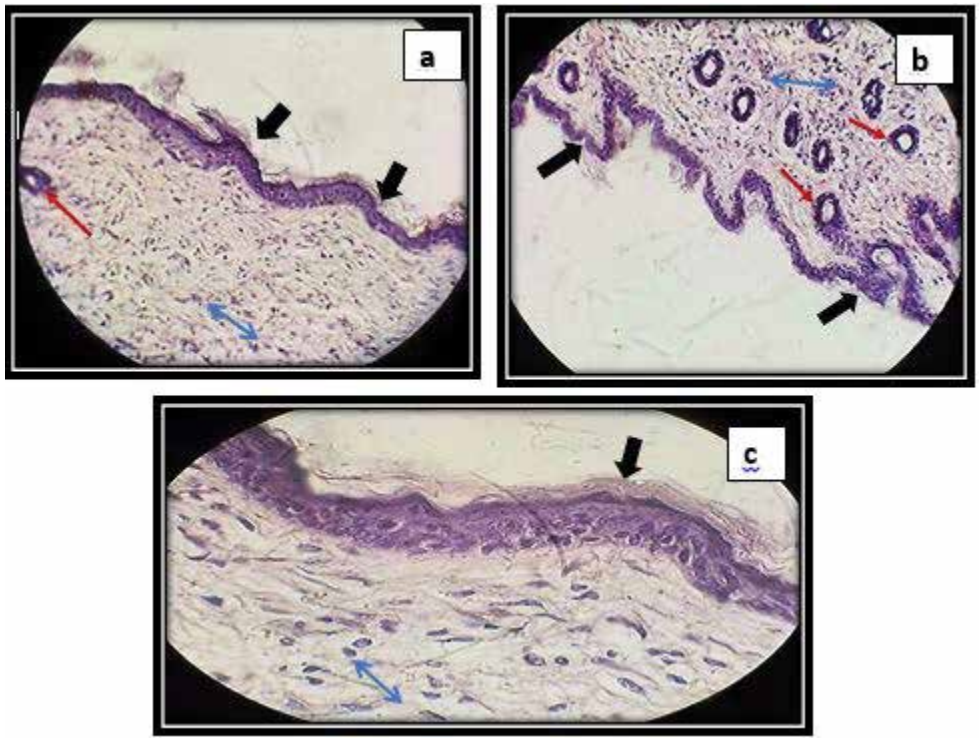


Fig. 3: General view of the skin cross section of the second test group. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),► (hair follicles),→(blood vessel). H & E stain, a,b (X 40) & c (X 100)

To get more information about the time exposure we increase it to 20 minutes with the same power, which is called the second group. That result shows significantly enhancing of the skin features comparing with that other groups. However, it shows the slight increases of the epidermis thickness and appearing well architecture of the skin composition. At present the in figure, (4a) epidermis cells of stratum corneum are more danced. The attaching between the epidermis and dermis is good and reflect enhancing the rate of mitotic activity of cells in stratum basale as present in figure (4c).

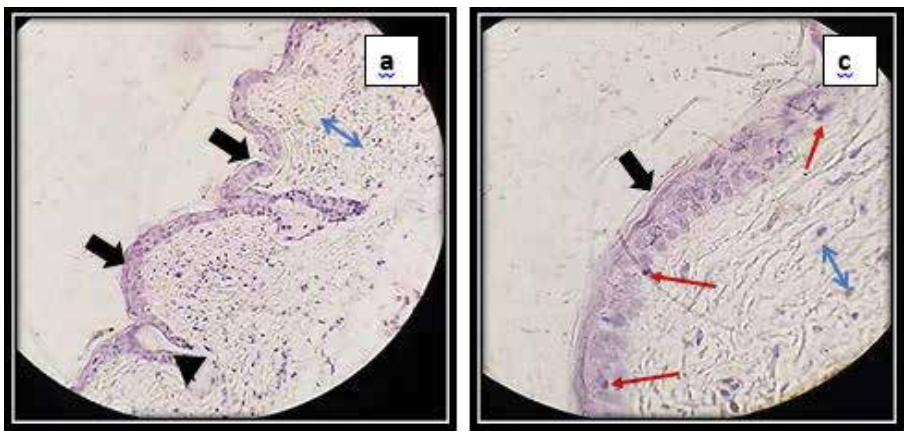


Fig. 4: General view of the skin cross section of the third test group. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis), ► (hair follicles), → (blood vessel). H & E stain, a (X 40) & c (X 100)

When the time of strike increasing to 30 minutes at 1.31 mW or the third group, there is noticeable effect on the shape of cells and it is found the merging in the cell wall. This effect not good for the tissue cells this merging is the evidence for abnormal cell growth. Furthermore, the vacoulation in cells in the epidermis is referring to precede the cells death as showed in figure (5a). De-attach the cells and sub layers of stratum cornum was clear in this group with irregular increase in thickness of the epidermis and, also found in thickening with spilt part of superficial layer of corneum. A number of inflammatory cells and leukocytes appear spread in the parenchyma of dermis refer to damage of blood vessels and inflammation case, showing a decrease of the activities of epidermal, as showed in figure (5c).

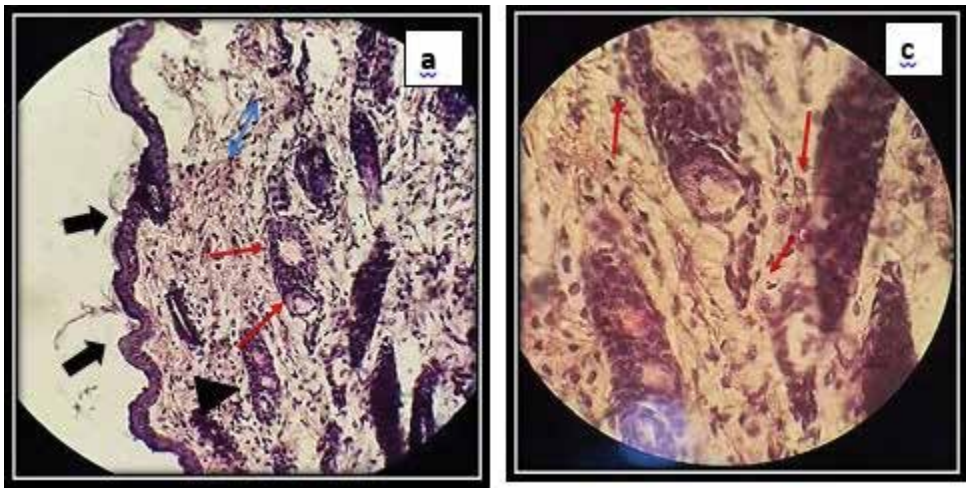


Fig. 4: General view of the skin cross section of the fourth test group. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),► (hair follicles),→(blood vessel). H & E stain, a (X 40) & c (X 100)

Discussions

One objective of the present study was to assess the effect of He-Ne laser irradiation on the thickness skin layer of mice therefore we monitor increase of the thickness layers with help of histological measurements of desire and undesired effect obtained. The results suggest that a low dose of red light (He-Ne laser, 632.8 nm) has significant enhancing of the skin features comparing with that doesn't illuminated groups. However, it shows the slightly increases of the epidermis thickness and appearing well architecture of the skin composition specially in figure (1). The attaching between the epidermis and dermis its good and reflect enhancing of the rate of mitotic activity of cells in stratum basale hair growth in Swiss albino mice skin. These results agreement with earlier reports which demonstrate that exposure to low-level laser radiation leads to augmentation in proliferative and synthesizing activity of cells [5, 6].

Our findings suggest that the He-Ne laser was more effective laser, and significant difference was observed in terms of the doses within same laser groups and our results were in line with previous studies. That have shown that wavelength is an important factor in controlling cell growth [7, 8], that explain the cells proliferation in the epidermis of our study, also the He-Ne laser have a positive on healing hard palate wounds regardless of the radiation dose. Low power with He-Ne laser was deemed more effective compared to another laser light in terms of fibroblast proliferation and collagen fiber density. However, further robust randomized clinical studies are required [9, 10].

The significant increasing is found at a dose of 2.548 J/cm2, however, the dose 4.094 J/cm^2 has a little change of the thickness. On the other hand, it is found in the inhibition of hair growth due to increase in follicles with exposure to the He-Ne laser for both doses. That indicates to the enhancement of hair growth related to skin improving. However, exposure to the He-Ne laser at a dose of 4.094 J/cm^2 caused no significant change [11].

Effects of low-level helium-neon laser radiation were compared on thickness skin layers of mice those dosages of 6.141 J/cm^2 during a 30 min exposure every day, 4.094 J/cm^2 during a 20 min and 2.047 J/cm^2 during a 10 min exposure. No significant differences in effect were observed between laser-exposed region and control exposed. He-Ne laser irradiation of increases certain aspects of healing in the early stages, but not to such

a degree as to be clinically applicable. More detailed research is indicated to obtain optimal exposure levels necessary to accelerate effect significantly. These results to similar to Surinchak et.al when they did vitro study[12].

The application of the He-Ne laser 10 mw at 2.548 J intensity for 20 days caused a gradual increase. Furthermore, microscopic examinations revealed that the laser-irradiated skin changed. The release of stratum granule from epidermis to hair follicle, and produced blood vessel thrombosis of the dermal capillary plexus[13]. A previous study report an increase in cell proliferation and collagen production using specific and somewhat arbitrary laser settings with the helium neon (He-Ne) and gallium arsenide lasers, but none of the available studies address the mechanism, whether photo thermal, photochemical, or photomechanical, whereby low power may exerting its effect. Some studies, especially those using He-Ne lasers, report improvements in surgical wound healing in a rodent model; however, these results have not been duplicated in animals such as pigs, which have skin that more closely resembles that of humans. In humans, beneficial effects on superficial wound healing found in small case series have not been replicated in larger studies [14].

Our results showed that a particular laser irradiation stimulates fibroblast proliferation, without impairing of layers skin. These results to similar to Pereira et [15].

The influence of low-intensity polarized visible laser radiation on the acceleration of skin wound healing. Low-level laser therapy (LLLT) at adequate wavelength, intensity, and dose can accelerate tissue repair. However, there is still unclear information about light characteristics, such as coherence and polarization. Some studies indicate that linearly polarized light can survive through long propagation distance in biological tissue Histological analysis showed that the healing of irradiated wounds was faster than that of non-irradiated wounds [16].

Conclusion

The low power helium–neon laser is representing the future of dermatology and the therapeutic application with numerous other applications. The results that found indicate skin tissue can enhanced by using low power laser. The time and power density represent the good tool to make that enhancing. Histological analysis displays the results that group illuminated at time 20 minutes and power 1.13 mW had a good changes in the architecture of skin. That refer to the optical effect of laser on the skin might change the future of dermatology.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken

REFERENCE

1. Ansari MA, Mohajerani E. Mechanisms of laser-tissue interaction: optical properties of tissue. Journal of Lasers in Medical Sciences. 2011;2(3):119.
2. Niemz MH. Laser-tissue interactions: fundamentals and applications: Springer Science & Business Media; 2013.
3. Rinnerthaler M, Streubel MK, Bischof J, Richter K. Skin aging, gene expression and calcium. Experimental gerontology. 2015;68:59-65.
4. Suvarna KS, Layton C, Bancroft JD. Bancroft's Theory and Practice of Histological Techniques E-Book: Elsevier Health Sciences; 2018.
5. Yu H-S, Wu C-S, Kao Y-H, Chiou M-H, Yu C-L. Helium–neon laser irradiation stimulates migration and proliferation in melanocytes and induces repigmentation in segmental-type vitiligo. Journal of investigative dermatology. 2003;120(1):56-64.
6. Karu T, Pyatibrat L, Kalendo G. Biostimulation of HeLa cells by low-intensity visible light. V. Stimulation of cell proliferationin vitro by He− Ne Laser irradiation. Il Nuovo Cimento D. 1987;9(12):1485-94.
7. Moore P, Ridgway TD, Higbee RG, Howard EW, Lucroy MD. Effect of wavelength on low-intensity laser irradiation-stimulated cell proliferation in vitro. Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery. 2005;36(1):8-12.
8. Carrinho PM, Renno ACM, Koeke P, Salate ACB, Parizotto NA, Vidal BC. Comparative study using 685-nm and 830-nm lasers in the tissue repair of tenotomized tendons in the mouse. Photomedicine and Laser Therapy. 2006;24(6):754-8.

9. Fahimipour F, Mahdian M, Houshmand B, Asnaashari M, Sadrabadi AN, Farashah SEN, et al. The effect of He-Ne and Ga-Al-As laser light on the healing of hard palate mucosa of mice. Lasers in medical science. 2013;28(1):93-100.
10. Evans DH, Abrahamse H. Efficacy of three different laser wavelengths for in vitro wound healing. Photodermatology, photoimmunology & photomedicine. 2008;24(4):199-210.
11. Shukla S, Sahu K, Verma Y, Rao K, Dube A, Gupta P. Effect of helium-neon laser irradiation on hair follicle growth cycle of Swiss albino mice. Skin pharmacology and physiology. 2010;23(2):79-85.
12. Surinchak JS, Alago ML, Bellamy RF, Stuck BE, Belkin M. Effects of low-level energy lasers on the healing of full-thickness skin defects. Lasers in surgery and medicine. 1983;2(3):267-74.
13. Kim YG, Pak SC, Lee SR. Hairless mouse epidermal antioxidants and lipid peroxidation assessed by He-Ne laser. Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery. 2000;27(5):420-6.
14. Posten W, Wrone DA, Dover JS, Arndt KA, Silapunt S, Alam M. Low-level laser therapy for wound healing: mechanism and efficacy. Dermatologic surgery. 2005;31(3):334-40.
15. Ribeiro MS, Da Silva DDFT, De Araújo CEN, De Oliveira SF, Pelegrini CMR, Zorn TMT, et al. Effects of low-intensity polarized visible laser radiation on skin burns: a light microscopy study. Journal of clinical laser medicine & surgery. 2004;22(1):59-66.
16. Pereira AN, Eduardo CdP, Matson E, Marques MM. Effect of low-power laser irradiation on cell growth and procollagen synthesis of cultured fibroblasts. Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery. 2002;31(4):263-7.

The Effect of Electric Stimulation in the Development of the Explosive and Speeding Ability of the Arms to Achieve the High Snatch of the Weightlifters Karbala Youth Club

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ABSTRACT

In order to reach the rappers to achieve the completion of Snatch, it is necessary to develop muscle strength and integration with the speed of performance, and to achieve this was developed training Program with electrical stimulation to see their impact in explosive power and speed-specific power.

The aim of the research is to prepare a training Program for electrical stimulation to develop the explosive power and the speed of the arms of the weightlifters Karbala youth club, as well as the impact of the training course on electrical stimulation to develop the explosive power and speed of the arms of the research sample.

The researcher reached the most important conclusions that the training Program prepared by the researcher has a positive effect on the development of explosive capability and the speed characteristic and raise the level of achievement in the high Snatch, with a preference for the training Program electric stimulation prepared by the researcher, and that elective stimulation sessions lead to the recruitment of all Muscle fibers to constrict at once and stimulate the backup power of work during performance achievement.

Keywords: *electric stimulation, explosive ability, speeding ability and high snatch.*

Introduction

Training is a major science that contributes to the development of athletic achievement through many means, tools and procedures that have been adopted in the Program to achieve achievement. The training Program depends on the fact of his work on the concerted efforts in the use of different sciences and employing the appropriate tools to reach the desired goal. Trainers to bring about a kind of change and diversification in the vocabulary of the training Program or change the place and form of training In order to increase excitement and suspense, the use of aids in the development of physical and skill capabilities of athletes and shortening time to reach the player As well as the ability of these means to isolate the working muscle alone, which facilitates the process of directing the physical effort to develop the target segment, as the use of electrical stimulation is useful in the development of muscle strength and rehabilitation of injuries as well as use in warm up and is widely used in various fields of sports and factor medical assistant.[1]

In the sport of weight lifting can be developed muscle groups working in lifting through the various training methods as well as the use of methods and techniques to help guide the effort and shortest time to reach the player to achieve the objectives of the training Program. Some researchers used electrical stimulation to contribute to the development of physical abilities, but they did not determine the doses according to the requirements of the muscle and its functional ability rationing doses of stimulation is necessary to guide the work and knowledge of the electrical signal of the contractions caused by the training, which contributes to the development of the ability to achieve the achievement of the platform and scientific principles.[2]

The importance of research in the preparation of a training Program using the electrical stimulation of the muscles working arms to raise the level of achievement by combining the development of explosive capability and increase the speed of performance in the abduction of young adults.

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Research Methodology and Field Procedures

Research Methodology: The researcher used the experimental method in two experimental groups with both the pre and the post tests.

Table 1: Shows the experimental design

Groups	Pretest	Experimental Variable	Posttest
First experimental		Training Program + electric stimulation	
Second experimental		Training Program	

Community and Sample Search: The research community is represented by Karbala weightlifters (56 and 69), which consists of (14) quartets. The researcher chose the research society in a deliberate way. They are the weightlifters of Karbala city in weights (56) kg and they numbered (6) players quadruple and (69) the study sample consisted of (12) quartiles, (85.7%) of the research community, randomly distributed to the first experimental and experimental groups. Each group consisted of (6) three-quarters of the weight. The first experimental group used the training course with electrical stimulation Prepared by the researcher and the second experimental group has used the same training Program prepared by the researcher without electrical stimulation.

Search Procedures: Selection of physical and skill capabilities:

1. Test throwing a ball of medicine from the front of the chest back weight (3 kg):
2. Withdrawal of the opening of the abduction to stand within (10) seconds and strongly (70%):
3. Characterization of the test of completion of snatch:[3]

Pretests: The tests were carried out on Monday and Tuesday, 8-9/10/2018, in Karbala Training Center Hall. The tests were carried out. The tests included the throwing of a medical ball weighing 3 kg, (10) seconds. On the second day, the technical tests were carried out, including the test of the completion of the snatch.

Training Program: The training Program was adopted by the electrical stimulation of the first experimental group and the training Program without the electrical stimulation of the second experimental group, both of which were prepared by the researcher. The quartets used the vocabulary of the two methods in the method of repetitive training according to the gradual loading of physical and skill exercises. The total number of training units reached (32) training units and was applied during the special preparation period.

For the first experimental group, the training and electrical stimulation Program was applied in the main section. It takes 60-65 minutes and gave high-level abduction exercises which amounted to (12) exercises which were divided into weightlifters training units during the week. The first part of the main section of the training unit includes exercises for the technical performance of the abduction shield. The second part of the main section includes physical exercise and electrical stimulation. They were coordinated alternately to avoid effort on muscle groups. For the first training using a frequency different from (75-45) Hertz, used during the first (12) units frequency (45) Hertz time (10) seconds and 10 units of the second frequency (60) Hertz time (8) seconds and (10) of the last units (75) Hertz time (6) seconds, and the number of electrical stimulation sessions (32) session.

Posttests: The tests were carried out on Monday and Tuesday, 10-11/12/2018 at 10:00 am as Monday was allocated for physical tests and on Tuesday to test the completion of the snatch.

View, Analyze, and Discuss Results

Table 2: Shows mean, standard deviations, (Z) value, and significance of differences between pre and posttest in physical tests and achievement of the first experimental group

Sl. No.	Tests	Units	Pretest		Posttest		(z) value	Level of significance	Significance of differences
			Mean	SD	Mean	SD			
1.	Throw a medical ball weighing (3) kg back	Meter	7.25	0.326	8.41	0.306	-2.214	0.027	Sig.
2.	With the opening of the snatch, stand up (10) seconds	Second	5.00	0.632	7.50	0.548	-2.251	0.024	Sig.
3.	The completion of the snatch	Kg.	69.17	6.178	80.33	5.645	-2.264	0.024	Sig.

* Level of significance (0.05)

Table (2) shows that there is a significant difference in explosive force of the arms in the test of throwing a medical ball weighing (3) kg between the pre and post testing and for the benefit of the post-test. The researcher attributed the reason to the effectiveness of the training Program and electrical stimulation used within the vocabulary of the training Program, The high-speed exercise is similar to the performance of the abduction to be the most effective and effective, and the electrical stimulation has a positive role in the development of explosive force "The appropriate frequency to develop muscle strength up to (100) Hertz, and the higher the frequency was the field of training in the direction power the duration and duration of the alert shall be according to the training objective ".[4]

As for the strength characteristic of the speed of the arms, there are significant differences between the tests of pre and post for the benefit of the post-test, and attributed the researcher to the effectiveness of the training Program to develop exercises for this ability and was employed with the stimulation of electrical exercises were given with (10) repetitions of one group at high speed and strongly (70) -90% of the maximum performance. "The use of special exercises for the development of speed of lift performance contributes to the reduction of performance time through the development of speed strength." [5]Moreover, electrical stimulation has a positive role, which was used to develop the force explosive with the duration of the continuation of the current up to 10 seconds, it is "the more exciting continuation of the duration differed different training effects as lead for the alarm for (8-10) again to an increase in the speed of muscle contraction arise". [6]

The researcher attributed the reason for this to the integration of physical exercises with electrical stimulation, "as it eliminates the rotation of work between the tissues of one muscle and operates the tissues of the muscle involved in the training once and the adequacy of large and in a single time, Which increases the efficiency of this electrically operated muscle ".[7]

Table 3: Shows mean, standard deviations, Z value, and significance of differences between pre and posttests in physical tests and achievement of the second experimental group

Sl. No.	Tests	Units	Pretest		Posttest		(z) value	Level of significance	Significance of differences
			Mean	SD	Mean	SD			
1.	Throw a medical ball weighing (3) kg back	Meter	7.16	0.307	7.74	0.359	-2.201	0.028	Sig.
2.	With the opening of the snatch, stand up (10) seconds	Second	5.00	0.894	6.00	1.095	-2.121	0.034	Sig.
3.	The completion of the snatch	Kg.	68.00	5.441	70.50	5.577	-2.251	0.024	Sig.

* Level of significance (0.05)

Table (3) shows that there are significant differences between the pre and post tests and for the post-test of the second experimental group. The researcher attributed this to the use of the training Program prepared by the researcher where he used training loads in exercises that were repeated according to scientific and training criteria. The requirements for training this age group that have achieved a comprehensive and balanced development of the physical attributes under consideration and to ensure their continued development "The use of special exercises for the purpose of developing the speed of performance of the lift contributes to the reduction of performance time through the development of speed-specific power". [8]

Table 4: Shows mean, standard deviations, Z value, significance of differences in physical tests, and achievement of the first experimental and experimental groups in the post-test

Sl. No.	Tests	Units	Mean	SD	(z) value	Level of significance	Significance of differences
1.	Throw a medical ball weighing (3) kg back	Meter	8.076	0.472	-2.722	0.004	Sig.
2.	With the opening of the snatch, stand up (10) seconds	Second	6.75	1.138	-2.345	0.026	Sig.
3.	The completion of the snatch	Kg.	75.42	7.416	-2.177	0.026	Sig.

* Level of significance (0.05)

Table (4) shows the post-test of the first experimental and experimental groups, the mean (8.076) was at a deviation of (0.472), and the calculated Z value (-2.722) was at a level of significance (0.004), indicating the significance of differences between the post-test at the level of significance (0.05) and for the benefit of the first experimental group. In the power differential characteristic of the speed of the traction test in the abduction slot to stand within 10 seconds. In the post-test of the first experimental and experimental groups, the arithmetic mean (6.75) has a deviation of 1.138 and the calculated Z value (-2.345) (0.026). This indicates the significance of the differences between the pre and posttests at the significance level (0.05) and for the benefit of the first experimental group.

In the pre-test experiment of the first experimental and experimental groups, the mean (75.42) was a linear deviation of (7.416) and the calculated Z value (-2.177) at the level of significance (0.026). This indicates the significance of the differences between the two tests (0.05) and for the first experimental group. Table (4) shows a significant difference in the explosive force of the test arms and for the benefit of the first experimental group. The researcher attributed the reason to the effectiveness of the training Program and the electric stimulation directed towards the target muscle groups. The appropriate frequency for the development of muscle strength is up to (100) the highest frequency was the field of training in the direction of the explosive force and the duration of the alert will be according to the training target ".[9]

As for the strength characteristic of the speed of the arms, there are significant differences in the post-test and for the benefit of the first experimental group and attributed the researcher to the reason for the increase in the components of the training load of the size of the training increases the frequency of the hands to (10) repetitions of exercises used in addition to the electrical stimulation has a positive role, "The different duration of the continuation of the stimulant arise different training effects as the duration of the alarm for (8 - 10) seconds to increase the speed of contraction of the muscle". [10] As for the variable of completion of the snatch, there are significant differences in the post-test and for the benefit of the first experimental group. The researcher attributed the reason to the effectiveness of the training Program by integrating the physical exercises with the electrical stimulation of the muscles working at the high level of abduction.[11] this contributed to the increase of muscle strength, resulting in an integrated development. The advantage of the use of electrical stimulation is evident in its ability to recruit all muscle fibers to contract at once. This is not the case in the case of involuntary constriction where it remains part of the muscle fibers did not contract and this part is called the reserve force.[12]

Conclusions

1. The training Program prepared by the researcher has a positive effect on the development of explosive capability and the speed-specific force and raising the level of achievement in the high level of snatch.
2. There is a preference for the electrical stimulation training Program prepared by the researcher with the positive effect in the development of explosive force and the strength of speed and raise the level of achievement in the high snatch.
3. The regulated diversity in the values of the electrical stimulation frequencies used by the researcher contributes to the development of the special muscle strength of the muscle groups working at the height of the abduction.
4. Electrical stimulation sessions help to recruit all muscle fibers to constrict at once and stimulate the back-up force to work during performance to achieve achievement.

Ethical Clearance: Taken from Technical Institute of Karbala, Iraq.

Source of Funding: Self

Conflict of Interest: None

REFERENCES

1. Ali S. J.: tests, measurement and statistics in the field of sports, Edit.1, Qadisiyah, University Press Qadisiyah, 2004, p. 95.
2. Omar K. A.: standardization of training loads in accordance with the method of hierarchical, flat and italic and its impact in some forms of muscle strength and achievement of the height of the nit for ages (18-19) years, Master, Baghdad

University, Faculty of Physical Education and Sports Sciences, 2014, p.68

3. Jamil H.: International Law and International Weightlifting Regulations 2001-2004, International Weightlifting Federation, 2004, p. 69.
4. Times M.: Therapeutic modalities in sports medicine, Mosby college publishing, 1999, p 20- 21.
5. AbdelMoneim H. S.: The effectiveness of some special exercises to develop the speed of the motor performance of the young players in high snatch, Master Thesis, Faculty of Physical Education and Sports Sciences, Diyala University, 2005, p. 47.
6. Fawzi A.: Sports Medicine and Fitness, Edit.1, Lebanon Dar al-Ulum Arab, 2000, p. 43.
7. Kadri B.: Muscle Training and Electrical Alert, Regional Development Center of the International Amateur Athletics Federation, 1996, p.
8. Omar S. A.: Effect of training on the five areas of stress in some biochemical variables and special abilities and achievement of young adults, doctoral thesis, University of Diyala, Faculty of Physical Education and Sports Sciences, 2013, p.88.
9. Abu El-Ela A. A.and Ahmed N.: physiological physiology, Cairo, Dar Al-Fikr Al-Arabi, 2003, p. 132.
10. Alsayigh HA, Athab NA, Firas M. Journal of Global Pharma Technology The Study of Electrical Activity of the Triceps Brachia Muscle according to the Chemical Changes of Water Loss during Spike in Volleyball. 2017;57–62.
11. Al-mashhadi RAA. The Impact of the Plan and PDEODE Strategies in Developing Awareness of Cognitive Processes and Reducing Psychological Pollution Among Students of the Faculty of Physical Education and Sports Sciences. 2018;928–35.
12. Alsayigh HA, Athab NA. The Study of Rectus Femoris Activity after Knee Joint Rehabilitation. 2016;9(9):360–5.

Monte Carlo Simulation to Estimate the Male and Female Effective Dose due to Radon Exposure in Al-Najaf

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ABSTRACT

In this article, the concentrations of radon gas (^{222}Rn) in some houses were measured at 10 sites in Al- Najaf city, using RAD-7 radon monitoring system. The effective doses for all samples were estimated using Monte Carlo method. The Visual Monte Carlo code was used to simulate the transport of the radiation as emitted from the ^{222}Rn through the human voxel model. Room geometry of 3×3×4 m^3 was designed to estimate the people radiation dose due to the exposure to the indoor radon. The latter doses were estimated for each of male and female people individually. It is found that the radon concentrations varied from (8.75 ± 1.1 Bq/m^3) to (32.32 ± 4.0 Bq/m^3) with an average (20.57 ± 2.90 Bq/m^3). The resulted data of the Monte Carlo calculations for male reveal that the effective dose was ranged from 2.91E-05 to 1.07E-04 μSv/h while the female effective dose was noticed to range from 2.87875E-05 to 1.06333 E-04 μSv/h.

Keyword: *^{222}Rn, Monte Carlo, effective dose, Al- Najaf city and RAD-7.*

Introduction

Radon gas is a natural radioactive source and is chemically considered as an inert element. It originates from the natural decay of uranium 238 series, with atomic number 86 and mass number 222[(1)]. The major contribution of radon exposure is attributed to indoor or household air[(2)]. In this regards, many houses and buildings are built on top of radon emitting rocks. It should be noted that radon daughters are likely to attach to dust which would result in that people are exposed to them via breathing. However, the radon level in outdoor air is, to large extent, low at about 0.003 to 2.6 picocuries/liter of air. When considering the indoor exposure, such that at homes, schools, or offices buildings, the levels of radon and its daughters are generally higher than that of outdoor levels. Cracks exist in the foundation or basement of the homes can increase the level of the radon. This happens when the radon gas move through these cracks into home. In this context, at some areas of the country the amount of uranium and radium in rocks of different kinds, such as phosphate rock or granite, is high. In areas like these the radon levels in outdoor air is generally expected to be high[(3)]. The radon gas enters the houses from the ground via cracks present in concrete of the floors and walls, then through the gaps between floor and slab, around drains and pipes, and small pores of hollow-block walls. It is important to mention that radon levels usually high in places such as basements, cellars and ground floors. Based on certain factors, the concentration of radon in indoors changes considerably throughout the time of the year, from day to day, and from hour to hour[(4,5)]. As reported in many countries, the radon is taking the second order of being the most important cause of lung cancer after smoking[(6)]. Nevertheless, relevant studies in Europe, North America and China have also confirmed that even at lower concentrations of radon – such as those live in homes – also include health risks and contribute markedly to the occurrence of lung cancers worldwide[(7,8)]. It has been reported that probability of lung cancer incidence can increases by 16% per 100 Bq/m^3 of radon concentration increment. In this regards, the dose-response relation appears to be linear, this means that the lung cancer risk

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increases proportionally with increasing radon exposure. The level of the environmental radon is a function of time and climatic conditions. So, on order to monitor the radon level, active and passive techniques can be used. Active method often used for short-term measurements of radon. By contrast, passive method could be suitable for the assessment of radon exposure over long period of time. This enables it to be used for large-scale surveys at a low cost[9]. In active measurement, in general, radon and its decay products are brought either into the vicinity of a detector or into a collector device via forced pumping, while in passive measurements, radon and its decay products are collected through their natural diffusion (or permeation) into the device, containing a detector. The terms active and passive are also used to differentiate those radiation detectors that operate with and without power supply. However, estimation of the amount of dose received by tissues/organs of the body that exposed to radiation source in an environmental medium is an extremely difficult computational task[10]. Therefore, Visual Monte Carlo (VMC) is computerized software that simulates the human body irradiation by an external source of radiation. It uses a voxel phantom designed at Yale University and the Monte Carlo method to simulate the emission of photons by a point, ground, cloud source as well as X-ray source. It therefore simulates the transportation of the photons through the phantom of the human body and estimates the dose to all body regions[11]. Consequently, this permits the estimation of the effective dose. The aim of the present work is to measure the radon concentrations in some houses of Al-Najaf area. Also by using Monte Carlo method the estimates for the effective dose can be provided for both male and female voxel phantoms/models.

Materials and Method

Najaf city situated between coordinates of latitudes of 32°21ǫ N and 29°50ǫ N, coordinates of longitudes of 44°44ǫ E and 42°50ǫ E with a total area of 28,824 km^2 (6.6% of Iraq whole area)[12]. Al-Najaf city, considering the administrative side, includes three qadhaas (administrative units consisting of the governorate, Al-Manatheria, Al-Kufa and Al-Najaf Qadhaas). In the current study, ten sites were selected as fair distribution in Al-Najaf city.

The RAD-7 is a device that provides a real-time and continuous monitoring for radon. The latter would help in observing the variations occur within the radon concentration levels during the measurement period. This might be effective, in turn; in the case that one can check the factors that impacting the radon levels throughout time. To illustrate, these factors may include temperature variation, wind speed, humidity (relative). This could give an insight into movements of the air inside a room[13]. The RAD-7 includes an internal standard sample cell at around 0.7 liter and has a hemispherical shape as can be observed in Figure (1). The inner side of the hemisphere is coated with an electrical conductor that can be changed, with a high power supply, to a potential difference range of about 2000-2500 Volts relative to the detector. This in turn creates an electrical field across the cell. The latter electric field drives the positively charged particles into the detector in the periodic-fill cell.

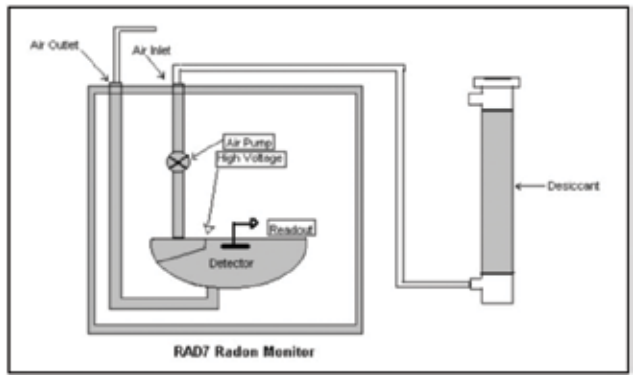


Fig. 1: Schematic diagram of the RAD-7 detector[14]

The method which was adopted to collect the samples can be described as follows: Four samples for the house air were taken from each region. The number of air samples that considered in this work was forty. The sniff mode and circle time was set at 1 hour in accordance with running time of each path of the valve. In order to investigate the amount of radon released from the sample to air, the samples were enclosed into a column, and an airborne radon/thoron was measured with a continuous monitor of electrostatic type (RAD-7, Durridge Company, and USA). The flow rate of the air was 0.7 L min^{-1}. The air of the room was drawn from the, and the radon generated in the air flow system was measured using the RAD-7 device.

The concentration of radon in the inside cell of RAD7 is calculated by the following equation[15]:

$$\frac{dU(t)}{dt} = \lambda U(t) \qquad \ldots 1$$

$$\frac{dU_{Po}(t)}{dt} = \lambda_{po}U(t) - \lambda_{po}U_{po}(t) \quad \ldots 2$$

where $U(t)$ represents the concentration of radon in the RAD7 internal cell, λ is the radon decay constant, $U_{Po}(t)$ is a concentration of ^{218}Po, and λ_{po} is decay constant of ^{218}Po and equals to 0.0037s^{-1}.

Once the pumping time has elapsed, the concentration of radon in the inside cell of RAD7 equals that of the environment C_o. Equation 2 can be rewritten as

$$\frac{dU_{Po}(t)}{dt} = \lambda_{po}U_o - \lambda_{po}U_{po}(t) \quad \ldots 3$$

The initial condition is

$$U_{po}(0) = 0 \quad \ldots 4$$

The solution of Eq. (4) is

$$U_{po}(t) = U_o(1 - e^{-\lambda_{po}t}) \quad \ldots 5$$

When the time is much longer than that of the half-life of ^{218}Po, Equation 5 then can be rewritten as (3).

$$U_{po}(t) = U_o \quad \ldots 6$$

The concentration of radon can be calculated using Equation 6, and this is the measurement principle of RAD-7. The RAD-7 utilizes a high electric field over a silicon semiconductor at a ground potential to catch the heavy charged of the polonium daughters, $^{218+}$Po ($t_{1/2}$ = 3.1 min; E_α = 6.00 MeV) and $^{214+}$Po ($t_{1/2}$ = 164 μs; E_α = 7.67 MeV), which are estimated in sample as a measure of ^{222}Rn activity concentration., the RAD7 prints out a summary of the average radon reading at the end of each run (about 30 min for each run). The time required for the process of collecting and analyzing the sample is corrected using equation (3):

$$U = U_o e^{-\lambda t} \quad \ldots 7$$

where U is the recorded concentration, U_o calculates primary concentration next to the decay corrections and t is the elapsed time until collection in day unit, λ = 0.181, $t_{1/2}$= 3.83 days.

VMC Validation: This VMC program was written in the Instituto de Radioprotecão e Dosimetria for simulating the radiation transport via specific voxel model. Basically, this program was written using visual basic, and can be applied to both internal and external dose calculations resulted from photons[16]. The program was later extended to include alpha particle, electron and proton transport through a specified voxel structure. To investigate the validity of this software, it has previously been benchmarked via comparisons with many other models and Monte Carlo software[17].The results of these validation attempts show a good agreement for the effective dose due to cloud immersion obtained using VMC and Federal Guidance Report No.12. In this paper, the program provides coefficients that based on the Monte Carlo simulation to calculate both the organ and effective dose as a result of radiation exposure.

Results and Discussion

The resulted data concerning the level of radon concentrations in houses air and for the 10 sires at Al-Najaf are presented in Table (1). According to Table (1), it can be seen that radon concentrations were varied from (8.75 ± 1.1 Bq/m^3) in location (N10 sample) to (32.32 ± 4.0 Bq/m^3) in location (N1 sample) with an average value (20.57 ± 2.90 Bq/m^3). The variations of radon concentrations which were seen among different regions can be caused by a number of factors. These include things like the geological structure of the sites, different kinds of building materials that used to construct houses, the heating systems together with ventilation level, the aging effect on the building and the social habits of the dwellers. The maximum value of ^{222}Rn concentrations in present study is which is much lower than the recommended ICRP indoor of (200-400) Bq/m^3[18]. Comparing these results with those of the Arabic countries it was found that the range of average radon concentration in Jordan (west of Iraq) building measured is (9.95 – 68.15) Bq/m^3[19] and in Egypt particularly in some region, the average radon concentration in air of buildings was reported to be about 79.505 Bq/m^3 in range from (38.62-120.39)Bq/m^3[20].

Table 1: Results of Radon Concentrations

No.	Study Site	Location Sample	^{222}Rn Concentrations	
			Mean	± Standard Error
1.	Missan	N1	32.32	4.0
2.	Asskry Kufa	N2	28.62	3.6
3.	Mutnabi	N3	27.95	3.5
4.	Jmohria	N4	11.78	1.5
5.	Tmoz	N5	17.17	2.1
6.	Srrai	N6	28.28	3.5
7.	Addalh	N7	9.09	1.1

Conted…

8.	Saad	N8	14.48	1.8
9.	Asskry Najaf	N9	27.27	3.4
10.	Milad	N10	8.75	1.1
Average ± S.E			20.57 ± 2.90	

Effective Dose: The results of the Monte Calro simulation which was conducted for the room geometry that mentioned above to calculate the effective dose for human exposed to radon at indoor are presented in the Table 2 and 3 for each of the male and female respectively.

Table 2: the male effective dose estimated at room geometry of 3*3*4 m^3

Location Sample	Bq/m^3	Male effective dose (µSv/h)
N1	32.32	1.07E-04
N2	28.26	9.38E-05
N3	27.95	9.28E-05
N4	11.78	3.91E-05
N5	17.17	5.70E-05
N6	28.28	9.39E-05
N7	9.09	3.02E-05
N8	14.48	4.81E-05
N9	27.27	9.05E-05
N10	8.75	2.91E-05

Table 3: The female effective dose estimated at room geometry of 3*3*4 m^3

Location Sample	Bq/m^3	Female effective dose (µSv/h))
N1	32.32	1.06333 E-04
N2	28.26	9.29754E-05
N3	27.95	9.19555E-05
N4	11.78	3.87562E-05
N5	17.17	5.64893E-05
N6	28.28	9.30412E-05
N7	9.09	2.99061E-05
N8	14.48	4.76392E-05
N9	27.27	8.97183E-05
N10	8.75	2.87875E-05

According to the above Tables (2 and 3), it is clear that for male the highest effective dose was noticed to be at Missan site with a value of 1.07E-04 µSv/h whereas the lowest was found to be at Milad site with an effective dose of 2.91E-05 µSv/h. By contrast, when considering the female effective dose, the highest was 0.000106333 at Miasan site and the lowest was at Milad with an effective dose of 2.87875E-05 µSv/h. The reasons behind the above fluctuations in the value of dose can be attributed to the level of radon detected in these sites (see Table 1). Also, it should be mentioned that Missan site as a one of the new neighborhoods in Najaf city is undergoing a marked wave and building using different materials that could arise the level of radon. The rest of the sites reveal different levels of radon and therefore exhibit different radiation absorbed dose.

Conclusions

According the results of the current work, the following conclusions can attained: all the findings of radon concentrations were obtained in this study were less than the allowed level. The highest people effective dose whether for male or female was found to be at Missan Neighborhood of Al Najaf city.

Conflict of Interest: There are no conflict interest.

Source of Funding: The authors declare that they have no competing interests.

Ethical Clearance: All authors are in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5).

REFERENCE

1. Stone R. EPA analysis of radon in water is hard to swallow. Science. 1993 Sep 17;261(5128):1514-7.
2. Schauer DA, Linton OW. NCRP report No. 160, ionizing radiation exposure of the population of the United States, medical exposure—are we doing less with more, and is there a role for health physicists?. Health physics. 2009 Jul 1;97(1):1-5.
3. Abojassima AA, Shltake AR, Najam LA, Merzaa IR. Radiological parameters due to radon-222 in soil samples at Baghdad Governorate (Karakh),

Iraq. Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 Jun 29;60(2):72-8.

4. Lippmann M, editor. Environmental toxicants: human exposures and their health effects. John Wiley & Sons; 2000.
5. Al-Hamidawi AA. Monitoring of 220Rn concentrations in buildings of Kufa Technical Institute, Iraq. Science and Technology of Nuclear Installations. 2015;2015.
6. Krewski D, Lubin JH, Zielinski JM, Alavanja M, Catalan VS, Field RW, Klotz JB, Létourneau EG, Lynch CF, Lyon JI, Sandler DP. Residential radon and risk of lung cancer: a combined analysis of 7 North American case-control studies. Epidemiology. 2005 Mar 1:137-45.
7. Lubin JH, Wang ZY, Wang LD, Boice Jr JD, Cui HX, Zhang SR, Conrath S, Xia Y, Shang B, Cao JS, Kleinerman RA. Adjusting lung cancer risks for temporal and spatial variations in radon concentration in dwellings in Gansu Province, China. Radiation research. 2005 May;163(5):571-9.
8. Abojassim AA, Mraity HA, Husain AA, Wood MD. Estimation of the excess lifetime cancer risk from radon exposure in some buildings of Kufa Technical Institute, Iraq. Nuclear Physics and Atomic Energy. 2017 Dec 28;18(3):276-86.
9. Ahn GH, LEE JK. Construction of an environmental radon monitoring system using CR-39 nuclear track detectors. Nuclear Engineering and Technology. 2005;37(4):395-400.
10. Eckerman KF, Ryman JC. External exposure to radionuclides in air, water, and soil. Oak Ridge National Lab.; 1996.
11. Hunt JG, Da Silva FC, Mauricio CL, Dos Santos DS. The validation of organ dose calculations using voxel phantoms and Monte Carlo methods applied to point and water immersion sources. Radiation protection dosimetry. 2004 Jan 1;108(1):85-9.
12. Mohammad MK, Ali HH, Ali BA, Hadi AM. The biodiversity of Bahr Al-Najaf depression, Al-Najaf Al-Ashraf Province. Bulletin of the Iraq Natural History Museum. 2013;12(3):21-30.
13. Hayes R, Chiou HC. Preliminary evaluation of real time false CAM alarm prediction through continuous radon monitoring. Health physics. 2003 May 1;84(5):S89-92.
14. Abojassim AA. Radon concentrations measurement for drinking water in Kufa City/ Iraq using active detecting method. Advances in Physics theories and Applications. 2013;26.
15. El-Taher A, Al-Turki A. Radon activity measurements in irrigation water from Qassim Province by RAD7. Journal of environmental biology. 2016 Nov 1;37(6):1299.
16. Hunt JG, da Silva FC, de Souza-Santos D, Malatova I, Foltanova S, Dantas BM, Azeredo A, Isakson M. Visual Monte Carlo and its application to internal and external dosimetry. InAdvanced Monte Carlo for Radiation Physics, Particle Transport Simulation and Applications 2001 (pp. 345-350). Springer, Berlin, Heidelberg.
17. Natouh SA. Calculation of Radiation Dose from a Cloud of Radioactive Iodine Using Voxel Phantoms and Monte Carlo Methods. InWorld Congress on Medical Physics and Biomedical Engineering, September 7-12, 2009, Munich, Germany 2009 (pp. 573-575). Springer, Berlin, Heidelberg.
18. ICRP, against Radon IP. 222 at Home and at Work. ICRP publication. 1993;65.
19. Salameh B, Abu-Haija O, Ajlouni AW, Abdelsalam M. Radiation dose due to indoor radon concentration in Tafila district, Jordan. Res J Envoron Toxicol. 2011 Jan 1;5:71-5.
20. El-Zaher MA, Fahmi NM. Studying the variation of radon level in some houses in Alexandria city, Egypt. InIX Radiation Physics & Protection Conference 2008 Nov (pp. 15-19).

Impact of Material of Water Storage Tanks on Bacterial Quality in Shualat Al-Sadrain City in Baghdad

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ABSTRACT

The most important reason for storage water in special tanks in the buildings and houses is an insufficient amount of water. These tanks enhance the causative agent of water contamination through several aspects like its shape, size, color, position, cleaning….etc., therefore,the current study was aimed to investigate the effect of tanks material on the microbial quality of water in Shualat Al- Sadrain region in Baghdad city through four summer months Jun, July, August, and Septembe 2017.

120 water samples were collected from 40 tanks of drinking water, three samples were taken from each tank at the same time. These tanks divided into two groups 20 tanks were made from galvanized iron, and the rest 20 tanks were made from plastic. The temperatures of water were recorded at the time of collection. These entire water samples were undertaken to microbial test in the laboratory of a hospital of Baghdad in the medical city in Baghdad. The results show significant differences in bacterial growth between two types of tanks. Enterobacter contamination involves *E. Coli*, Fecal *E. Coli*, Klebsiella and Proteus among plastic tanks. In the conclusion: A lot of factors affect water contamination in tanks, whereas the most important one is Iraq climate, which leads to conclude that the galvanized iron tank is suitable and has fewer disadvantages than a plastic one in Iraq and hot areas.

Keywords: *water storage tanks, drinking water, microbial quality, plastic tank, iron tank*

Introduction

Water pollution was definedas theaddition of an article or energy to an aquarium environment as a result of human activity or natural sources which lead to negative effects on human health and other organisms. [(1)]70% of fresh water on the ground is altered to being ineligible for consuming [(2)], whereas more than 1 billion of the world population inhabit in a poverty area suffer from this problem[(3)], 80% of diseases are water- borne diseases in the different areas of the world as WHO reported where poor sanitation and unhygienic treatment of drinking water cause 3.1% of death around the world [(4, 5)], One of the most challenges in the world is providing safe water, particularly in the countries which suffer from a shortage in their water stored. Thusled to use tanks in different capacities to keep safe water for daily usage, which varies in their types, sizes, shapes, and colors. As well as theyvary in their position. Numerous factors, physical, chemical and biological rise water contamination in these tanks[(6)] that cause a different health problem. For instance the galvanized tanks cause Zink and Cadmium sedimentation [(7)] While, the poor maintenance of aging Aluminum tanks will affect the nature of stored drinking water[(8)]. Beside organic materials sedimentation may precipitate to the safe water from plastic tanks [(9, 10)] in addition to spread a lot of kinds of bacteria on their surface, causing water contamination[(11)].

Material and Method

The study was conducted between 1 June to 30 September 2017, which considered summer months in Iraq characterized by high temperature. The minimum temperature ranging from 27- 34c (2.93- 6.80 F), while the maximum temperature ranging 43- 47c (116.6- 107.6 F). However, sometimes reaches to 50 c^{o} or more, according to the first report of the ministry of environment in Iraq.

Area of Study: The investigated area located in the west of the capital of Iraq (Baghdad), which occupies the north- west district of it. It is known as Shualat Al Sadrain. It is the second highly populated region in

Baghdad, where almost of them are limited income. This area provides by dinking water from Al- Hussain desalination plant, where chlorine use as disinfectant.

Water Sampling: Sampling was done at 3 a m from 40 roof tanks, by using disposable sterile hand gloves. 20 of those tanks were galvanized iron (cubic shape) water storage tanks and 20 were plastic tanks (halve cylinder shape, white in color), both type tanks were 1000 litters in its capacity. Three samples were taken from each tank by sterilizing bottles of 500 ml and had been transported cooled after adding of 1ml of 10% sterile sodium thiosulfate ($Na_2S_2O_3$) to inhibit the action of chlorine.

Measurement of Temperature: Temperature measurement was carried out at the site of sample collection using a mobile thermometer. This was done by dipping the thermometer into the sample and recording the stable reading.

Bacteriological Analysis: This analysis had done according to [12] on the Baghdad hospital laboratory in the medical city in Baghdad. All three samples per one tank were pooled together to produce one sample for analysis in the laboratory (the total samples number 40 samples were undertaken to microbial analysis). 10 fold dilution of the samples were conducted, and utilized for culturing as the following: 0.1 ml of each dilution were cultured in the Nutrient, MacConkey, SS agar for bacteriological identification and Sabharoud dextrose agar for fungi identification. All plates were aerobically incubated 24 hrs at 37c^o and inspected for the microbial growth. Gram-positive and negative bacteria were identified according to the standard microbiological procedure[13] Bacterial colonies were differentiated in compliance with the colonies characteristics. A series of biochemical tests were carried out to positive cultures. The bacterial colony counter was used to get the number of bacteria/ml of water.

Statistical Analysis

The Statistical Analysis System- SAS (2012) program[14] was used to effect of different factors in study parameters. The Chi-square test was used to significant compare between percentage and T-Test was used to significant compare between means in this study

Results

The results of the current study as shown in the following tables

Table 1: Effect of tanks type in water temperature

Type of Tanks	Mean ± SE of temperature (C)			
	June	July	August	September
Plastic	37.58 ± 0.20	41.83 ± 0.61	42.24 ± 0.19	37.58 ± 0.20
Iron	40.75 ± 0.47	51.30 ± 0.53	51.75 ± 0.44	39.00 ± 0.42
T-Test	2.047 **	3.848 **	2.175 **	1.991 **
** (P<0.01).				

This table shows significant differences (P<0.01) in the effect of type of tanks on the temperature. The high level of temperature in the iron tanks in the four observation months

(40.75, 51.30, 51.75 and 39.00) respectively, while the low level in the plastic one (37.58, 41.83, 42.24, 37.58) for the four months (June, July, August and September) respectively.

Table 2: Effect of tanks type in Bacterial count

Type of Tanks	Mean ± SE of *Bacterial count* (x 10^5)			
	June	July	August	September
Plastic	3.71 ± 2.40	0.00 ± 0.00	0.00 ± 0.00	5.11 ± 3.35
Iron	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.0041 ± 0.002
T-Test	1.918 **	0.00 NS	0.00 NS	1.551 **
** (P<0.01).				

The table shows the effects of tanks material made on the type of bacterial count during four months. There are significant differences (P<0.01) between the two tanks type in the presences of bacterial count. The superiority of bacterial count among plastic tanks in June and September (3.71, 5.11) respectively, while the results of July and August were marked by no significant differences between the two types.

Table 3: Distribution of Bacterial growth type with difference of tanks//June

Bacteria	Plastic		Iron		Chi-Square (χ^2)
	No	%	No	%	
Proteus	2	40.00	0	0.00	10.58 **
E. Coli	2	40.00	0	0.00	10.58 **
Fecal enter Coli	1	20.00	0	0.00	7.94 **
Total	5	100	0	0.00	15.00 **
** (P<0.01).					

The table shows different types of bacterial growth in the plastic tanks which marked by Proteus, E. Coli, Fecal enter Coli (40.00, 40.00, 20.00) respectively during June. While there is no bacterial growth in the iron tanks. Therefor there are significant differences (P<0.01) between the two types.

Table 4: Distribution of Bacterial growth type with difference of Tanks//September

Bacteria	Plastic		Iron		Chi-Square (χ^2)
	No	%	No	%	
Klbsella	2	40.00	0	0.00	10.58 **
Proteus	2	40.00	0	0.00	10.58 **
E. Coli	1	20.00	2	10.0	13.27 **
Total	5	71.43%	2	28.57%	11.46 **
** (P<0.01).					

The table shows different types of bacterial growth in the plastic tanks which marked by Klebsiella, Proteus and E. Coli (40.00, 40.00, 20.00) respectively during June. While 10.0 of the iron tanks contains E. Coli. Therefor there are significant differences (P<0.01) between the two types.

Discussion

The results demonstrate that the abundant contamination of water is Enterobacter genus which agree with [15, 16], particularly E. Cole, that agree with several studies [17, 18]. The existence of minimum level of microbial growth in the drinking water swerves from WHO 2006 permission [19]however, some health agency classifies drinking water to four classes according to the presence of coliform bacteria: very acceptable water when it has 1 or less E. coli/100 ml of water. While acceptable water if it has 1-2 cell/100 ml of water, whereas the suspected water and unacceptable water when it has 3-10 and more than 10 cell/100ml of water respectively [20]. The results show other observation 40% Klebsiala and 40% proteus which agree with [21,17]. Also, 20% of isolates were fecal E. coli that agrees with[22,23], but disagreewith[24].This type of water, inadequate for drinking [25], where the recommended ratio of WHO is0 cfu/100 ml [19].The aged and leakage of pipe distribution system in addition to infiltration of sewage line access into the pipe network of DW were the reasons of these results [26, 27,18].Solid materials loaded water could be deposited within pipes due to low level of providing water in summer season result in accumulation and proliferation of microorganisms depending on their oligotrophic adaptation through their coexist in the drinking water (less than 2 mg of organic matter per liter of drinking water in many cases) which will access the tanks through power of water plumping machine, which uses in tanks filling throughout a day, the usage of plumping machine increases the corrosion and erosion of pipes materialto be focus for saprophytic and opportunistic microbial

attachment and proliferation[28]. Materials of pipeline, whatever it made plastic or metal are corroded and stay spacious colonized by microorganisms through their physical nature[29, 30].

The significant differences in the temperature between the two types explain the ability of bacterial growth in the plastic than iron tanks, since the mean temperature of plastic tanks 37.58c in June and September which considers the ideal temperature for bacterial growth [31], while July and August characterized by high temperature (the hottest months on record in Iraq) that prevents bacterial growth in the two tanks types, while the highly corrosion of iron promotes bacterial colonization[32] However, another contributing factor cooperates water tanks contamination is overnight stagnated water in the pipes (the residents explain) plus plumping usage on the day will aggravate microbial activity[33, 34].This factor is critically important where the stagnation of water enhances microbial metabolism and increase their concentration in the winter months[35, 36]. The current study shows only 10% of the iron tanks (open lid) had E. coli contamination which access through birds feces or soil particles.[37]It should be noted that all tanks have not washedsince 12-15 years, thusincreased the opportunity for growth of bacteria. Studies reported three times cleaning annually decrease the level of *E.coli* in the water stored comparing with less frequent cleaning[38].

Conclusions

The most important factor has revealed in this study is the high temperature of Iraq, which plays a significant role in determining the kind of tanks material that should use in Iraq for stored drinking water. The iron tanks are less bacterial growth comparing with plastic tanks in summer months.

Conflict of Interest: There is no conflict of interest.

Source of Funding: Self

Ethical Clearance: Not required

REFERENCES

1. Bernnan, S. and J. Withgott Environment the science behind the stories. Pearson Education Inc. New York.2005: 418-453.
2. Anil K Dwivedi. Research in water pollution: A review, International Research Journal of Natural and Applied Sciences.2017: 4, (1).
3. World Bank. World Development Report 2010: Development and Climate. 2009
4. Khan N, Hussain ST, Saboor A, et al. Physiochemical investigation of the drinking water sources from Mardan, Khyber Pakhtunkhwa, Pakistan. International journal of physical sciences.2013: 8(33):1661-71.
5. Pawari MJ, Gawande S. Ground water pollution & its consequence. International journal of engineering research and general science. 2015: 3(4):773-76. 6. J
6. Wright J, Gundry S and Conroy R. Household drinking water in developing countries: a systematic review of microbiological contamination between source and point-of-use. Tropical Medicine and International Health. 2004: 9 (1), 106-117
7. World Health Organization. Zinc in drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality. 2003
8. Al-Azaw MGh, Al-Azawi SA and Al-Obaidi RMS. Study of Aluminum concentration levels in Tigris river, drinking water treatment plants and supply network in Nineveh Governorate, AL Rafdain Engineering Journal. 2010: 18, 13-25.
9. Brick T, Primrose B, Chandrasekhar R, Roy S, Muliyil J, and Kang G. Water contamination in urban south India: household storage practices and their implications for water safety and enteric infections. International Journal of Hygiene and Environmental Health. 2004:207 (5), 473-480.
10. Nath KJ, Bloomfield SF and Jones M. Household water storage, handling and point of use treatment. A review commissioned by IFH, 2006: Accessed Online: http://www.ifh-homehygiene.org
11. Evison, L., and Sunna, N. Microbial re-growth in household water storage tanks. Journal of the American Water Works Association,2001: 93, 85-94.
12. Sherman C. Biochemical activities of microorganisms. Microbiology at Laboratory manual. 2009: 7thed, 143- 203

13. Greenwood D., Slack., Penth erery and arer milk edical Microbiology. 2007: 17th Ed, Edinburgh London New York Oxford: 175- 2

14. SAS.Statistical Analysis System, User's Guide. Statistical.Version 9.1th ed. SAS.Inst. Inc. Cary.N.C. USA. 2012

15. Kistemann T, Claβen, T, Koch, C, Dangendorf, F, Fischeder, R, Gebel, J, Vacacta, V and ExnerM. Microbial laod of drinking water reservoir tributaries during extreme rainfall and runoff", Appl. Environ. Microbiol. 2002: 68, 2188–2197

16. Pokhrel D, Viraraghavan T Diarrhoeal diseases in Nepal vis-à-vis water supply and sanitation status. J Water Health. 2004: 2. 71-81

17. Ekhosuehi A, Akharame MO, ObyuwanaP. Bacteriological Quality and Antibiogram of Isolates from Potable Water Sources in Ekosodin Community, Benin City, Nigeria**.** J. Appl. Sci. Environ. Manage.2018: 22 (1) 129-133

18. Derara C, Moa M, Abebe B. Assessment of the quality of drinking water in storage tanks and its implication on the safety of urban water supply in developing countries.Environmental Systems Research. 2018: 6(12)

19. World Health Organization (2006) Guidelines for Drinking- Water Quality, First Addendum to 3th ed Vol. 1. Recommendations

20. Al-Musleh R M. water microbiology ministry of higher education and scientific research. University of Baghdad, bait Alhekma.1988(In Arabic)

21. Lateef A, Kolawole L, Agosu, O. Quality Assessment of Some Groundwater Samples in Ogbomoso Metropolis, Southwest Nigeria. Journal of Environment and Earth Science. 2012: 2,39-47.

22. Akuffo I, Cobbina SJ, Alhassan EH, Nkoom M. Assessment of the quality of water before and after storage in the Nyankpala community of the Tolon-Kumbungu District, Ghana. Int J Sci Technol Res.2013: 2(2):2277–8616.

23. Tabor M,Kibret M, Abera B.Bacteriological and physicochemical quality of drinking water and hygiene-sanitation practices of the consumers in Bahir dar city, ethiopia.Ethiop J Health Sci. 2011: 21 (1), 19-26.

24. Meride Y, Ayenew B. Drinking water quality assessment and its effects on residents health in Wondo genet campus, Ethiopia. Environ Syst Res. 2016: 5(1)

25. Opara AU and Nnodim J. Prevalence of Bacteria in bottled and sachet water sold in Owerri metropolis. International Journal of Science Innovations and Discoveries. 2014: 4.117-122.

26. Patrick AS, Roland A. Impact of Temperature on Bacterial Growth and Survival in Drinking-Water Pipes. Res J of Env and Earth Sci.2012: 4. 807-817.

27. Daud M, Muhammad N, Shafaqat A, Muhammad R, Raees A, Muhammad B, Muhammad U. Drinking Water Quality Status and Contamination in Pakistan, BioMed Research International,2017: https://doi.org/10.1155/2017/7908183

28. Colwell RR and DJ Grimes Nonculturable microorganisms in the environment. ASM Press, Washington, USA,2000: 354

29. Niquette, P., Servais P, Savoir R. Impacts of Pipe Materials on Densities of Fixed Bacterial Biomass in a Drinking Water Distribution Systems of Brussels, Wat.Res.2000:.34. 6,1952-1956.

30. Zacheus OM,Ilvanainen E I, Nissinen TK, Lethola MJ, and Martikainen PJ. Bacterial biofilm formation on polyvinyl chloride, polyethylene and stainless steel exposed to ozonated water. Wat. Res.2000: 34, 63-70.

31. Fotadar U, Zaveloff P, Terracio L. Growth of Escherichia coli at elevated temperatures".Journal of Basic Microbiology.2005: 45 (5): 403–4.

32. Batte M, Appenzeller B., Greadjean D., Fass S, Gauthier V, Jorand F, Mathieu L, Saby S and Block J-C. Biofilms in drinking water distribution systems, SummerSchool BIO-IMEBII. Galway, Irland,11-14 Aout 2003.Conference Paper (PDF Available) January 2003

33. Lautenschlager K, Boon N, Wang Y, Egli T, Hammes F. Overnight stagnation of drinking water in household taps induces microbial growth and changes in community composition. Water Res. 2010: 44, 4868–4877

34. Prest E.I., Hammes F, Kötzsch S, van Loosdrecht M.C.M., Vrouwenvelder J.S. Monitoring microbiological changes in drinking water systems using a fast and reproducible flow cytometric method Water Res. 2013: 47 (19) 7131-7142

35. Lipphaus P, Hammes F, Kötzsch S, Green J, Gillespie S, Nocker A. Microbiological tap water profile of a medium-sized building and effect of water stagnation. Environ. Technol.2014: 35 (5) 620-628

36. Zhang HH, Chen S N, Huang TL, Shang PL, Yang X., W.X. MaIndoor heating drives water bacterial growth and community metabolic profile changes in building tap pipes during the winter season Int. J. Environ. Res. public health.2015: 12 (10) 13649-13661

37. Thompson T, Sobsey M, Bartram J. Providing clean water, keeping water clean: an integrated approach. Int J Environ Heal R.2003:13:89–94CrossRefGoogle Scholar

38. Cynthia A Schafer, M JR Effect of storage tank material and maintenance on household water quality. J Am Water Works Assoc. 2012: 10(49):49–50*Google Scholar*.

A descriptive Study on Pulmonary Tuberculosis in Salahaddin Governorate, Iraq

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ABSTRACT

Background: Tuberculosis (TB) remains a leading cause of death in the world. Iraq is considered to be a middle burden country with TB**.**

Objective: is to evaluate patients with pulmonary tuberculosis in Salahaddin Governorate.

Patients and Method: the study included 140 patients with pulmonary tuberculosis, who attended chest diseases clinic in Tikrit during the period from May to August 2018. Pulmonary TB treatment outcomes were evaluated according to WHO definitions as new case, cured, relapsed, failed and defaulted.

Results: A total 140 pulmonary TB patients were included in this study with mean age of them was 42.7 ± 15.7 years. The males represented 51% of patients while the females were 49% of patients. Most of patients in this study were beyond primary school education, low income and displaced families represented as 88.6%, 90.7% and 82.1% respectively. Regarding outcome of treatment with anti TB; 78.6% of patients were cured, 7.1% of patients were relapsed, while defaulted and failed patients presented in 2.9% of patients for each one of them.

Conclusion: Pulmonary tuberculosis is still growing problem in this locality. It is common among low education, low income and displaced patients.

Keywords: *pulmonary tuberculosis, Salahaddin, displaced patients, TB outcome.*

Introduction

Tuberculosis (TB) remains a leading cause of death in the world, nearly one third of the global population is infected with *Mycobacterium tuberculosis* and at risk of developing the disease.[(1)] Furthermore, more than 90% of global TB patients and deaths present in the developing countries, where 75% of patients are in the most economically productive age group (15-54 years). [(2,3)]

Iraq has an estimated population of 33 million and is considered to be a middle burden country with TB, and occupies rank 108 globally and 7 in eastern Mediterranean region among countries with TB burden size. According to WHO report 2015, the estimated incidence of TB in Iraq is 45/100000 population, while the prevalence is 74/100000.[(3,4,5)] Moreover, after the 2003 war with deterioration of security and living condition, the infrastructure and health services to effectively provide TB care were seriously damaged.[(2,3,5)]

The objectives of this study are to evaluate patients with pulmonary tuberculosis and to assess their adherence to treatment in Salahaddin Governorate.

Patients and Method

A cross sectional study, including 140 patients with pulmonary tuberculosis, who attended outpatient clinic of chest diseases in Salahaddin Governorate in Tikrit, during the period from May to August 2018. Patients were selected irrespective of the duration of disease and therapeutic status.

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The diagnosis was made according to WHO criteria: A patient was considered as pulmonary TB case if he/ she has symptoms for 3 weeks or more with one of the following: [6,7,8]

- At least 2 direct smears positive sputum.
- One direct smear positive sputum and positive CXR finding.
- 3 consecutive negative sputum smears but strong evidence of pulmonary TB by CXR and clinical features.[6,7,8]

Treatment Outcome: The following definitions were obtained from WHO reports to explain treatment outcome: [6,7,8]

- **New case:** Patient who has never had treatment for tuberculosis.[12, 13]
- **Cure:** Patient who completed treatment and have negative sputum smear in the last month of treatment. [6,7,8]
- **Relapse:** Patient who has been cured from pulmonary TB previously, and now diagnosed with an active disease. [6,7,8]
- **Failure:** Patient who while on treatment remained or become again smear positive 5 months after commencing treatment. [7,8,9]
- **Defaulter:** patient whose treatment was interrupted or stopped as soon as he feel better for two months or more and return to the health services with features of active pulmonary TB. [7,8,9]

The study was accepted by ethical committee of College of Medicine- Tikrit University and Salahaddin directorate of health. All patients were instructed about the study and their agreements were taken.

Statistical Analysis: The collected data was statistically analyzed using statistical package for social science (SPSS) version 18. Chi ($\chi 2$) square test and t- test were used to compare the statistical difference among of variables. P value of ≤ 0.05 was regarded as statistically significant.

Results

The general demographic characteristics of studied patients: The demographic features of present study were shows in table 1. A total 140 pulmonary TB patients with mean age of them was 42.7 ± 15.7 years were included in this study. The males were 71 (51%) patients, while the females represented 69 (49%) patients without significant difference between them. There was significant difference between males and females regarding body mass index (BMI), educational level and economic state. Most of patients in this study were beyond primary school education, low income and displaced families represented as 88.6%, 90.7% and 82.1% respectively. Moreover family history of pulmonary TB present in 13% of patients.

Table 1: General demographic characteristic of studied patients

Variables		Males	Females	Total	P value
		No. %	No. %	No. %	
Number %		71 51%	69 49%	140 100%	>0.05 NS
Age (years) mean ± SD		40.97 ± 14.2	44.4 ± 17.1	42.7 ± 15.7	>0.05 NS
BMI (Kg/m^2) mean ± SD		22.2 ± 2.1	20.5 ± 2.3	21.4 ± 2.4	<0.05 S
Educational level	Illiterate	1 1.4%	1 1.4%	2 1.4%	<0.05 S
	Primary	56 78.9%	68 98.6%	124 88.6%	
	Secondary	14 19.7%	0 0%	14 10%	
Income	Low	59 83.1%	68 98.6%	127 90.7%	<0.05 S
	Good	12 16.9%	1 1.4%	13 9.3%	
History of displacement	Yes	58 81.6%	57 82.6%	115 82.1%	<0.05 S
	No	13 18.3%	12 17.3%	25 17.9%	
Family history of TB	Yes	7 10%	11 16%	18 13%	>0.05 NS
	No	64 90%	58 84%	122 87%	

Symptoms of Pulmonary TB in Studied Patients: Moreover, this study showed that the most common presenting symptoms were cough and sputum present in 138 (96.6%) patients, followed by fever 136 (97.1%) patients, sweating 125 (89.3%) patients, anorexia 93 (66.4%) patients, and weight loss 72 (51.4%) patients, as shown in table 2.

Table 2: Frequency of symptoms of pulmonary TB in studied patients

	Frequency	Percent
Cough	138	98.6%
Sputum	138	98.6%
Fever	136	97.1%
Sweating	125	89.3%
Anorexia	93	66.4%
Weight loss	72	51.4%
Hemoptysis	46	32.9%
Dyspnea	29	20.7%
Pleuritic chest pain	11	7.9%
Others (joints pain)	2	1.4%

Chest X ray (CXR) Findings of Pulmonary TB in Studied Patients: Regarding chest X ray (CXR) findings, most of patients had nonhomogeneous opacities presented in 70 (50%) patients followed by cavity lesions in 30 (21.4%) patients, pleural effusion in 17(12.1%) patients then miliary shadowing in 17(12.1%) patients. Moreover, The CXR findings appeared mainly in the right lung rather than the left, as shown in table 3.

Table 3: Chest X ray (CXR) findings of pulmonary TB in studied patients

Chest X ray findings	Site of the lesion						Total	
	Right lung		Left lung		Bilateral			
	No.	%	No.	%	No.	%	No.	%
Nonhomogeneous opacities	51	56.6%	5	29.4%	14	42.4%	70	50%
Cavity lesions	24	26.7%	4	23.5%	2	6%	30	21.4%
Pleural effusion	10	11%	6	35.2%	1	3%	17	12.1%
Miliary shadowing	1	1.1%	0	0.0%	16	48.4%	17	12.1%
Consolidation	4	4.4%	2	11.7%	0	0.0%	6	4.2%
Total	90	100%	17	100%	33	100%	140	100%

Results of Sputum Smears in Studied Patients: Furthermore, early morning sputum samples for Ziehl- Neelsen stain were obtained from all patients, which revealed positive results in 42 (59.2%) males patients and 37 (53.6%) of females patients, The total positive results were 79 (56.4%) patients, this relation was statistically not significant, as shown in table 4. All patients were negative for HIV. This relation was statistically not significant as shown in table 4.

Table 4: Results of sputum smears in studied patients

Test		Males	Females	Total	P value
Sputum for AFB	Positive	42 59.2%	37 53.6%	79 56.4%	>0.05 NS
	Negative	29 40.8%	32 46.4%	61 43.6%	
	Total	71 100%	69 100%	140 100%	

The Outcome of Treatment with anti TB Drugs in Studied Patients: All patients were received antituberculous regimen, 12 (8.6%) patients represented new cases, 110 (78.6%) patients were cured, 10 (7.1%) patients were relapsed, while defaulted and failed patients represented as 4 (2.9%) patients for each one of them, without significant differences between males and females, as shown in table 5.

Table 5: The outcome of treatment with anti TB drugs in studied patients

		Sex		Total	P value
		Males	Females		
Treatment outcome	Total patients	71 100%	69 100%	140 100%	>0.05 NS
	New case	7 9.9%	5 7.2%	12 8.6%	
	Cured	57 80.3%	53 76.8%	110 78.6%	
	Relapsed	4 5.6%	6 8.7%	10 7.1%	
	Failed	0 0%	4 5.8%	4 2.9%	
	Defaulted	3 4.2%	1 1.4%	4 2.9%	

Discussion

The General Demographic Characteristics of Patients with Pulmonary TB: The mean age of affected patients in this study was 42.7 ± 15.7 years. A study conducted by Al-Kadhimi HM et al in Baghdad showed that the majority of pulmonary TB patients are belong productive age group.[10] Furthermore, most of patients in this study were beyond low education, low income and displaced families, resulting in a high economic burden for patients (during transportation, hospital stay and reduced working hours) and society.[11] The WHO calculates that an average TB patient loses three to four months of work time, and up to 30% of annual household earnings.[11]

Moreover, the present study revealed that the mean BMI of patients was 21.4 ± 2.4 (Kg/m^2), which is still within lower normal limit. Sultan KS et al and Yen YF et al noticed that low BMI is associated with high risks of mortality during TB treatment.[12,13]

Symptoms of Pulmonary TB in Studied Patients: Moreover, this study showed that the most common presenting symptoms were cough and sputum present in 96.6% of patients, followed by fever 97.1%, sweating 89.3%, anorexia 66.4%, and weight loss 51.4% of patients. Karadakhay K et al in Sulaimaniyah study reports that most common symptoms of pulmonary TB are cough, sweating, fever, fatigue and weight loss, and these symptoms are related to the severity of the disease.[14,15] Achkar JM et al observed that cough lead to an increased exposure of close contacts, and hemoptysis is often associated with cavitary lesions, and therefore could be considered a sign of advanced pulmonary TB.[16] The Infectious Disease Society of America (IDSA) and Centers for Disease Control and Prevention (CDC) recommend that pulmonary TB should be suspected in any patient who has persistent cough for more than 2 weeks with or without other signs and symptoms.[17]

Chest X ray (CXR) Findings of Pulmonary TB in Studied Patients: In this study the most common CXR findings was nonhomogeneous opacities presented in 50% patients followed by cavity lesions in 21.4% patients, pleural effusion in 12.1% of patients then miliary shadowing in 12.1% of patients. The CXR findings appeared mainly on the right lung rather than the left. These findings were consistent with those of AL-Jubouri AM et al a study in Baghdad that most reported radiological findings are nonhomogeneous opacities and cavity lesions as 48% and 37% respectively without significant differences between right and left lung.[18] Jumaah HM et al showed the right lung was affected more frequently than the left lung, which may be attributed to anatomical factors.[19] Furthermore, cavitary pulmonary tuberculosis associated with more sputum smear positivity, more hemoptysis and more infection spread.[20]

Results of Sputum Smears in Studied Patients: In present study, early morning sputum samples for Ziehl-Neelsen stain were obtained from all patients, which revealed positive results in 56.4% patients, however, it was still below that of WHO target, which is 70%.[21,22] A study done by Khattak MI and colleagues, in Pakistan showed 52% of patients had positive sputum AFB results.[23] The finding from Ethiopia revealed low case detection rate achieved as 21.6%.[21]

The Outcome of Treatment with Anti TB Drugs in Studied Patients: This study implies that percentage of new cases was 8.6%, it means that pulmonary TB is still growing problem in our locality. The cure rate was 78.6% which reflects the effective role of TB centers in Salahaddin Governorate in management of tuberculosis, but it is still below the recommended target of 85% by the WHO.[24,25] Relapse rate was 10%, it could be either due to lack of compliance or emergence of multidrug resistance TB, while defaulted and failed patients

represented as 4 (2.9%) patients for each one of them. Karadakhy K et al study in Sulaimaniyha reported that 89% of patients were treated successfully and 3% were defaulted, higher percent of cure in his study is due to application of DOTS strategy.[15] Other studies, from Turkey reveals 93% cure rate and 4% default rate, while from Ethiopia reports a successful treatment rate of 60% and a default rate of 9%. [26,27]

Iqbal Z et al study reported that before application of DOTS the cure rate was only 48.6% which rose to 94.8% after DOTS, while the default rate which was initially 19.8%, declined to less than 1% after DOTS, which means improvement in treatment outcomes after the implementation of DOTS strategy.[28]

Iraqi crises, including armed conflict and population displacement, lead to destruction of basic medical infrastructure, inhibit immunization programs, and cause significant decrement in healthcare services and medicines. Unfortunately, these conditions forced TB patients to interrupt their treatment, faced personal instability and difficult living conditions, which leads to decrease treatment success rate and increase the incidence of multidrug resistant-TB.[29.30]

This study concluded that pulmonary tuberculosis is still growing problem in this locality, it is common among low education, low income and displaced patients.

Conflict of Interest: There are "NO CONFLICT OF INTEREST".

Source of Funding: Self.

REFERENCES

1. Ali AA, Abdul Razzaq MS, AL-Saadi MA. Incidence of tuberculosis in Babylon Province-Iraq. Int.J.Curr.Microbiol.App.Sci 2013; 2: 1-4.
2. Global tuberculosis report 2012/WHO 2012.
3. World Health Organization. The global plan to stop TB 2011-2015: transforming the fight towards elimination of tuberculosis. WHO publications. Available from: www.who.int/publications/2010/eng.pdf. Accessed on: 14.4 2018.
4. Heymann D, Thuriaux M. Control of Communicable Diseases Manual. 18th Edition. American Public health Association & WHO publication 2004. P. 560-572.
5. Durib AK. Prevalence of Tuberculosis in Baghdad, Iraq 2012-2016. International Journal of Scientific and Research Publications 2018;8:565-570.
6. WHO: Tuberculosis Fact Sheet, 2017.
7. Jaiswal SK, Jaishwal C, Shrestha S, Jaiswal S, Mahara AB, Suwal A, et al. Factors associated with relapse, defaulter and treatment failure in tuberculosis treatment in eastern Nepal. International Journal of Current Advanced Research 2018;7:12905-12911.
8. Sultan HI, Al-Jebouri MM. Pulmonary tuberculosis in Alzab district. Tikrit Medical Journal 2010;16:37-41.
9. Djibuti M, Mirvelashvili E, Makharashvili N, Magee MJ. Household income and poor treatment outcome among patients with tuberculosis in Georgia: a cohort study. BMC Public Health 2014,14:2-7.
10. Al-Kadhimi HM, Dawood HN. The Effect of Age on Clinical and Radiological Presentation in Patients with Pulmonary Tuberculosis in Baghdad. The Iraqi postgraduate medical journal 2011;10:125- 129.
11. Gurung GN, Chhetri PS, Jha N. Economic impact of pulmonary tuberculosis on patients and their families of Dharan municipality, Nepal. Nepal Med Coll J 2012;14:196-198.
12. Sultan KM, Alobaidy MW, AL-Jubouri AM, Naser AA, AL-Sabah HA. Assessment of Body Mass Index and Nutritional Status in Pulmonary Tuberculosis Patients. J Fac Med Baghdad 2012;54:204- 208.
13. Yen YF, Chuang PH, Yen MY, Lin SY, Chuang P, Yuan MJ, et al. Association of Body Mass Index With Tuberculosis Mortality A Population-Based Follow-Up Study. Medicine 2016;95:1- 8.
14. International organization for migration (IOM)/ Iraq. Displacement tracking matrix across Iraq. 2017. 1- 3.
15. Karadakhy K, Othman N, Ibrahimm F, Saeed AA, Amin AAH. Tuberculosis in Sulaimaniyah, Iraqi Kurdistan: A Detailed Analysis of Cases Registered in Treatment Centers. Tanaffos 2016; 15: 197-204.

16. Achkar JM, Sherpa T, Cohen HW, Holzman RS. Differences in Clinical Presentation among Persons with Pulmonary Tuberculosis: A Comparison of Documented and Undocumented Foreign-born to US-born Persons. Clin Infect Dis 2008; 47:1277-1283.

17. Cudahy P, Shenoi S. Diagnostics for pulmonary tuberculosis. Postgrad Med J 2016; 92:187- 193.

18. AL-Jubouri AM, AL-Obaidy MW, Jameel BF, Hussein WL. Statistical Radiological Analysis in Patients with Sputum Smear Positive Pulmonary Tuberculosis. The Iraqi Postgraduate Medical Journal 2016;15:148- 157.

19. Jumaah HM. The roles of radiology and ESR in the diagnosis of tuberculosis in young military males in Iraq. Ann Coll Med Mosul 2013; 39: 182-185.

20. Lotfian F, Mehrian P. Assessment of Cavitary Pulmonary Tuberculosis in Children. Arch Pediatr Infect Dis. 2016; 4:1-5.

21. Mekonnen A. Smear-positive pulmonary tuberculosis and AFB examination practices according to the standard checklist of WHO's tuberculosis laboratory assessment tool in three governmental hospitals, Eastern Ethiopia. BMC Research Notes 2014;7:1-8.

22. World Health Organization (WHO). Proposed reduction of number of pulmonary TB: background document. 2015.

23. Khattak MI, Ihsanullah, Muhammad A, Khan N, Zaman M. Frequency of sputum positive AFB cases among patients of pulmonary tuberculosis in tertiary care hospitals of northern Pakistan. J Ayub Med Coll Abbottabad 2010;22:56-60.

24. Fatiregun AA, Ojo AS, Bamgboye AE. Treatment outcomes among pulmonary tuberculosis patients at treatment centers in Ibadan, Nigeria. Annals of African Medicine 2009;8:100-104.

25. Laserson KF, Wells CD. Reaching the targets for tuberculosis control: the impact of HIV. WHO Topic 2018. Avialabale at http://www.who.int/bulletin/volumes/85/5/06.035329/en.

26. Gadoev J, Asadov D, Tillashaykhov M, Tayler-Smith K, Isaakidis P, Dadu A, et al. Factors Associated with Unfavorable Treatment Outcomes in New and Previously Treated TB Patients in Uzbekistan: A Five Year Countrywide Study. PLoS One 2015;10:907.

27. Sengul A, Akturk UA, Aydemir Y, Kaya N, Kocak ND, Tasolar FT. Factors affecting successful treatment outcomes in pulmonary tuberculosis: a single-center experience in Turkey, 2005-2011. J Infect Dev Ctries 2015;9:821-8.

28. Iqbal Z, Ali S, Ziaullah, Basit A, Khan MY, Javaid A. Comparison of treatment outcome of tuberculosis before and after the introduction of daily dots in TB clinic at lady reading hospital Peshawar. Lady Reading Hospital, Peshawar, Pakistan 2014.

29. Ismail MB, Rafei R, Dabboussi F, Hamze M. Tuberculosis, war, and refugees: Spotlight on the Syrian humanitarian crisis. PLOS Pathogens2018;7:1-6. Available at https://doi.org/10.1371/journal.ppat.1007014.

30. United Nations Development Programme (UNDP). Keeping TB patients under treatment is a priority in Iraq Mar 24, 2015. http://www.undp.org/content/undp/en/home/presscenter/articles/2015/03/24.

The Relation between Homocysteine, Oxidative Stress and Atherosclerosis Disease

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ABSTRACT

Homocysteine(Hcy) may promote atherogenesis through oxidativestress. Malondialdehyde (MDA), which produced through peroxidation of lipid. It is widely used in estimating the oxidative stress. We aimed to evaluate the serum Hcy levelsand serum MAD in atherosclerosis patients and to find whether these variables are associated with the severity of atherosclerosis disease. Sixty patients diagnosed with atherosclerosis diseases were included in our study. Patients were divided to three groups(Low risk= 1.0, moderate risk = 3.55, and high risk= > 6.15) according to the value of atherogenic index. Fifteen healthy individual, as control group.Serum MDA is estimated by methods of Benge (1978). Hcy were quantitatively determined in patients and control subjects by ELISA test. The receiver operator curve (ROC) analysis of the forthcoming variations revealed the descending order of (Hcy = 0.959; MAD = 0.832;TC = 0.609; LDL = 0.594;and Tri = 0.502) that showed significant variation. The rest of parameters (uric acid, HDL and albumine) failed to occupy a significant ROC area.In our study,we found serum each Hcy and MAD was significantly increased in patients than control; it was gradually increased with increase atherogenic index, affected by the severity of disease, and significantly increases in third group than first group of patients. Person linear correlation revealed a significant positive linear correlation with serum Hcy and MAD and increased risk factor of atherosclerosis disease in the three progressed groups of patients. In summary, there is a significant relation between Hcy levels, MDA, and atherosclerosis diseases. This relationship could cause early development of atherosclerosis diseases even in males. So we suggest that Hcy and MAD might be taken into consideration through the evaluation of atherosclerosis patients

Keywords: *Atherosclerosis, homocysteine, malondialdehyde, oxidative stress*

Introduction

Atherosclerosis is a complex and chronic disease involving gradual accumulation of lipids, collagen, elastic fiber, and proteoglycans in the arterial wall.

Pathogenesis of atherosclerosis is becoming better understood [(1)].Because of some studies showed clearly provides now free radical involvement in the pathogenesis of atherosclerosis itself[(2)]. Hcy may promote atherogenesis through oxidative stress the mechanisms by which Hcypromotes atherosclerosis is not fully understood (3).Hcy is nonessential amino acid of molecular weight (268 dalton), formed during the metabolism of methionine [(4)(5)]. Recently, in both clinical and experimental studies it has been discovered that a moderate increase of plasma Hcy level to confer an independent vascular disease risk factor [(6)(7)]. It has also been revealed that hyperhomocysteinemia (HHcy) lead to the hurried process of atherosclerotic in diabetic patients [(8)]. In this study, we aimed to evaluate the serum Hcy levels and serum MAD in patients with atherosclerosis disease and to find whether these variables are correlated with the severity of disease atherosclerosis disease.

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Material and Method

This study has been carried out at the consultative clinic in Baquba, for the period from September 2016 to

May 2017. The study included (75) subjects (35 females and 40 males) with age range (59-72) years, (15) healthy individuals as control group and (60) patients(29 females and 31 males) with atherosclerosis. Patients were divided to three groups (Low risk= 1.0, moderate risk = 3.55, and high risk= > 6.15) according to the value of atherogenic index. blood sample was collected from each participant after (12-14) hours fasting. For all participant BMI = weight/(height)^2 was calculated. The enzymatic methods were used to estimate the following variables :triglyceride, total cholesterol (TC) concentrations. LDL-cholesterol concentrations were measured by using the Friedewald formula. Serum MDA is estimated by methods of Benge (1978) [9]. Homocysteine were quantitatively determined in subjects by ELISA test. Atherogenic index is the ratio between total cholesterol/HDL- cholesterol[10]. To calculate Atherogenic index the following equation was used [11]: Atherogenic Index = TC/HDL- C.

Result

Receiver Operator Curve (ROC) Analysis: To discriminate between atherosclerotic patients and controls by employing the forthcoming investigated parameters, the ROC analysis was applied. Such analysis Allows to regulate the parameters according to the ROC area that can occupy and if such occupation is significant or not. The ROC analysis showed the descending order (Hcy = 0.959; MAD = 0.832; TC = 0.609; LDL = 0.594;and Tri = 0.502) of parameters that showed a significant variation. The rest of parameters (Uric Acid, Albumin and HDL-C) failed to occupy a significant ROC area (Table 1)

Table 1: ROC analysis for the investigated parameters in atherosclerotic patients and controls

Parameter	ROC Area	P ≤
Hcy	0.926	0.001
MAD	0.832	0.01
TC	0.609	0.01
LDL-C	0.594	0.05
Tri	0.502	0.05
HDL-C	0.402	(N.S)
Uric Acid,	0.452	(N.S)
Albumin	0.372	(N.S)

Distribution of Patients According to Value of Atherogenic Index: We notice that there have been a highly significant differences (P<0.01) in value of atherogenic index. (73.3 %) of patients have high risk= > 6.15, while (15%) of the patients are considered to be moderate risk having 3.55 and (11.6%) of them are considered to be goals for atherogenic index in patients with atherosclerosis was low risk =1as shown in table 2

Table 2: Distribution of patients according to value of atherogenic index

Value of Atherogenic Index	Gender	N	%	Comparison of Significance by Kruskal-Wallis Test
Lowrisk = 1.0	Males	3	11.6	P<0.01
	Females	4		
moderate risk = 3.55	Males	3	15	
	Females	6		
high risk = > 6.1	Males	25	73.3	
	Females	19		
Total	60		100	

Serum Homocystein (Hcy) and Correlation with Atherogenic Index: Figure (1and 2) Showed the serum Hcy a gradual increased level in Atherosclerosis patients (2.26 ± 0.21,4.09 ± 0.25, and 8.45 ± 0.16mg/ mL, respectively) in the three progressed groups of Atherosclerosis. Such differences were significant in patients (P ≤ 0.05), moreover the r value (0.822) was also significant (P ≤ 0.001) in patients.

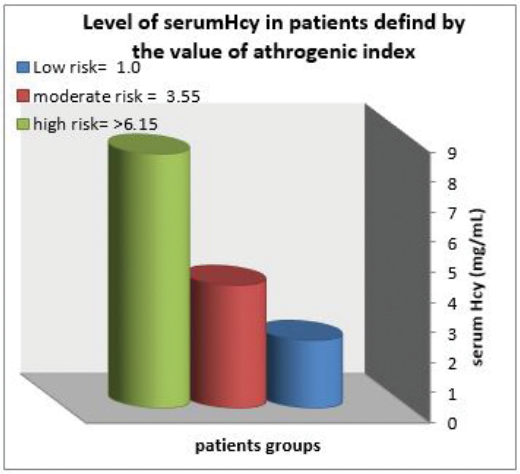


Figure 1: Serum Hcy level in Atherosclerosis patients

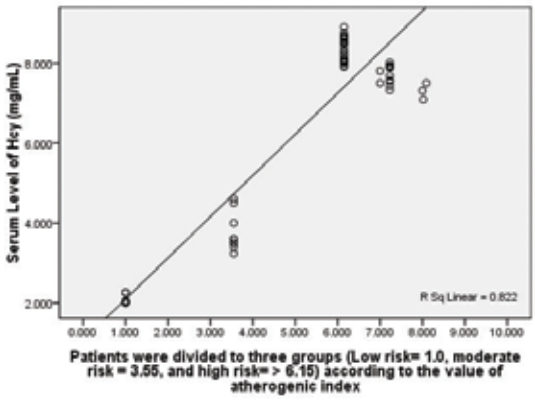


Figure 2: Correlations of Hcy and the value atherogenic index in patients groups

SerumMADand correlation with atherogenic index: The patients group demonstrated a gradual increase of MAD level (0.32 ± 0.12 0.65 ± 0.19M and 1.09 ± 0.23µ mol/L, respectively) in the three groups of Atherosclerosis. Such difference was significant ($P \leq 0.05$), and the r value (0.59) of correlation was also positively significant ($P \leq 0.01$) as shown in figure (3 and 4)

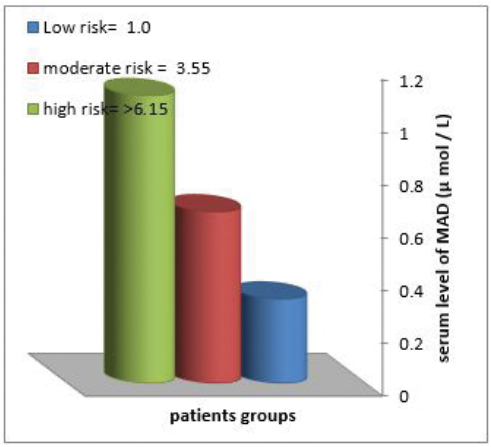


Figure 3: MAD serum level in Atherosclerosis

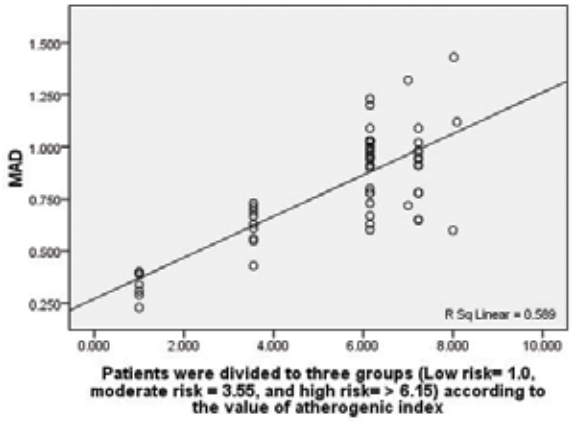


Figure 4: Correlations of MAD and the value atherogenic index in patients groups

Discussion

Over the past three decades, homocysteine has relieved as uncommon risk independent marker for the procession of CVD [12]. Baushey et al. (1995) have found a linear relationship between vascular risk and Hcy levels, that a 5 µmol/L increase in Hcy concentration was correlating with an increase in risk of vascular about thirds one [13]. The relation between CVD and Hcy had investigated by several predictable studies. Many [14][15] but not whole [16][17] get it a positive relation. None of the preceding studies, however, studied the possibility of association between oxidative stress and Hcy with respecting to risk of Atherosclerosis.

The results of the current study propose that serum Hcy is a predictor of atherosclerosis. However, levels of Hcy are correlated with value of atherogenicindex Earlier studies on the serum level of Hcy as a predictor of atherosclerosis are argumentative. Clark et al.(1991), One main property of total Hcy(tHcy) is might to prompt atherogenesis Hcy reason atherogenesis by increasing DNA synthesis of a gene called Cyclin A which in turn prompt replication of an uncontrollable cells in one region within the blood vessels lining [18]. Hcy has been supposed to induce atherosclerosis by the inducement the endothelium of oxidative injury, which is a crucial step in the restraint to injury hypothesis[19] [20] Finally, harmony to Melvin et al. (2004) demonstrated increasing of serum Hcy in atherosclerosis and concluded that homocysteinemia being an independent risk factor for CVD as happens in ischemic disease such as myocardial infarction and stroke and thrombotic events [21].

MAD level was found to be higher in patients compared with the control groups ($P > 0.01$) as shown in table (1). These results are agreement to the some pervious study [22] [23]. Peroxidation of lipid produced MDA which is used widely in estimating oxidative stress therefore; the evaluation of MDA may be used to decide whether a process of lipid peroxidation has taken place [22]. The measurement of MDA has widely been used to detect oxygen free radicals-mediated cell injury. In patients with atherosclerotic disease lipid peroxidation activity is accelerated. So higher MDA level is associated with the clean out of antioxidant and several forms of scavengers. It can be suggested that higher MDA levels might be a biochemical marker for atherosclerotic disease [23].

There is no doubt about the relation between serum lipids profile and the risk of chronic disease including CVD. As well as the metabolic syndrome, which is characterized by obesity, hypertension, glucose intolerance, visceral, and dyslipidemia that increases the risk for CVD. Our investigation agrees with Laaksonen et al. (2002)[24].The propagation of atherosclerosis a gradual increase with age. The aging process may promote modification of lipoprotein metabolic, which lead to an increase in the receptivity oxidation of the LDL-C because of their small size. So it is supposed that LDL are associated with increased atherogenesis[25]. HDL-C is believed to act as cholesterol scavenger. It removes cholesterol first by absorption on its surface, and then facilitates enzymatic conversion to cholesterol esters which moves to the core of the HDL particle and returns to the liver. This property of removing cholesterol from peripheral tissues is thought to give HDL its favorable cardioprotective properties [26][27].So for each 1mg/dL decrease in concentration of HDL-C, the risk for atherogenesis is increased by 2-3%in patients with low levels of HDL-C.

We showed a highly significant differences in value of atherogenic index. Most of patients have high risk, while remind of the patients are considered to be moderate and low risk .unexpectedly high prevalence of coronary atherosclerosis in Iraqi people, atherosclerosis disease is more prevalent in males than females, and it is increasing with age progression, and the prevalence becoming 100% after the age of 40 years old [28]

The level of serum Hcy a gradual increased level in the third progressed groups of Atherosclerosis. Such differences were significant in patients; moreover the r value was also significant in patients. These results are similar to the observations of a number of other investigators [29] [30].Misra et al.(1994) relived that Hcy thiolactone, which forming during complicated rearrangements of Hcy is chemically reactive and acylates free amino groups in protein such as the side-chain lysine groups . In the process of homocysteinylated proteins formation moreover development oxidative stress and homocysteinylated proteins become damaged and may lose their biological activity. Jones et al. (1994), confirmed that oxygen free radicals generated from Hcy by noticing Hcy toxic effects and in the presence of Cu2+, and their association with increased peroxidation of lipid, which was inhibited by catalase and attenuated by desferal[31]. Oxygen radicals have been confirmed to reason injury of endothelial [32]

The patients group demonstrated a gradual increase of MADlevel in the thrid groups of Atherosclerosis. Such difference was significant, and the r value of correlation was also positively significant. There are several previous studies that have studied the relation between MAD and aherosclerosis disease.Kostner et al. revealed higher levels of MDA in patients with coronary artery [33]. Pucheu et al. showed an increase in level of serum MDA following thrombolysis in acute MI patients, but no significant differences they could find between control group and stable angina pectoris patients group [34]. In (2001) Cavalca et al, in their study about oxidative stress and Hcy in coronary artery disease, he observed, higher significant levels of MDA were estimated in patients with coronary artery when compared to the healthy group [35].In our study, we found serum MAD was significantly increased in patients than control; it was gradually increased with increase atherogenic index, affected by the disease severity, and significantly increases in third group than first group of patients. We believed that MDA possibly also be associated with Atherosclerosis involvement.

Conclusion

There is a significant relation between Hcy levels, MDA, and atherosclerosis diseases. This relationship could cause early development of atherosclerosis diseases even in males. So we suggest that Hcy and MAD might be taken into consideration through the evaluation of atherosclerosis patients.

Ethical Cearance: This study was conducted with the consent of the volunteers and without mentioning the names with the complete privacy of volunteers

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Thomas, M., Devling, Ph.D. BIOCHEMISTRY with clinical correlations, PUBLISHING USA 1982,9, 514 – 515.
2. Steinberg, D and Witztum,J,L. 1990. lipoproteins and Atherogenesis .current concepts, Jama 23: 264 -3047.
3. Lawrence, M. P ; Title, M, D,; Peter, M. Cummings, B;,A, MSC, Karen Giddens, Jacques J; Genest, Jr, MD,; Bassam, A;Nassar, MB, BCH.. Effect of Folic Acid and Antioxidant Vitamins on Endothelial Dysfunction in Patients With Coronary Artery Disease, JACC, 2000,36(3),758–65
4. Tucker, K., L;Selhub, J; Wilson, P.,W; Rosenberg, I.,H. Dietary intake pattern relates to plasma folate and homocysteine concentrations in the Framingham Heart Study. *J. Nutr*,1996,**126**,3025-31
5. George., N.; Welcl, J.; L. New England. *J. Medicine*,1998,**338**(15),1042-50
6. Boushey., C.,J;Beresford, S.,A.,A; Omenn, G.,S; Motulsky., A,G. A quantitative assessment of plasma homocysteine as a risk factor for vascular disease. JAMA, 1995,274, 1049-1057,
7. Nygard., O.; Vollset., S,E; Refsum., H; Stensvold., I; Tverdal., A;Nordrehaug., JE;Ueland.,PM; Kvale., G. Total plasma homocysteine and cardiovascular risk profile. JAMA,1995,274, 1526-1533,.
8. Okada., E; Oida., K; Tada., H; Asazuma., K; Eguch.,i K; Tohda., G; Kosaka., S;Takahashi., S; Miyamori., I. Hyperhomocysteinemia is a risk factor for coronary arteriosclerosis in Japanese patients with type 2 diabetes mellitus. Diabetes Care, 1999,22,484-490,
9. Robert., K, Murray.; Daryl., K; Granner. (Eds). Harpers Illustrated Biochemistry.26th. McGrow-Hill Companies, United States. 2003,Ch.26,pp,219-20
10. Benge J.A. and Aust S.D. Estimation of serum Malondialdehyde level in hoffee P.A. and Jones M.E. (eds), Methods in Enzymology Hoffee Jones. Academic Press, New York, San Francisco, London, ASubsidinary of Harcoart Brace Jovanovich, Publisher,1978,51,302.
11. Wilson., P, W, F; Ordovas., J, M; and Namara., J, R, M. Clinical chemistry: remnant lipoprotein cholesterol and triglyceride reference range from the Framingham heart study. Blackwell-Scientific Publication, London. 1998,44, 1224- 1232.
12. Rutishauser, W and Lerch, R. Asymptomatic ischemia, an important part of the spectrum of coronary disease; Schweiz. Rundsch. Med Prax. 1995,.84(42),1181-5
13. Boushey.,CJ,;Beresford., SA; Omenn., GS; Motulsky., AG..Jama 1995,274,1049-57.
14. Stampfer., MJ; Malinow., MR; Willett., WC; Newcomer., LM; Upson., B; Ullmann., D; Tishler., PV;Hennekens., CH.. A prospective study of plasma homocysteine and risk of myocardial infarction in US physicians. JAMA. 1992,268,877-881.
15. Verhoef., P; Hennekens., CH; Malinow., MR; Kok., FJ; Willett., WC;Stampfer MJ. A prospective study of plasma homocysteine and risk of ischemic stroke, 1994,25,1924-30.
16. Evans., RW;Shaten., J; Hempel., JD; Cutler., JA ;Kuller., LH. For the MRFIT Research group. Homocystiene and risk of cardiovascular disease in the multiple risk factor intervention trial. ArteriosclerThrombVasc Biol. 1997, 17,1947-53
17. Alfthan., G; Pekkanen., J; Jauhiainen., M; Pitkaniemi., J; Karvonen., M, Tuomilehto., J; Salonen., JT ;Ehnholm., C.. Relation of serum homocysteine and lipoprotein concentrations to atherosclerotic disease in a prospective Finnish population based study. Atherosclerosis,1994 106,9-19.[Medline]
18. Clarke., R, Daly.;R, RobinsonK, Blood levels of homocystein and increased risks of cardiovascular diseases. N Engl J Med, 1991, 324:1149

19. Prasad, K..Homocystein, a risk factor for cardiovascular diseases. Int J Angiol., 1999.,8:76

20. Jakubowski, H..Homocysteine is a protein amino acid in humans. Implications for homocysteine-linked disease. *J. Biol Chem*,2002,**277**,30425–48.

21. Melvin., R, Hayden and Suresh., C, Tyagi. Homocysteine and reactive oxygen species in metabolic syndrome, type 2 diabetes mellitus, and atheroscleropathy: The pleiotropic effects of folate supplementation. J. Nutr. 2004, 3:4.

22. Bragt., PC, Bansberg., JI., and Bonta., IL.Anti-inflammatory effects of free radicals scavengers and antioxidants. Inflammation,1980,4, 289-299.

23. May, K Ismail. Ph.D. Thesis submitted to college of Science, University of Mosul Cupta S. and D eshmurk U.U. (1994) formation and function of free radicals in human body . Ann. Nat. Acad. Med. Science,2006,30,45 – 59.

24. Laaksonen., D, E; Niskanen., L; Punnonen., K; Nyyssonen., K;Salonen., R;Rauramaa., R. ; Salonen., JT. Sex hormone, inflammation and the metabolic syndrome: a population based study. European J. of endocrinol., 2003,149,601- 608.

25. Khalil., A; Fortin., J; LeHoux., Jand Fulop., T. Age- related decrease of dehydroeepiandrosterone concentration in low density lipoproteins and its role in the susceptibility of low density lipoproteins to lipid peroxidation. J. Lipid Res., 2000,41, 1552- 1561.

26. Zhao., X; Mrse., J. S; and Adowdy .,A. Safety and Tolerability of simvastatin plus niacin in patients with coronary artery disease and low high – density lipoprotein cholesterol. Am. G. Cardiol., 2004,93,307, 312.

27. Davidsons., B. Principle and Practice of Medicine. 19th ed., International Editor, Toronto, 2002,PP 420 – 437.

28. Ammar Mohammad Khudeer Al-Aamood,Nemah H. Al-juboriandAli Al-Tmeme. Prevalence of Coronary Atherosclerosis in Babylon Governorate; Histopathological, Postmortem Prospective Study. Medical Journal of Babylon2015,Vol,12- No. 2

29. Misra, HP. Generation of superoxide free radical during the autoxidation of thiols. *J. Biol Chem,* 1994,**249**,2151–2155

30. Blom., HJ. Consequences of homocysteine export and oxidation in the vascular system. SeminThrombHemost.,2000, **26**,227–32

31. Jones., BG; Rose., FA; Tudball., N. Lipid perioxidation and homocysteine induced toxicity. Atherosclerosis,1994,105:165.

32. Weis., SJ; Young., J;LoBuglio., AF. Role of hydrogen peroxide in neutrophilmediated destruction of cultured endothelial cells. J Clin Invest. 1981,68:714.

33. Kostne.,r K; Hornykewyc.,z S;Yang., P. Is oxidative stress causally linked to unstable angina pectoris? A study in 100 CAD patients and matched controls. Cardiovasc Res, 1997,36,330–6 8.

34. Pucheu., S;Coundray., C; Vanzetto., G; Favier., A, De; Liris., J. Assessment of radical activity during the acute phase of myocardial infarction following fibrinolysis: utility of assaying plasma malondialdehyde. Free RadicBiol Med,1995, 19,873–81 9.

35. Cavalca., V; Cighett.,i G; Bamonti., F. Oxidative stress and homocysteine in coronary artery disease. Clin Chem, 2001,47(5),887-92

Comparison of the Educational Effect of Two and Three Dimensional Books on Dental Anxiety in Children with Hearing Impairment (Aged 7–9 Years)

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ABSTRACT

Introduction: Dental anxiety is common in children prior to dental treatment especially in hearing impaired children because of difficulties in communicating their fears. One of the method to overcome dental anxiety is positive image.

Materials and Method: The study was done in 21 children 7-9 years old with hearing impairment. Each children were educated by two and three dimensional book "Aku dan Gigiku". Dental anxiety was assessed by measuring respiratory rate, salivary alpha amylase, and electrodermal activity.

Results: Statistical data were analized with independent t-test and mann-whitney test. There were difference but not significant in delta value between two and three-dimensional book "Aku dan Gigiku".

Conclusion: This study show that two and three dimensional book "Aku dan Gigiku" has positive effect on dental anxiety by decreasing breathing frequency, salivary alpha amylase, and electrodermal activity.

Keywords: *Dental Anxiety, Two Dimensional Book, Three Dimensional Book, Children with Hearing Impairment.*

Introduction

Dental anxiety is common in children prior to dental treatment. Children with communication barriers, such as hearing impairment, are more likely to experience higher levels of anxiety due to difficulties in communicating their fears. Lack of communication between dentists and pediatric patients owing to the doctor's minimal skills in the management of children with anxiety can affect treatment success. Dental anxiety causes uncooperative behavior and introduces various obstacles; thus, treatment will not be optimal because a lot of time is wasted. Dental anxiety is manifested in different ways in each individual, for instance, specific physiological reactions, such as increases in salivary alpha amylase levels, respiratory rate, electrodermal activity, heart rate, and blood pressure can occur.[1,2]

According to the American Association of Pediatric Dentistry, effective communication is essential.[3] For children with hearing impairment, various types of media can be used to communicate, including writing, drawing, and lip-reading [4]. One of the methods to overcome anxiety is positive pre-visit imagery, in which the patient's parents show them positive images of dentistry or dental care in the waiting room prior to dental treatment. The purpose of positive pre-visit imagery is to provide visual information to children and parents regarding procedures performed by the dentist and to provide opportunities for children to ask questions prior to dental treatment.[3]

In the present study, the type of media used to reduce dental anxiety in children with hearing impairment were the two- and three-dimensional versions of the book "Aku dan Gigiku," which contains material on oral hygiene, dentist visits, and an introduction to dental devices that are expected to be used, with a view to reducing dental anxiety in children with hearing impairment.

Materials and Method

The present study was conducted at SDLB Santi Rama Cipete, South Jakarta, and aimed to analyze the differences in the educational effects of two- and three-dimensional versions of the book "Aku dan Gigiku" on the respiratory rate, salivary alpha amylase levels, and electrodermal activity in children with hearing

impairment. This was an experimental clinical study comprising total 42 children with hearing impairment (age, 7−9 years; 26 boys and 16 girls). Subjects were divided into two intervention groups: one using the three-dimensional version of the book and another using the two-dimensional version. Inclusion criteria were children with hearing impairment aged 7−9 years with communication level class 1, 2, or 3 SDLB and an IQ level of >90, and children who had never visited a dentist.

The respiratory rate, salivary alpha amylase levels, and electrodermal activity of the subjects were measured twice in both intervention groups; the first measurement was performed prior to the intervention, whereas the second measurement was performed following the intervention with either the two- or three-dimensional version of the book, Each measurement was performed thrice and the obtained values were averaged; the delta value, which is the value that was analyzed, was taken as the difference between the second and first values.

Results and Discussion

Data for the respiratory rate, salivary alpha amylase levels, and electrodermal activity were tested for normality using the Saphiro–Wilks test (sample size, n = 42). The results of the data normality test showed that the respiratory rate in both intervention groups was normally distributed at $p \geq 0.05$. Furthermore, a parametric independent *t*-test resulted in a significance value of $p < 0.05$.

Table 1: Comparison of the delta value for the frequency of breaths between the two- and three-dimensional book intervention groups

Variable	n	Mean ± SD (breaths per minute)			p
		FN_1	FN_2	Δ	
Three-dimensional book intervention group	21	23.490 ± 2.782	19.654 ± 4.471	−3.837 ± 4.808	0.062*
Two-dimensional book intervention group	21	22.698 ± 2.089	21.016 ± 1.851	−1.174 ± 1.169	

Independent *t*-test *significance = $p < 0.05$; FN_1 = First respiratory rate; FN_2 = Second respiratory rate

Table 1 shows that the mean first and second breathing frequency in the three-dimensional book intervention group were 23.490 ± 2.782 and 19.654 ± 4.471 breaths per minute, respectively, and that the delta value was −3.837 ± 4.808 breaths per minute. These results show that the respiratory rate decreased following intervention with the three-dimensional version of the book "Aku dan Gigiku." Similarly, the breathing frequency in the two-dimensional book intervention group decreased, with a delta value of −1.174 ± 1.169 breaths per minute. An independent *t*-test was used to test the hypothesis ($p = 0.062$). Thus, it can be concluded that there was no statistically significant difference ($p > 0.05$) in the respiratory rate between the two- and three-dimensional book intervention groups.

Table 2: Comparison of the delta value for the salivary alpha amylase levels between the two- and three-dimensional book intervention groups

Variable	n	Median (minimum–maximum)			p
		ASS_1	ASS_2	Δ	
Three-dimensional book intervention group	21	27 (3−170)	11 (2−101)	16 (−7–69)	0.199*
Two-dimensional book intervention group	21	18 (2−44)	10 (3−24)	11 (−11–26)	

Mann–Whitney test, *significance = $p \leq 0.05$; AAS_1: First alpha amylase score; AAS_2: Second alpha amylase score

Table 2 shows that the delta value for the salivary alpha amylase levels of the three-dimensional book intervention group was 16 (−7−69) and that for the two-dimensional book interventional group was 11 (−11−26). These data show that the median alpha amylase levels decreased in both intervention groups. A non-parametric Mann–Whitney test was used to test the hypothesis ($p = 0.199$), which indicates that there was no significant difference in the salivary alpha amylase levels between the two- and three-dimensional book intervention groups.

Table 3: Comparison of the delta value for the electrodermal activity between the two- and three-dimensional book intervention groups

Variable	n	Median (minimum –maximum) (μS)			p
		EA_1	EA_2	Δ	
Three-dimensional book intervention group	21	3.334 (1.121−9.255)	2.358 (0.638−5.702)	−1.346 (−5.386−0.000)	0.001*
Two-dimensional book intervention group	21	1.410 (0.023−4.318)	1.020 (0.849−4.247)	−0.390 (−0.872−−0.071)	

Independent *t*-test *significance = $p< 0.05$; EA_1 = First Electrodermal activity; EA_2 = Second Electrodermal activity; μS: micro Siemens

Table 3 shows that the delta value for the electrodermal activity of the three-dimensional book intervention group was -1.346 (-5.386−0.000) and that of the two-dimensional book intervention group was -0.390 (-0.872−-0.071). These results show that the median electrodermal activity decreased in both intervention groups. A non-parametric Mann−Whitney test was used to test the hypothesis ($p = 0.001$), which indicates that there was a significant difference in electrodermal activity between the two- and three-dimensional book intervention groups.

General anxiety typically occurs in children with hearing impairment owing to barriers in communication, particularly regarding difficulties in conveying emotions. This high level of anxiety affects the complex communication process; thus, information becomes more difficult to understand. Anxiety can lead to uncooperative behavior in children, which contributes to avoidance of dental checkups, thereby leading to dental complications and oral problems.[5,4]

Subjects involved in the present study were children with hearing impairment who had never visited a dentist. Anxiety is an emotional response in the form of fear of an unknown threat or a situation that has not yet taken place.[6] Physiological responses as a result of anxiety include increases in respiratory rate, salivary alpha amylase levels, electrodermal activity, and heart rate, in addition to palpitations, sweating, and abdominal discomfort or pain. An increased respiratory rate can be caused by negative emotions, such as anxiety, as the physiological response of the body changes.[1] The response caused by anxiety occurs due to increased activity of the autonomous nervous system, particularly the sympathetic nerves. Major respiratory controls are performed by the brain stem; however, the end result of breathing may be affected by the amygdala in the limbic system, which is responsible for emotional regulation.[7,8]

The three-dimensional version of the book "Aku dan Gigiku" is about oral health, the conditions of a healthy and unhealthy mouth, the causes of dental caries, and how to maintain good oral health.Pop-up books play a role in providing information prior to dental visits by introducing oral hygiene and dental care in a fun manner. This book has become one of the main tools in the management of mild anxiety in children with hearing impairment. For moderate and mild anxiety, visual or auditory stimuli, such as music sounds, videos, or positive images, are helpful in reducing anxiety.[1] The American Academy of Pediatric Dentistry(AAPD) has stated that attractive images and colors in books can act as a medium in a positive pre-visit imagery approach to decrease dental anxiety.[3]

The results presented in Tables 1, 2, and 3 show revealed no statistically significant differences ($p> 0.05$) between the respiratory rate, salivary alpha amylase levels, or electrodermal activity between the two- and three-dimensional book intervention groups. These results indicate that both types of books are similarly effective as oral health education media in overcoming dental care anxiety in children with hearing impairment prior to oral prophylaxis, as characterized by decreases in the respiratory rate, salivary alpha amylase levels, and electrodermal activity. Education provided prior to dental treatment can inculcate a sense of security in children with hearing impairment through vision, touch, and facial expressions.[4,9,10,11]

The Galvanic Skin Response (GSR) logger sensor is a tool for measuring electrodermal activity. Emotional and sensory stimulation causes sweat production. The GSR logger sensor is used to measure sweat from the sweat glands in the hand.[12] As a result of the stimulation,

the amount of sweat increases and so does the skin conductivity.[13] Electrodermal activity measurement was selected as the parameter to be evaluated in the present study because it is one of the simplest tools to measure the psychophysiological activity of anxiety in a quantitative manner.[14,15] Najafpour et al. (2016) reported that the GSR logger sensor is a reliable and valid measurement tool for assessing dental anxiety in children in clinical settings. The GSR may help identify clinically anxious children prior to dental treatment to provide appropriate interventions.[14]

Conclusion

The two- and three-dimensional versions of the book "Aku dan Gigiku" did not significantly differ in their effect and similarly decreased anxiety in children with hearing impairment aged 7−9 years, as characterized by the decreases in respiratory rate, salivary alpha saliva levels, and electrodermal activity.

Acknowledgments

This paper has been fully supported and financed by the Directorate of Research and Community Service University of Indonesia.

Conflict of Interest: There is no conflict of interest in this study.

Ethical Clearance: This study obtained a label of ethics escaped by the number: 39/Ethical Approval/ FKGUI/2017 and register number 050480617 on June 22, 2017.

REFERENCES

1. Milica Jovanović-medojević JN, Medojević A. Dental Anxiety : Etiology and Treatment Options. *Serbian Dent J*. 2015;62(4):174-84.
2. Guinot Jimeno F, Bielsa SY, Fernández CC, Rodríguez AIL, Mercade Bellido M. Objective and subjective measures for assessing anxiety in paediatric dental patients. *Eur J Paediatr Dent*. 2011;12(4):239-44.
3. American Academy of Paediatric Dentistry. Guideline on Behavior Guidance for the Pediatric Dental Patient. *Clin Pract Guidel*. 2015;37(6):180-9.
4. Suhani R, Suhani M, Badea M. Dental anxiety and fear among a young population with hearing impairment. *Clujul Med*. 2016;89(1):143-9.
5. Dougall A, Fiske J. Access to special care dentistry, part 2. Communication. *Br Dent J*. 2008;205(1).
6. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: Arlington, American Psychiatric Publishing; 2013.
7. Holstege G, Beers CM, Subramanian HH. The Central Nervous System Control of Respiration: Great Britain, Elsevier Science; 2014.
8. Kreibig SD. Autonomic nervous system activity in emotion: A review. *Biol Psychol*. 2010;84(3):394-421.
9. Bunawan L, Yuwati C. Penguasaan Bahasa Anak Tunarungu: Jakarta, Yayasan Santi Rama; 2015.
10. Achmad, H. et. al. Prevalence of Medically Compromised Children Regarding Dental Caries and Treatment Needs in WahidinSudirohusodo Hospital. Journal of International Dental and Medical Research. 2017:10 (3); 915-19
11. Najafpour E, Asl-aminabadi N, Nuroloyuni S, Jamali Z, Shirazi S. Can Galvanic Skin Conductance be used as an Objective Indicator of Children's Anxiety in the Dental Setting? *J Clin Exp Dent*. 2017;9(3):3-9.
12. Galvanic Skin Response. [internet 2016]. [accessed in 2017 Jan 15]: https://imotions.com/blog/galvanic-skin-response/
13. Samnieng P. Dental Cares for Patients Who Have a Hearing Impairment. *Korean Acad Prev Dent*. 2014;10(4):215-8.
14. Neulog GSR sensor guide. [internet 2015]. [accessed in 2017 Feb 5]: www.neulog.com.
15. Achmad H, Rasmidar Samad, Hendrastuti Handayani, Sri Ramadhany, Mardiana Adam, Mardiana And Andam Dewi Suci. Analysis Of Disease Risk Factors Of Early Childhood Caries (Ecc) On Pre-School Children Psicosocial Project Review. Asian Journal. ofMicrobiol. 2018;20:18-25.

Effectiveness of an Education Program for School Age Children Related to Management of Growth Hormone Deficiency University of Baghdad-College of Nursing

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ABSTRACT

Study aimed to determine effectiveness of educational program on children with growth hormone deficiency knowledge at and determine relationship between knowledge and their general information.

Methodology: A quasi-experimental study was carried out at Child's Central Teaching Hospital, Medical City of Al Imamian Al Khadhmain Teaching Hospital, and National Centre for Treatment and Research of Diabetes, Specialized Center for Endocrine Diseases and Diabetes; and Department of Medical City (Children Welfare Teaching Hospital) The study included a purposive sample of (80) children with growth hormone deficiency who were attending to outpatient endocrine clinics and centers. Descriptive statistical analysis procedure (frequency, percentage and mean of score) and inferential analysis procedure (person correlation coefficient, chi-square test, t-test and Z score) were used to analysis data.

Results: The findings of the study indicated that there is an effectiveness of an educational program upon school age children related to the management of their growth hormone deficiency. There is no statistically significant difference between child's knowledge about their management and their demographic data.

The researchers recommended to (1) provide specialized nurses in endocrine centers and clinics to give high quality care, (2) implement the educational program to educate children and their families at schools, nurseries and other institutes, and (3) encourage children with growth hormone deficiency and their care givers about management through initiate of training session as group and incentive for children by educational media like CD, pamphlet, about normal range of height, weight, nutrition, exercise, and medication.

Keywords: *School-age Children, Growth Hormone Deficiency*

Introduction

Growth is a systematic and organized process it is begins at ordered conception. Growth has a sophisticated interaction between hormones, genes and nutrients. The human growth and maturation can be affected and controlled by several hormones, specially growth hormone (GH), which is secreted by the pituitary gland [(1)].

The Growth and development process consider the most important and vital features of a child's life. The great development in the past few decades in sciences of biological work and growth biology at molecular, cellular and serology helps to discover this physical and maturational process mechanisms and the key that controlled it, have participated in the knowledge of the growth disorders pathophysiology. The genetic revolution is re-inventing medicine. This understanding helps us to remake new management like molecular genetic techniques which clarified the etiology of growth disorders. Expression of effective and scheduled of the growth hormone (GH) program is important for growth in stature such as metabolic homeostasis [(2)].

Assessing pediatric wellbeing or growth assessment, through anthropometric measurement (height, weight, head circumference, chest circumference, abdomen

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circumference, skin fold thickness, body mass index, wrist circumference, bone age and growth chart". Height, weight, and bone age most common for use to detect of growth hormone deficiencies [3-4].

Growth hormone is a peptide hormone that stimulates growth and development. Growth hormone is synthesized in the somatotropic cells, which are found in the anterior pituitary gland. Any disturbance for rate growth hormone effect on growth and development of the children [5].

Nursing management for children with growth hormone deficiencies is very important to improve normal growth and development and reduce burden on the child and their family through the role of nursing education for parent about monitoring early signs and symptoms that appear for the child and indicators for growth deficiencies, education for the children and their caregivers about nutrition of the child, special exercise that help the child, sleep pattern of the child, and psychological status so the knowledge for children and their caregivers is important to improve growth for children and decrease burden of the problem on children and their family and society [6].

Method and Material

Method

Research Design: A quasi-experimental design was followed to conduct this study.

Setting: Study carried out in outpatient endocrine clinics and centers at Baghdad City hospitals.

Subject: A purposive (non-probability) sample of (80) children with growth hormone deficiency agree to participate in this study.

Tool of the Study: A study instrument was designed and constructed by the researcher to measure the variables underlying the present study. A questionnaire format construction through reviewing of literature and related studies. The tool of the study consisted of two parts (Child Demographic Characteristic and their knowledge questionnaire related to management of hormone deficiency)

Part 1: A demographic data sheet, consisted of (2) items, which included age and gender,

Part 2: knowledge questionnaire designed to measure the children knowledge and it consists of (48) items that concerned with: growth hormone replacement therapy dosage, rout of administration and side effects, children knowledge toward nutrition status,child knowledge toward exercises and it is effect on child height and growth, and children knowledge toward sleep disturbance and it is effect on growth.

Method of while the intervention procedure:

1. Approval request provided to the children to obtain their participate agreement of the study.
2. Validity: Content validity for the early developed instrument was determined through the panel of experts (who have had more than 5 years of experiences in their specialty field) to investigate the clarity, relevancy, and adequacy of the questionnaire in order to achieve the present study's objectives. A preliminary copy of the questionnaire was designed and presented to (15) experts. They were (6) faculty members from college of nursing/ university of Baghdad, (6) endocrinologist faculty member from ministry of health (Central child teaching Hospital) (1) Endocrinologist from Babylon College of Medicine, (1) nutritionist from Al-Kindy Collage of Medicine and (1) psychologist from Ibn Rushed Hospital.
3. Determination of the questionnaire was based on test –retest method.

Statistical Analysis: Descriptive and inferential statistical analysis procedure were used to analysis data.

Results

Data analyzed reveal that table (1) show the child's age mean is 10.36 ± 1.75; two-third age 12-years-old (*n = 32*; 40.0%).

Concerning child's gender, more than a half are females (*n = 43*; 53.75%) compared to males (*n = 37*; 46.25%).

Table (2) There are statistically significant differences in children management follow-up (Mean = 47.5625, 53.3275, 69.443) respectively.

Tables (3) show there is no statistically significant difference in children's management of growth hormone deficiency, nutrition, exercise, sleep, and psychological status their demographic data like child's gender groups in the pre-test time.

Table (4) show there is statistically significant differences in children's management of nutrition, exercise, and management of sleep and children's gender groups in the posttest I (p-value = .005).

Table (5) show there is a statistically significant difference in children's management of exercise between children's gender groups in the post-test II (p-value = .005).

Table 1: Distribution of children general information (n = 30)

Variables	Frequency	Percent
Child's Age (Years): Mean (SD): 10.36 ± 1.75		
7-8	16	20
9-10	18	22.5
11-12	46	57.5
Total	80	100.0
Child's Gender		
Male	37	46.25
Female	43	53.75
Total	80	100.0

Table 2: Distribution and association of children knowledge

Management	No.	Mean	Std. Deviation	Std. Error Mean
Pretest	80	47.5625	3.73469	.31754
t=82.513 df=79				
Posttest I	80	53.3275	3.8980	.43335
t=147.121 df=79 p-value = .000, .000, .000				
Posttest II	80	69.443	1.0832	.11286
t=340.568 df=79				
Correlation between child's age and their knowledge				
Variables	**Knowledge Pretest**	**Knowledge Posttest I**	**Knowledge Posttest II**	
1. Child's Age	0.346	0.196	0 .142	

N = number, Std= standard deviation, t= t test, df = degree of freedom

Table 3: Distribution and Association of children's knowledge and their gender pre test

	Male						Female					
	N	**Mean**	**df**	**Sig.**	**T**	**S.D**	**N**	**Mean**	**df**	**Sig.**	**T**	**S.D**
Child's Management of Growth Hormone	37	31.2703	.332	4.62270	78	.741	43	30.8605	.339	6.15120	76.685	.735
Child's Management of Nutrition	37	19.5135	1.149	2.98721	78	.254	43	18.7442	1.149	2.98483	76.212	.254
Child's Management of Exercise	37	15.7027	1.829	2.67566	78	.071	43	14.5349	1.844	2.98687	77.862	.069
Child's Management of Sleep	37	9.3784	-1.187-	1.58730	78	.239	43	9.8605	-1.207-	1.98304	77.623	.231
Child's Management of Psychological Status	37	16.0811	-.083-	3.14800	78	.934	43	16.1395	-.083-	3.12883	76.089	.934

N = number, SD= standard deviation, t= t test, df = degree of freedom

Table 4: Group Statistics for the difference in child's management between gender groups in the posttest I

	Male						Female					
	N	**Mean**	**df.**	**Sig**	**t**	**S.D**	**N**	**Mean**	**df**	**Sig.**	**T**	**S.D.**
Child's Management of Growth Hormone	37	43.1081	-.493-	1.57734	78	.623	43	43.2791	-.492-	1.51698	75.250	.624

Conted…

Child's Management of Nutrition	37	18.3243	-.603-	.85160	78	.548	43	18.4884	-.626-	1.45360	69.321	.534
Child's Management of Exercise	37	2.7027	1.063	.46337	78	.291	43	2.5814	1.076	.54478	77.993	.285
Management of Sleep	37	13.6216	.379	1.18676	78	.706	43	13.5349	.370	.85493	64.334	.713
Management of Psychological Status	37	17.0270	.501	1.49975	78	.618	43	16.83783	.509	1.83783	77.800	.613

N = number, SD= standard deviation, t= t test, df = degree of freedom

Table 5: Distribution and association of children's knowledge and their gender posttest 2

	Male						**Female**					
	N	**Mean**	**Sig**	**df.**	**t**	**S.D**	**N**	**Mean**	**Sig.**	**df**	**T**	**S.D**
Child's Management of Growth Hormone	37	44.5135	-.188-	1.12105	78	.852	43	44.5581	-.186-	1.00717	73.134	.853
Child's Management of Nutrition	37	18.2973	-.918-	1.02374	78	.361	43	18.5116	-.921-	1.05497	76.850	.360
Child's Management of Exercise	37	22.2162	.389	1.05765	78	.699	43	22.0930	.401	1.65923	72.238	.689
Management of Sleep	37	7.4595	-.378-	.83648	78	.707	43	7.5349	-.381-	.93475	77.868	.704
Management of Psychological Status	37	7.4595	-.378-	.83648	78	.707	43	7.5349	-.381-	.93475	77.868	.704

N = number, SD= standard deviation, t= t test, df = degree of freedom

Discussion

Concerning the children age, the two third of study sample 57.5% was (11- 12) years old (table1) this result agree with [7] of the study (pattern of short stature attending the growth center in Al-Sulaimaniyah they reported that most frequent of age group was(8-12years), the study agree with [8] (Evaluation of the American-English Quality of life in Short Stature in the United States) show that the (54.5%) of study sample (11-12) years old, the result agree with [9] of the study Causes of short stature in patients referred to the pediatric endocrinology clinic of children Welfare Teaching Hospital reported that ratio between male and female 1.14 and [10] found (22.4%) of study sample (11-12) years who showed in a study (Stunting among primary-school children: a sample from Baghdad, Iraq) conducted in primary-school children in Baghdad.

The Researcher stated that according growth and development this period are conceder acritical period for life of children in this period. Physiologically, the children is attention in the body image and in this stage the bone age density after 12 years old is closed in 11–14 in girls and 13–16 in boys) when the bone is closed. After closed the bone the medication and different aspect

of treatment that not effect on height and weight. Finally, this age of children is a final chance for treated children with growth hormone deficiency.

Concerning the children gender was more than half of study sample are female (53.75%), this result agrees with [11] of their study (Causes of short stature in Iraqi hospital-based study patients in pediatric endocrine clinic of children welfare teaching hospital) found (53.33%) of study sample is female. The study result similar with [12] of his study (Evaluation of The Response of Children with Short Stature to A Six Months Treatment with Recombinant Human Growth Hormone) was found (51.7%) of study sample is female. The result agree with [13] of their study they found 54.3% of study sample were female, This result similar with [8] found (54.5%) in the study sample female. And disagree with [10] who found (54.6%) of this study sample were males and the remaining were females, and similar of [13] of his study (Prospective study of Etiology of Short Stature in Pediatrics Endocrinology, Imam Khomeini Hospital), Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran, are found (78 %) of study sample are male.

Successful parent education programs help parents acquire and problem-solving skills necessary to build a healthy family. Research shows that effective parent training and family interventions can change parents' attitudes and behaviours, promote protective factors, and lead to positive outcomes for both parents and children.

Health related causes of impaired linear growth include diverse systemic diseases, nutritional and emotional deprivation, endocrine diseases and a wide range of dysmorphic syndromes, inborn errors of metabolism, and chromosomal abnormalities. Variants of normal growth including constitutional growth delay (CGD) and familial short stature (FSS) are the most common causes of short stature [14]

The study result indicated that the children management toward (growth hormone, nutrition, exercise, sleep and psychological management) domain and sub domain shows that the children management was not accepted before beginning educational program and the improvement in their management was clearly observed through the first and second follow ups that refer to effectiveness of the program sessions (table 2).

The findings indicated that there was significant association between children management and their age (pretest, post 1and post 2) (p-value <0.05) (table 3). The researcher showed that the children knowledge deference according stage of children, children in late stage have more knowledge than early and late stage, knowledge improved developmentally with age, so children were oriented and obeyed to constructions and directions.

The findings indicated that there was a significant association between children management and their gender at (pretest post1 and post 2 of follow up (p value <0.05). There are statistically significant differences between both genders. In posttest I, posttest II male rather than female in some aspect like: sleep, exercise, psychological status this variance depends on attitude of the children and over time the boys contact with peer in the street and school

Conclusion

The study indicated that the most of children were male and the care givers were female, most of children age (12) years. The findings of the present study indicate that the implementation of educational program was effective, the management of children is improved in first and second post-test of follow up as compared with the pre implementation of the program.

Recommendations

1. Provide specialized nurse in endocrine centers and clinics to give high quality care.
2. Implementation the educational program to educate children and their families at schools, nurseries and other institutes.
3. Encouragement of children with growth hormone deficiency and their care givers about management through initiate of training session as group and incentive for children by educational media like CD, pamphlet, about normal range of height, weight, nutrition, exercise, and medication.

Conflict of Interest: The researchers report no conflict of interest.

Source of Funding: This study did not receive any funding from any agency.

Ethical Clearance: A permission to conduct this study was obtained from the ethical committee in the College of Nursing, University of Baghdad.

REFERENCES

1. Stewart PM. Current therapy for acromegaly. Trends Endocrinol Metab 2000;11(4):128-134.
2. Kaulfers AM, Backeljauw PF, Blum S, et al., J Pediatr, 2010; (in press).Desai MP, Ogawa M, Yamamoto M et al. Growth Hormone Releasing Hormone Receptor (GHRH-R) gene mutation in familial Growth Hormone deficiency. J Pediatr Endo & Metab (2010);13:Suppl 3:1170.
3. National Center for Educational Statistics. The Nation's Report Card: An Overview of Procedures for the NAEP Assessment. U.S. Department of Education, U.S. Government Printing Office; Washington D.C: 2009. NCES 2009–493.
4. Al Otaibi, M, Al. Issa, S and Omer, H,: Short stature in children, Pattern and frequency in a pediatric clinic, Riyadh, Saudi Arabia, Sudanese journal of pediatrics, (2012), 12(1):79.
5. Grimberg A, DiVall SA, Polychronakos C, et al. Guidelines for growth hormone and insulin-like growth factor-I treatment in children and adolescents: growth hormone deficiency, idiopathic short stature, and primary insulin-like growth factor-I deficiency. Horm Res Paediatr. 2016;86(6):361-397
6. Hardin DS. Treatment of short stature and growth hormone deficiency in children with somatotropin (rDNA origin). Biologics: Targets and Therapy 2008; 2(4): 655-61.
7. Rassheed, S raoof, pattern of chort stature among patients attending the growth center in Alsulaimaniyah, scientific Council of pediatrics 2015,
8. Bullinger, M, Sommer, R, Andreas Pleil, Nelly Mauras, Judith Ross, Ron Newfield, Lawrence Silverman, Anja Rohenkohl, Janet Fox and Julia Quitmann : Health and Quality of Life Outcomes (2015) 13:43 DOI 10.1186/s12955-015-0236-2.
9. Jawad, Z and Al- Zubaidi, M, Cause of short stature in patients referred to the pediatric endocrinology clinic of children welfare teaching hospital thesis 2014.
10. Al-Saffar, A, Stunting among primary-school children: a sample from Baghdad, Iraq La Revue de Santé de la Mediterranean oriental Department of Community Medicine, College of Medicine, 2009, Vol. 15, N° 2.
11. AlZubaidi, M, A Saleh M. M. Jawad Z. M. Causes of short stature in Iraqi hospital based study patients JFac Med Baghdad 2017; Vol.59, No. 3 Receive May 2017 Accepted Aug.2017
12. Moayeri, H and Aghighi, Y, A Prospective Study Of Etiology Of Short Stature In Short Children And Adolescents, Department of Pediatrics Endocrinology, Med, 2004, 7(1): 23 – 27.
13. Lundahl, B. W., Tollefson, D., Risser, H., & Lovejoy, M. C, A meta-analysis of father involvement in parent training. Research on Social Work Practice, 2007, 18, 1-10.
14. Rosenfield R, Cuttler L. Short stature. In: DeGroot LJ Jamesan JL, eds. Endocrinology. 4th ed. Philadelphia: WB Saunders; 2001: 485 – 94.

The Impact of Smart Phones on Musculoskeletal Pain on Students in Tikrit University

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ABSTRACT

Background: A Smartphone is a device which is can be holded by hand with computer capabilities, such as internet connections, information storage, video, e-shops, games, and others. Smart phones due its easily handling has a large impact on everyday life activities.

Patients and Method: current study was done during period (November 2017 to February 2018).to evaluate the impact of the smart phones on musculoskeletal system among students of Tikrit university, Total 104 samples(68 male and 36 female) randomly chosen in cross sectional study, data collected by using self administered questionnaire.

Results of current showed the age of precipitations from (18-26)year. The mean age is 22 ± 4 in study, the age (18-20 years) is (No.= 32 ; 30.72%),the age (20-22 years) is the most age included in the study (No.= 40 ; 38.4%), the age (22-24 years) is (No.= 26 ; 24.96%) and the age (24-26 years) is (No.= 6 ; 5.76%)also all samples in this study use touch screen smart phone (102 samples), just (2 samples) use keyboard phones, the duration of use of smart phones during day in the study was high percentage 30.74%(No.= 32) For 2-4 hour followed 22.12% (No.= 23) For 4-6 hour, whilst only (15.39 and 12.51) % for More than 8 hour and hour Less than 2 hour respectively. results of current study showed the males prefer lay down position during use mobile (61.74% of male), While female prefer sitting position(55.56% of female),as well as 32.34% (No. = 22) prefer sitting position, whilst 25.02% (No. = 9) of female prefer lay down position, as well as 4.41%(No. = 3) of male prefer standing position during use phone while 1.47% (No. = 1) prefer walking, and 13.89% (No. = 5) of female prefer standing while 5.56% (No. = 2) prefer walking, so the 77.9% (No. = 81) of use social media while 22.1% (No. = 23) not use social media,as well as the Precipitants in study suffer from neck pain (31.54%) as highest percentage, followed by wrist pain (25.38) %,but low percentage (2.31%) for eye pain and joint pain(8.47%).relief pain 38.47% (40 samples) respondents prefer rest and also the same number prefer change position while 7.69% (8 samples) prefer lay down, 1.92% (2 samples) take pain killer. 13.45% (14 samples) of respondent do nothing to relief pain.

Conclusion: findings of this study is the assessment of effect of smart phones on musculoskeletal system. Smart phones cause pain mainly in neck joint, wrist joint,back and muscle spasm.The pain increase by overuse of phones, and relieved by rest or change position.

Keyword: *smart phones ; musculoskeletal pain ; students and Tikrit university*

Introduction

Smart phones and musculoskeletal system diseases attracted the attention of the media and the clinical literature is being a potential cause for this medical problem[1]. To use the smart phones for sending messages, Internet searching, or playing games or using other functions, the user usually press on the screen repeatedly. These repeated upper-extremity movements in static and bad postures may cause pain, decreases in motor abilities, and feeling of discomfort[2].

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Using smart phones for long periods of time well lead to repetitive use of certain group of muscles, which causes muscle fiber injury, cumulative damage from repeated acute injuries, and myogenic tonus, which affects mostly often the neck and shoulder muscles [3]. According to study by Shim and Zhu [3], it showed more load and stress on neck and shoulder muscles that occur during the use of touch screen computers and smart phones more than the usage of desktop devices. This occur more easily due small monitors used for tablets, smart phones and others.

Smart phones usually used in a static positions and without support to arm and neck well cause abnormal alignment of cervical spine and shoulders. Smart phones have small monitors, which is usually held during usage, the users must bend their necks to see the small screens, this well lead to increasing activity in the neck muscles especially the extensor group, overloading the neck and shoulders causing muscle fatigue, decreases muscle capabilities to work and affects the musculoskeletal system[2,4].

The mechanical support given by musculoskeletal system, which is important for providing and permitting movements, is composed of skeletal muscle, bones, tendons, cartilages, ligaments and, joints.Skeletal muscles contain contractile fibers, and are connected to the bone by strong attachments through tendons. Bones act as rigid levers, connecting with other bones through joints, which are kept in relationship by ligaments.as well as a special characteristic of muscle, tendons and joints is the possession of a rich sensory nerve supply, which is responsible for detection of position of the body and the velocity of movement. The integration of this sensory information by the central nervous system is important for the musculoskeletal system to act normally[7].

The main functional characteristics of the bone is its specialized extracellular matrix, which is hardened by calcium deposition,enabling it to function as a rigid lever, The muscles controlling of the head and neck perform many important tasks, including movement of the head and neck, swallowing, facial expressions, and movement of the eye ball. These actions require strong, forceful movements and one of the fastest, finest, and delicate adjustments in the entire human body. The continuous contractions in the muscles of the neck and upper extremities during usage of smart phones resulted in microscopic damage to the muscles. Repeated press on the screen of smart phones in static position lead to accumulation of fluids and an increase in compartmental pressure of muscular tissues[5].

Material and Method

Cross sectional study was done in Tikrit university. the size of sample was (68 male and 36 female)(104), age ranged between (17_27)year.Collection of data was done by using self administered questionnaire, from students only. its conducted in Tikrit university from students during period November 2017 to February 2018.randomly assigned and manually analyzed data represented by figures and tables in result suction by computer using Microsoft excel 2007.

Results

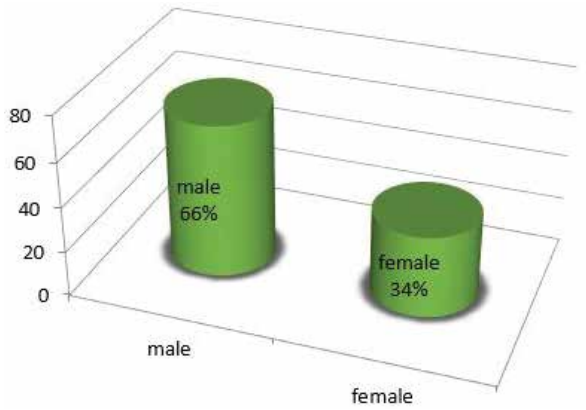


Figure 1: Distribution of group study according to gender

Results in fig.1 showed male (66%) more than female (34%).

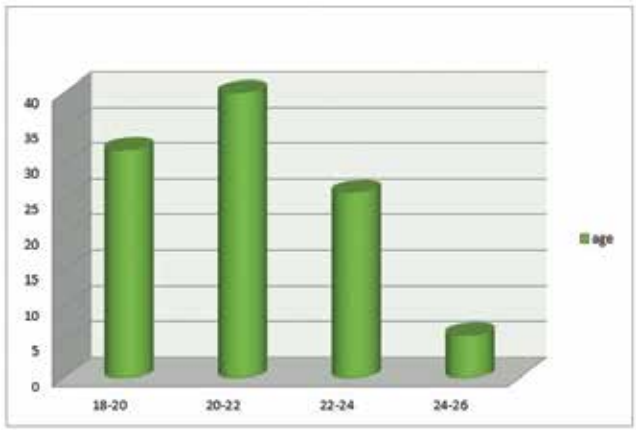


Figure 2: Disruption of study group according to age

Age of precipitations from (18-26)year. The mean age is 22 ± 4 in study, the age (18-20 years) is (No.= 32 ; 30.72%),the age (20-22 years) is the most age included in the study (No.= 40 ; 38.4%), the age (22-24 years) is (No.= 26 ; 24.96%) and the age (24-26 years) is (No.= 6 ; 5.76%)(fig.2).

Table 1: Duration of using smart phones during day

Time (hours)	Number of Samples	%
<2 H	13	12.51
2-4 H	32	30.74
4-6 H	23	22.12
6-8 H	20	19.24
>8 H	16	15.39
Total	104	100

In table (1) showed all samples in this study use touch screen smart phone (102 samples), just (2 samples) use keyboard phones, the duration of use of smart phones during day in the study was high percentage 30.74%(No.= 32) For 2-4 hour followed 22.12% (No.= 23) For 4-6 hour, whilst only (15.39 and 12.51) % for More than 8 hour and hour Less than 2 hour respectively.

Table 2: Positions during use smart phones acceding to gender

Position	Gender			
	Male (No.)	%	Female (No.)	%
Lay down	42	61.74	9	25.01
sitting	22	32.34	20	55.56
standing	3	4.41	5	13.88
walking	1	1.51	2	5.55
Total	68	100	36	100

Results in table (2) showed the males prefer lay down position during use mobile (61.74% of male), While female prefer sitting position(55.56% of female),as well as 32.34% (No. = 22) prefer sitting position, whilst 25.02% (No. = 9) of female prefer lay down position, as well as 4.41%(No. = 3) of male prefer standing position during use phone while 1.47% (No. = 1) prefer walking, and 13.89% (No. = 5) of female prefer standing while 5.56% (No. = 2) prefer walking.

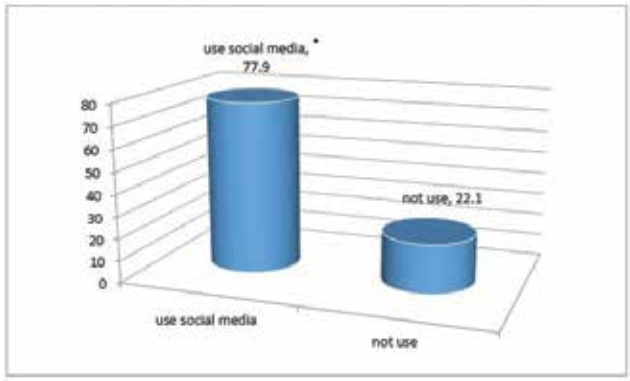


Figure 3: Pie chart show the percentage of use of social media in study

In figure (3) appearance the 77.9% (No. = 81) of use social media while 22.1% (No. = 23) not use social media.

Table 3: Percentage of symptoms in study group

Symptoms	Gender		Total (No.)	%
	Male (No.)	Female (No.)		
Wrist pain	20	13		25.38
Muscle spasm	13	6	40	14.61
Back pain	16	7	40	17.69
Neck pain	21	20	8	31.54
Eye pain	3	0	2	2.31
Joint pain	11	0	14	8.47
Total	84	46	77	100

In table 3 showed the Precipitants in study suffer from neck pain (31.54%) as highest percentage, followed by wrist pain (25.38) %,but low percentage (2.31%) for eye pain and joint pain(8.47%).

Table 4: Disruption of gender according to relief pain

Pain relief by	Gender		Total (No.)	%
	Male (No.)	Female (No.)		
Rest	30	10	40	38.47
Change position	19	21	40	38.47
Lay down	3	5	8	7.69
Drug	2	0	2	1.92
Nothing	14	0	14	13.45
Total	68	39	77	100

To relief pain 38.47% (40 samples) respondents prefer rest and also the same number prefer change position while 7.69% (8 samples) prefer lay down, 1.92% (2 samples) take pain killer. 13.45% (14 samples) of respondent do nothing to relief pain(table 4).

Discussion

The previous studies attempted to investigate whether the use of smart phones is a risk factor that would lead to musculoskeletal disorders and examined changes in pain and muscle fatigue occurring during use of smart phones.

In current study, use of smart phones for long time lead to musculoskeletal system disorder. Respondent in this study suffer from neck pain, wrist pain, back pain, muscle spasm, joint pain and eye pain, These results were consistent with the results of other previous studies that show pain in the neck and shoulders due to use of smart phones the results of a study by Berolo *etal.,*([1]) Also, it was reported that the use of smart phones caused pain in users' necks, shoulders, and arms. Fischer[(5),] Wrist pain is one of the findings in this study (33 samples) and this is also was mentioned in previous study that show the intensive use of the hands,thumbs, and fingers with repeated, static, or extreme finger postures may lead to pain and discomfort, Wrist pain may indicate development of carpal tunnel syndrome so that, these cases need to undergo further investigations to confirm the diagnosis[(6,7,8).]

The respondents suggest that pain due to use of phones can be relieved by rest or change position. Also, some of respondents prefer lay down to relief pain. Some of them take pain killer. But, about 13.45% of sample do nothing to relieve pain. This show in table 4. In this study the questionnaire is self administrated, so that chance of bias increased.

Conclusion

1. Current study conclude the effect of smart phones concentrated on wrist and neck joints. Also, other parts affected like back,muscle spasm and eye problems,this effect is increase with increase use of phones.
2. Signs and symptoms due to the use of smart phones include : neck pain, wrist pain, back pain,muscle spasm, eye problems and other joints pain.
3. The relieving factors of pain are take rest, change position and lay down.

Recommendations

1. Decrease duration and frequency of use smart phone because overuse of phones lead to musculoskeletal system disorder.
2. Counseling people to have comfortable position during use of smart phones.
3. Educate people to do special wrist and neck (most effective parts) exercises to avoid pain, also educate people to avoid abundant use of social media and writing.

Ethical Consideration: All the participants will not be subjected to harm in any way, as well as Precipitants in research will take full privacy for their answers, so the research is clear from any misleading information, also any representation of primary data findings in a biased way is avoided.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Berolo S, Wells RP, Amick B.C.Musculoskeletal symptoms among mobile hand-held device users and their relationship to device use. Appl Ergon 211;42: 371–378.
2. Shin G, Zhu X.User discomfort, work posture and muscle activity while using a touchscreen in a desktop PC setting. Ergonomics 2011; 54: 733–744.
3. Schüldt K, Ekholm J, Harms-Ringdahl K.(1986). Effects of changes in sitting work posture on static neck and shoulder muscle activity. Ergonomics 1986;29: 1525–1537.
4. Mekhora K, Liston CB, Nanthavanij S.The effect of ergonomic intervention on discomfort in computer users with tension neck syndrome. Int J Ind Ergon 200; 26: 367–379.
5. Diulian Muniz Medeiros; Rodrigo Freitas Mantovani ; Cla´udia Silveira Lima.Effects of low-intensity pulsed ultrasound on muscle thickness and echo intensity of the elbow flexors following

exercise-induced muscle damage. Sport Sci Health 2010;DOI 10.1007/s11332-017-0366-5

6. Fisher AA. Documentation of myofascial trigger points. Arch Phys Med Rehabil 1998; 96: 286–291. 22.
7. Fontana L, Neel SC, Ughetto JM.Osteoarthritis of the thumb carpometacarpal Joint in women and occupational risk factors: a case–control study. J Hand Surg Am. 2007; 32: 459–465.
8. Juleen R Zierath and John A Hawley.Skeletal Muscle Fiber Type: Influence on Contractile and Metabolic Properties. PLoS Biol.2004; 2(10): e348.doi: 10.1371/journal.pbio.0020348.
9. Pirko, E. Y.; Razooqi,B.M.and Salman, H.K. and Tektook, N.K.Bacterial isolate isolated from Mobile Medical Staff of Immam Ali Hospital – Baghdad. 2nd international conference ;2018.

Risk at the Educational Laboratory in Indonesia

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ABSTRACT

A laboratory of Audio-Visual Aids (AVA) at the Faculty of Public Health of Universitas Airlangga is one of the education laboratories used as a room for teaching and learning activity related to health promotion implementation and behavioral science that becomes one of the competencies of public health graduates. Laboratory of AVA is equipped with electronic devices, storage cabinets, desks, chairs, and other supported equipment used for the laboratory work that has potential hazards and it can cause risks and impacts. In addition, it can damage either the students or the educational institution if the control is not performed. The objective of this research was implementing the method of Hazards Identification, Risk Assessment, and Determinant control at the Laboratory of AVA as a control effort toward the available potential hazards. The variables of this research were Hazard Identification, Risk Assessment, and Determinant control. Based on the finding toward hazard identification that had been done, it had been collected 6 activities that could lead to hazard potential and 7 sources of hazard that could cause 8 risks of occupational health and safety. Risk Assessment that had been done toward the available 8 risks, there were 7 risks included in low-risk level and 1 risk was included in moderate risk level. The given recommendation was tidying up the electrical cable installation, providing warning signs, repairing the broken or opened window, the lectures or teaching staffs guide the students to use a proper editing method, repairing the position of LCD and projector display, and providing the First Aid Kits and its content.

Keywords: *risk assessment, HIRADC, laboratory*

Introduction

Occupational health and safety according to OHSAS 18001:2007 is a condition and a factor that has a potential towards the health and safety of the workforce and other employees comprising contractual employee, contractor personnel, or other people in work environment[(1)]. Work environment or workplace according to Law Number 1 the Year 1970 is any room on space or field, it is closed or open, moving or stationary for the place for the employee to work, or it is often used by the employees for a business and the place where the sources of hazard exist[(2)]. The potential hazard that is available in the workplace can occur from the use of various devices and technology that are used for supporting the work activity. The devices and technology used for working can give the employees an impact in form of the risk of occupational accident, damage, and occupational disease.

In ILCI theory i.e. Loss Causation Model, it is mentioned that there are two causes of occupational accident i.e. the basic cause and direct cause. The underlying cause of the occupational accident is the human factor and occupational factor. The human factor that can cause occupational accidents including lacking physical, mental, and psychological capabilities, lacking knowledge and skill, stress, and inadequate motivation. Meanwhile, an occupational factor is an environmental condition that does not really support the employee to do their job safely. The direct causes of the occupational accident are unsafe action and unsafe condition [(3)].

One of the controls against the potential hazard is by conducting the management of the risk of occupational health and safety. According to Ramli, the process of risk management is one of the steps that can be done

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for realizing a sustainable improvement[4]. This risk management process should be done comprehensively and it should be a part that is not separated from the management process. The processes included in the Risk Management Standard AS/NZS 4360 (2004) are (1) determining the object and the scope of the risk management implementation, (2) implementing risk identification, (3) conducting the risk assessment consisting of risk analysis for determining the possibility and the consequence that will happen, determining the priority scale and comparing the available criteria, (4) conducting the risk evaluation to determine the priority scale and comparing the available criteria, (5) conducting an unacceptable Determinant control, (6) conducting the communication and the consultation that are performed in risk management process, which involves all parties, and (7) determining the monitoring and review toward the risk management program that has been implemented. The overall process of risk management can be called Hazard Identification, Risk Assessment, and Determinant Control (HIRADC)[5].

Universitas Airlangga is a pedagogical institution that extremely supports the teaching and learning process performed by the lectures and the students so that they put their best effort in providing the supporting infrastructures and facilities for teaching and learning activity. One of the supporting infrastructures and facilities for teaching and learning activity is an educational laboratory in form of a Laboratory of Audio-Visual Aids (AVA) existed in the Faculty of Public Health. Laboratory of AVA in the Faculty of Public Health is functioned as a place for conducting a learning process related to the implementation of health promotion and behavioral science that become one of the competencies of public health graduates. The laboratory of AVA at the faculty of Public Health is equipped with electronic devices, storage cabinet, desks, chairs, and other supporting devices that are used for laboratory work activity.

The objective of this research was implementing Hazard Identification, Risk Assessment, and Determinant control (HIRADC) method at the Laboratory of AVA as a preventive effort toward the accident and disease due to the use of the laboratory.

Material and Method

The research was conducted at the Laboratory of AVA Faculty of Public Health of Universitas Airlangga, Surabaya. This research was an observational descriptive with a cross-sectional approach. The data used in this research was the primary data collected using an observation method.

The primary data was collected for identifying the physical and common hazards comprising (1) dust, (2) noise, (3) being hit by falling objects, dan (4) the danger of electricity. The data collection was done with the assistance of observational table to identify and assess the danger related to the occupational accident. The assessment toward the hazards was done by combining the values of likelihood and severity to find out the collected risk level. Thereby, the appropriate Determinant control could be done. The data that had been collected was then being processed in a matrix and descriptive forms and it was also presented in narrative form.

Findings

Table 1: Hazard Identification and Risk Assessment at the Laboratory of Audio-Visual Aids of the Faculty of Public Health of Universitas Airlangga

Activities	Sources of Hazard	Risks	Risk Assessment Matrix		
			L	S	RR
Using the Electricity source as the support for learning activity	Electricity current	Electrical Shock	2	2	4 (Low)
	Electricity cable	Tripping over electrical cable installation	3	1	3 (Low)
General lecturing activity	Dust in the room for storing works	Inhaling dusty air	1	1	1 (Low)
		The available things in the room for storing works can be easily dirty and broken	1	1	1 (Low)
	The dangerous position of LCD and Projector Display	Being hit by falling LCD and Projector	1	2	2 (Low)

Conted…

The lecturing activity in Foundation of Communication Media, Information, and Education	Properties	Being hit by falling properties	1	2	2 (Low)
	Noise (Intermittent Noise)	noise-induced hearing disorder, stress	3	1	3 (Low)
The laboratory work implementation/learning activity at the laboratory of AVA and the incident of minor accidents	No First Aid Kit at the laboratory	The injury cannot be treated by first aids and it can result in severe injury	2	3	6 (Moderate)

Hazard Identification: The hazard identification that was done at the Laboratory of AVA by observing the devices, activities, and the environment of each activity. The best approach used for identifying the hazard was a proactive approach since it could found out the hazard prior to causing the impact. According to Ramli, without recognizing the hazard, the risk could not be determined so that the control effort toward the risk could not be implemented[4]. One of the proactive approaches that could be used for identifying the risk was Job Safety Analysis (JSA) that was conducted at each available work activities.

The first potential hazard was from the activity of using electricity source as the support for the learning activity. The activity had some sources of hazard i.e. the high electric current that risked the people around the source of hazard to get an electric shock and the use of an electrical cable that was not organized well could risk people around the source of hazard to be tripped over the electrical cable installation that was being used. The use of electricity source in the learning activity at the Laboratory of AVA was the primary thing that should be done to support the learning activity since learning activity needed a media such as LCD, projector, and speaker for the lectures in conveying the course material.

The second potential hazard was from the activity of general lecture i.e. the room for storing works used for storing the students' works after conducting the laboratory work on health promotion and behavioral science. The room for storing works was rarely visited by the students, lectures, teaching staffs or the laboratory officer and it caused the room for storing works was rarely cleaned so that there was so much dust stuck on the students' works. The dust sticking on the works might be inhaled by people who visited the room for storing works. Besides, the dust could make the students' works become easily dirty and broken. Thereby, it could not be seen and learned by the visitors of the room for storing works. The activity of general lecture that had a potential hazard was the position of LCD and the projector display that was dangerous. LCD and projector display available at the Laboratory of AVA was placed on the ceiling of the laboratory in hanging position. The position could make people around the LCD and projector display in danger since the object in a hanging position was vulnerable to cause people to be hit by falling objects.

The third potential hazard was from one of the lecturing activities such as Foundation of Communication Media, Information, and Education. Those courses had some outputs in form of making visual, audio, and audio-visual media and conducting the display of audio-visual media as the final project conducted at the Laboratory of AVA. The final project needed some properties used for decorating the laboratory so that it became a proper room according to the students' needs. The use of the properties needed some lifting and transporting processes that needed more than one lifting process, and the installation of the properties at the laboratory. It would result in the risk of being hit by falling properties due to the lifting and transporting processes and the incorrect installation of the properties. In addition, the learning process of Foundation of Communication Media, Information, and Education had other potential hazards such as momentary noise or intermittent noise. This momentary noise happened when the process of presenting the final project occurred since it needed the speaker for the presenter to communicate with the audiences who watched the presentation. Besides requiring the speaker to communicate the presentation, another media used here for supporting this final project presentation was the speaker for music or video presented in the final project. This momentary noise could cause noise-induced hearing disorder and stress

in the students, lectures, teaching staffs, and laboratory officers. The project presentation of Foundation of Communication Media, Information, and Education was conducted 3 times in a week for 7 weeks consecutively.

The fourth potential hazard was from the activity of general lecture or the laboratory work implementation at the Laboratory of AVA. The laboratory work activity or general lecture conducted at the laboratory had a risk at each activity process. The available risk could cause both small and major injuries that needed the first aid. At the Laboratory of AVA, there was no First Aids equipment so that when the injury happened due to the general lecturing activity or laboratory work implementation at the laboratory, it could not be treated immediately. It is not in line with the regulation of Ministry of Manpower and Transmigration of the Republic of Indonesia Number 15 the Year 2008 on First Aid in the workplace; it is stated that each institution should provide the First Aids facilities and the officer. According to the Regulation of Ministry of Manpower and Transmigration of the Republic of Indonesia Number 15 the Year 2008, First Aid in the workplace is the attempt to provide accurate and immediate first aid to the employees/labors and/or other people in the workplace who are sick or injured. The Laboratory of AVA is the workplace for the lectures, teaching staffs, laboratory officers, and the place for the students to study and apply their knowledge.

Risk Assessment: AS/NZS 4360: 2004 explains that the risk can be found through a combination between the severity of risk impact and likelihood and the possibility of the occurrence of the risk[5]. The assessment using the combination between severity and likelihood was used for determining the risk level whether it was low, moderate, or severe.

The result of risk assessment at the Laboratory of AVA found that there were 7 risks out of 8 risks in low level and 1 risk in the moderate level that can be seen in table 1. The risk in moderate level was the injury that could not be treated using the first aids and it resulted in severe injury due to unavailability of First Aids Kits at the Laboratory of AVA. According to AS/NZS 4360:2004, the risk level in the moderate category does not need the top management involvement, but it needs immediate treatment action to reduce the risk[5].

Meanwhile, the risks in low category were electrical shock, tripping over the electrical cable installation, respiratory irritation due to inhaling the dust, the students' works could be easily dirty and broken so that they could not be seen and learned by the visitor of the room for storing works, being hit by falling properties, being hit by LCD and projector display, and noise-induced hearing disorder and stress due to the momentary noise. According to AS/NZS 4360: 2004, the risk level in the low category could be treated using an applicable regular routine[5].

Determinant Control: Determinant control is an important step and it determines the overall risk management.. According to OHSAS 18001: 2007, the Determinant control attempt should be done to prevent and reduce the prevalence of occupational accident and damage; the effectiveness of control should be assessed to know how far the control had been conducted to be able to eliminate or minimize the available potential hazards[1]. Tarwaka explains that the hierarchy of Determinant control as the procedure that should be considered when choosing a method to reduce or decrease the risk such as elimination, substitution, technical engineering, administrative engineering, and the use Personal Protection Equipment (PPE)[6].

The Determinant control efforts that were available at the Laboratory of AVA had been conducted based on the available risk were tidying-up the electrical cable installation, hanging curtains on the broken window to minimize the dust from entering the room, providing warning signs, setting up the intensity of sound, supporting the LCD for a temporary period of time, and curing wounds using the available equipment. From variable Determinant controls that had been done at the Laboratory of AVA, there was still some risks in that the risk category should be degraded so that the researcher recommended some Determinant controls comprising fixing the opened or broken window in the room for storing works, the lectures, teaching staffs, or the laboratory officers guide the students to use the proper editing method, fixing the position of LCD and projector display in a safety place, and providing the first aid kit and its content according to the Regulation of the Ministry of Manpower and Transmigration of the Republic of Indonesia Number 15 Year 2008 on First Aid in the workplace[7].

Conclusions

The hazard identification that had been done against the activity done at the Laboratory of Audio-Visual Aids of Faculty of Public Health of Universitas Airlangga, it had been collected 7 potential hazards from all work

activities that could cause 8 risks related to occupational health and safety.

The result from the risk assessment done at the 8 risks, it had been obtained 2 risk levels i.e. 7 risks in low category and 1 risk in the moderate category. The teaching staffs and the officers of the Laboratory of AVA had performed some initial control efforts to minimize the available risks. The recommendations that could be given to prevent and minimize the impact that could be caused by the available risks were tidying-up the electrical cable, providing warning signs, repairing the opened or broken window, the lectures or teaching staffs guide the students to use the proper editing method, fixing the position of LCD and projector display and providing the first aids kit and its content.

Etichal Clearance: Etichal Clearance is taken from Health Research Committee, Faculty of Public Health, Universitas Airlangga Indonesia.

Source of Fundings: The author(s) disclosed receipt of the following financial support for the reasearch, authorship, and/or publication of this article. This study was supported by Universitas Airlangga.

Conflicts of Interest: Nihil

REFERENCES

1. OHSAS 18001. Occupational Health and Safety Management System Requirements. 2007.
2. House of Representative (Republic of Indonesia). Law Number 1 about Occupational Safety. Jakarta; 1970.
3. Sugandi D. Anthology of Company Hygiene and Occupational Safety : Use of Personal Protective Equipment for Workers. Semarang: Universitas Diponegoro Publisher; 2016.
4. Soehatman Ramli. Practical Guidelines for Risk Management in the Occupational Health and Safety OHSAS 18001 Perspective. Jakarta: PT. Dian Rakyat; 2010.
5. AS/ANZ 4360. 3rd Edition The Australian And New Zealand Standard on Risk Management. Australia; 2004.
6. Tarwaka. Occupational Health and Safety. Surakarta: Harapan Press; 2008.
7. Ministry of Manpower and Transmigration (Republic of Indonesia). Regulation of Minister of Manpower and Transmigration Number 15 about First Aid in Workplace Accidents. Indonesia; 2008.

Split Face Comparative Study of the Efficacy and Outcome of ND: YAG Laser and Intense Pulsed Light System for Hair Removal

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ABSTRACT

A prospective clinical split face comparison study conducted to compare the efficacy and safety of long-pulsed Nd:YAG laser and IPL in the treatment of idiopathic facial hirsutism. A 42 females with idiopathic hirsutism aged16-52 years with skin types II–IV were enrolled. A 38 patients completed the study; IPL applied on the right sides of the face and the ND: YAG on the left sides. They underwent six treatment sessions with 4 weeks intervals. Findings revealed that IPL treatment resulted in longer median hair-free intervals than Long-pulsed Nd:YAG laser therapy. Decrease in hair counts was significantly higher after IPL than Long-pulsed Nd:YAG laser. Hair reduction was 40%, 69% and 86% on IPL versus 32%, 58% and 80% on Long-pulsed Nd:YAG laser (p=0.0001), respectively. Patient satisfaction scores were significantly higher for the IPL when compared with Long-pulsed Nd:YAG laser treated sides at 1, 3, and 6 months. Slight stinging and burning sensation at time of the treatment were recorded in all patients. Erythema was seen on both the treated sides in all cases, which lasted from hours up to 2 days after session. Only 4 patients develop Leukotrichia on IPL treated side and are felt to be due to thermal damage to the melanocytes.

Keywords: *Hirsutism, Idiopathic, treatment, ND: YAG Laser, Intense Pulsed Light System*

Introduction

Hirsutism is defined as excess growth of terminal (coarse, medullated) hair in a female in a typically male distribution[1]. The androgen dependent growth areas affected include the upper lip, cheeks, chin, central chest, breast, lower abdomen, and groin[2]. The term idiopathic hirsutism has been used to describe the circumstance in which hirsutism is present with circulating androgen levels within the normal range[4]. Laser hair removal is accomplished through follicular unit destruction. The ability to remove hair without damaging the surrounding skin is based on selective photothermolysis. Lasers or light sources with wavelengths of about 600–1100 nm are absorbed by melanin and well suited for hair removal[6,7]. The longer Nd: YAG laser wavelength provides deeper penetration, a necessary factor in the attempt to achieve optimal laser hair removal results. In addition, the 1064 nm wavelength is relatively less absorbed by epidermal melanin than are the 694 to 810 nm wavelengths[8].

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Patients and Method

This is a therapeutic interventional split face comparative study of the efficacy and outcome of Nd:YAG laser and an intense pulsed light system for treatment of idiopathic hirsutism. It was conducted at the Laser Research Unit, College of Medicine, University of Kufa; for the period from October 2016 to October 2017. The ethical approval was obtained from the Scientific Council of Dermatology and Venereology - Iraqi Board for Medical Specializations. Forty two females were enrolled in this study; four of them defaulted; because of the treatment was interfered with their work. Thirty eight patients completed the treatment, of skin types II–IV. Hormonal assays including follicle stimulating hormone (FSH), luteinizing hormone (LH), serum

testosterone, dehydroepistenedione sulphate (DHEAS), serum prolactin, serum fasting insulin, and abdomino-pelvic ultrasonography were done to diagnose any hormonal abnormality. Any patients with a suspected hormonal causes hirsutism were excluded. Only patients with idiopathic hirsutism were included. Formal consent was taken from each patient after full explanation about nature of study. Exclusion criteria were pregnant women, patients with a history of keloid scars, light sensitivity and using systemic medications known to be photosensitizing.

This study was a split-face controlled trial of facial hair removal comparing the long pulsed alexandrite laser (Quanta system, ITALY) with the IPL system (Quanta system, ITALY). Patients with skin type's II–III were treated using 11 J/cm^2 as a starting fluence increasing up to 15 J/cm^2 as tolerated, with double pulses and a pulse duration of 20 milliseconds. Those with skin type IV were started at 10 J/cm2, increasing to 13 J/cm^2 as tolerated. The Quanta ND: YAG laser (Quanta system - DNA laser technology – ULTRALIGHT, Milan, Italy) used in this study has a wavelength of 1064 nm and 25 milliseconds pulse duration. All patients were treated using 10 mm spot size, 25 milliseconds pulse duration and accompanying Dynamic Cooling Device. Standard starting fluence of 48 J/cm^2 was used, with fluence subsequently increased up to 55 J/cm^2 as tolerated. After explaining the procedure to the patient, the patient was instructed to lie on a comfortable couch, under good light, goggle was worn by the patient, a transparent color gel applied to the area to be treated. The patients divided randomly in to two groups, one group applied IPL on the right sides of the face and the ND: YAG on the left sides and the other group vice versa.

All areas were treated in a sequence with minor overlap in adjacent areas. The fluence was increased gradually when the patient tolerate the pain. The patient was instructed to avoid sunlight for the next two days. The next visit was scheduled 4 weeks later. The patient was told to record any side effects or to call the doctor if she needed. The patients underwent six full treatments with 4 weeks intervals between treatments. Response to treatment on the both sides of the face was assessed at 1, 3 and 6 treatment sessions. Patients were instructed that they should not epilate the hair from the area to be treated for at least two weeks before each session, because epilation will remove the hair follicle with its melanin content; which is the target for the laser and IPL. The patients were also instructed to shave the area to be treated immediately before therapy to minimize the side effects that result from burning and smarting of the hair and to reduce energy absorption by hair shaft. No local anesthesia of any kind was required.

Evaluation: All the patients were evaluated objectively and subjectively regarding their response to the treatment by the following methods:

Objective Methods:

1. **Photographic assessment:** Color photographs for each patient were performed at the baseline and at 1, 3 and 6 months of treatment. Frontal, right and left side of face views were taken using Sony- Digital, high sensitivity, 8 mega pixels, DSC-W30 still camera, in the same place with fixed illumination and distance. All the treated patients were assessed at the end of the study in computer view, blindly by two independent board certified dermatologists by visual analogue scale (VAS) of improvement by scale scores from 0 to 10.
2. **Hair-free intervals (HFI):** HFI in days were recorded following each treatment. HFI were defined as the time to first hair re-growth, as measured by the patient, following each treatment.
3. **Hair Density:** The numbers of hairs in (4cm^2 area) square were calculated, for this a square was drawn on skin with colored pen in fixed area on each side of the face for each patient. Digital camera (Sony, 8 Mega Pixels) was used to take photograph of this area.

Subjective Methods, Which Include:

1. **Patient's satisfaction:** Patient satisfaction questionnaire with laser treatment in terms of hair reduction was recorded on linear analogue scales (LAS) with 0 = not at all satisfied and 10 = extremely satisfied.
2. **Side Effects:** Any incidence of immediate or delayed complications was assessed and recorded at each visit, including: erythema, stinging pain, hypo/hyper pigmentation and blistering.

Statistical Snalysis: Statistical analyses were done through descriptive and analytic statistics by using scientific calculator and SPSS version 10 considering P-value of ≤ 0.05 as significant.

Findings

The patients' age ranged (18-50) years. And patients in both groups were almost matched for age, diseases duration and other demographic characteristics

Objective Method:

1. **Photographic Evaluation:** According to visual assessment of hair reduction on each side of the face for each patient by computer viewing of their photographs before and after treatment by using visual analogue scale.

   At the end of the study, the visual analogue scale (VAS) at IPL system and Nd:YAG laser treated sides were 7.3 ± 1.2 and 6.5 ± 1.2 respectively, P value=0.0001 (highly significant).

2. **Hair–free intervals (HFI):** A gradual increase in time of HFI with the increase in the number of sessions was shown from pretreatment until sixth session. There was no difference in pretreatment of Hair–free intervals between the IPL and Nd:YAG laser sides, 5.79 ± 4.2 and 5.95 ± 5.19 respectively, (p=0.7), (Table 1).

3. **Hair Density:** A gradual decrease in hair density with the increase in number of sessions was shown from pretreatment until sixth session. There was no difference in pretreatment hair density between IPL and Nd:YAG laser sides, given a mean ± SD of 50 ± 21.6 and 41 ± 21.1 respectively p=0.998 (Table 2).

Subjective Evaluation, Which Included:

1. **Patient's satisfaction:** At all stages of follow-up, patient satisfaction with IPL treated side was statistically highly significant P value=0.0001, (Table 3).

2. **Side effects:** Slight stinging pain at time of treatment was recorded in most patients (Table 4) in women with idiopathic hirsutism.

Table 1: Mean and Standard Deviation (SD) of hair free interval

Comparison between pretreatment and first session					
System type	**Pretreatment mean ± SD**	**First session mean ± SD**	**Difference**	**P value**	**Increased%**
IPL	5.79 ± 4.2	13.08 ± 4.2	7.3	0.0001	126%
Nd:YAG	5.95 ± 5.19	9.05 ± 4.25	3.1	0.0001	52%
Comparison between pretreatment and Third session					
System type	**Pretreatment mean ± SD**	**Third session mean ± SD**	**Difference**	**P value**	**Increased%**
IPL	5.79 ± 4.2	19.16 ± 5.2	13.4	0.0001	231%
Nd:YAG	5.95 ± 5.19	13.4 ± 5.08	7.5	0.0001	126%
Comparison between pretreatment and sixth session					
System type	**Pretreatment mean ± SD**	**sixth session mean ± SD**	**Difference**	**P value**	**Increased%**
IPL	5.79 ± 4.2	28.89 ± 8.497	23.1	0.0001	554%
Nd:YAG	5.95 ± 5.19	19.95 ± 8.99	14	0.0001	235%
The statistic of hair free interval (P. values)					
between pretreatment (laser-IPL)	0.700				
between 1st session (laser - IPL)	0.0001				
between 3rd session (laser - IPL)	0.0001				
between 6th session (laser - IPL)	0.0001				

Table 2: Mean and Standard Deviation (SD) of Hair density

Comparison between pretreatment and first session					
System type	**Pretreatment mean ± SD**	**First session mean ± SD**	**Difference**	**P value**	**Reduction%**
IPL	50 ± 21.6	30.3 ± 15			
Nd:YAG	41 ± 21.1	27.8 ± 14.4	13.2	0.0001	32%
Comparison between pretreatment and Third session					
	Pretreatment mean ± SD	**Third session mean ± SD**	**Difference**	**P value**	**Reduction%**
IPL	50 ± 21.6	15.4 ± 11.6	34.6	0.0001	69%
Nd:YAG	41 ± 21.1	17.1 ± 11.6	23.9	0.0001	58%
Comparison between pretreatment and sixth session					
	Pretreatment mean ± SD	**sixth session mean ± SD**	**Difference**	**P value**	**Reduction%**
IPL	50 ± 21.6	7.2 ± 8.4	43.2	0.0001	86%
Nd:YAG	41 ± 21.1	8.3 ± 7.5	32.5	0.0001	80%
The statistic of hair density (p-values)					
between pretreatment (laser - IPL)	0.998				
between 1st session (laser - IPL)	0.252				
between 3rd session (laser - IPL)	0.433				
between 6th session (laser - IPL)	0.376				

Table 3: Comparison between Nd:YAG and IPL regarding satisfaction (N = 38)

Session	**System type**		**P value**
	Nd:YAG Mean ± SD	**IPL Mean ± SD**	
First	2.3 ± 1.1	5.6 ± 2.3	0.0001
Third	2.5 ± 1.3	7.5 ± 2.7	0.0001
Sixth	2.5 ± 1.2	8.3 ± 3.1	0.0001

Table 4: Side effects in Rt. and Lt. Sides after (1, 3, 6) Session

Side effect	**System type**	**Session no.**			**Total**
		1	**3**	**6**	
Hyperpigmentation	Nd:YAG	0	0	0	0
	IPL	2	6	0	8
Burning pain	Nd:YAG	0	0	0	0
	IPL	2	4	2	8
Erythema	Nd:YAG	10	3	0	13
	IPL	25	10	5	40
Swelling	Nd:YAG	0	0	0	0
	IPL	1	2	0	3
White hair	Nd:YAG	0	0	0	0
	IPL	0	3	4	7

Discussion

Unwanted hair growth remains a therapeutic challenge and there is a need for an effective, safe, and non-invasive treatment modality capable of removing hairs on a long term basis [3].

In the present study we conducted a split-face comparison for treatment of hirsutism with Long-pulsed Nd:YAG laser 1064 nm and Intense Pulsed Light System 650-1200 nm in women with idiopathic hirsutism.

The result from this study was that IPL treatment resulted in longer hair-free intervals than Long-pulsed Nd:YAG laser therapy (At sixth session HFI was increased to (55.4%) on IPL versus (23.5%) on Long-pulsed Nd:YAG laser) p-value = 0.0001.

Hair reduction was 86% on IPL versus 80% on Long-pulsed Nd:YAG laser at 6 months duration. When compared between IPL and ND: YAG at sixth session p=0.376 finding was statistically not significant.

Patient satisfaction scores were significantly higher for the IPL when compared with Long-pulsed Nd:YAG laser treated sides.

Kamal et al.2006[11], reported that 20% of patients on Nd:YAG laser and 30% of those on IPL device exhibited excellent hair reduction.

Karaca et al.2012, recorded in Comparison of SHR Mode IPL System with Alexandrite and Nd:YAG Lasers For Leg Hair Reduction, that the mean hair reductions in 6 weeks after three sessions were 50% for the IPL system, 53% for Alexandrite and 39% for the Nd: YAG lasers. However, after 6 months; 40%, 49% and 34% hair reduction were observed, respectively [12]. This study was comparable with the present study as the IPL has higher hair reduction than Nd:YAG laser but statistically not significant.

AL-Hamamy et al.2015, Compared in a split-face study the effectiveness of diode laser 808 nm and the IPL (690 – 1200 nm) in treatment of hirsutism. Results revealed after three sessions that both modalities were effective in hair reduction. For diode laser hair density was decreased by 30%, 45% and 58% compared with IPL in which the hair density was decreased by 38%, 44% and 49% after the first, second, and third session, respectively [13].

Recently Neejra [14], reported in comparative study between Diod, Nd:YAG lasers and IPL, the percentage of hair reductions after eight sessions were 92%, 90% and 70% respectively. This result differs from that of the present study as IPL in this study have lower hair reductions than Nd: YAG laser.

Radmanesh et al [15]. Investigated the side effects of IPL used for hair removal among 1,000 female hirsute patients. Patients were treated every 4–6 weeks for eight sessions or more and followed-up lasted up to 20 months. The authors documented burning as a frequent side effect, followed by post-inflammatory hyperpigmentation (n¼75), bulla and erosion (n¼64), Leukotrichia (n¼40) and finally scar formation (n¼1).

In present study more side effects were noted with IPL than with long-pulsed Nd:YAG. Slight stinging pain at the time of treatment was recorded in most patients. Erythema was seen on both treated sides, which lasted from hours up to 2 days after session. Only 4 patients developed Leukotrichia on IPL treated side and are felt to be due to thermal damage to the melanocytes that is seen more in older patients and in those who already have few white hairs in other areas as the scalp.

The effectiveness of different optical depilation devices varies significantly due to subjects' biological variables such as anatomical location, epidermal pigmentation, duration of the hair follicle cycle, and androgen status [16]. In this study the two used devices were compared in the same subject, at the same anatomical site and at the same time, so, differences in efficacy could be attributed to laser variables and not to the subject.

The present study is comparing between the treatments with long-pulsed Nd:YAG laser and IPL, results revealed that both modalities were effective in hair reduction. These results are expected because the mechanism of action of laser and IPL is the same (destruction of stem cell in hair bulge by the heat produced by the absorption of light energy in melanosomes).

Conclusion

Both Long-pulsed Nd:YAG laser and IPL were effective in unwanted hair removal. However; prolongation of the time for hair regrowth were significantly higher with IPL system.

Ethical Clearance: All ethical issues were approved from the local committee of ethical issues for scientific researches.

Conflict of Interest: None.

Source of Funding: Self-Funding

REFERENCES

1. Mofid A, Ahmad S, Alinaghi S, Zandieh S, Yazdani T. Hirsutism. Int J Clin Pract 2008;62:433–443.
2. James WD, Berger TC, Elestone DM. Hisutism. in: Andrews Disease of the Skin: Clinical Dermatology 10th ed. Philadelphia, WB Saunders Company, 2006; 26: 771-73.
3. Shah. D& Patel.S. Hirsutism. Gynecological Endocrinology, March 2009; 25(3): 140–148.
4. Azziz R, Carmina E, Sawaya ME. Idiopathic hirsutism. Endocr Rev 2000; 21: 347–62.
5. Anderson RR, Parrish JA. Selective photothermolysis: precise microsurgery by selective absorption of pulsed radiation. Science 1983; 220: 524- 7.
6. Dierickx CC. Hair removal by lasers and intense pulsed light sources. Dermatol Clin 2002;20 : 135–146.

7. Tanzi EL, Lupton JR, Alster TS. Lasers in dermatology: four decades of progress. J Am Acad Dermatol 2003;49 : 1–31.

8. Haedersdal M, Wulf HC. Evidence-based review of hair removal using lasers and light sources. J Eur Acad Dermatol Venereol 2006; 20 : 9–20.

9. Olsen EA. Methods of hair removal. J Am Acad Dermatol 1999; 40: 143–155.

10. Alster TS. Laser-assisted hair removal. In: Cutaneous Laser Techniques. Lippincott Williams & Wilkins, Philadelphia, 2000; 2:138-9.

11. Kamal T. Long-Pulsed Nd:YAG Laser and Intense Pulse Light Therapy for Idiopathic Facial Hirsutism. A Comparative Study. Journal of Pakistan Association of Dermatologists, 2006;16, 205-209.

12. Karaca S, Kacar SK, Ozuğuz P. Comparison of SHR Mode IPL System with Alexandrite and Nd: YAG Lasers for leg hair reduction. Balkan Med J 2012; 29: 401-5.

13. AL-Hamamy H, Anmar Z, Zahra A. Evaluation of Effectiveness of Diode Laser (808 nm) versus Intense Pulse Light (IPL) in the Management of Unwanted Hair. International Journal of Medical Physics, Clinical Engineering and Radiation Oncology, 2015; 4: 41-48.

14. Toosi P, Sadighha A, Sharifian A, Razavi G M, "A comparison study ofnthe efficacy and side effects of different light sources in hair removal." Lasers Med Sci. 2006; 21:1-4.

15. Neerja P. Comparative study of Diod Laser Versus ND:YAG Laser Versus IPL for the Treatment of Hirsutism. J Cutan Aesthet Surg. 2015 Apr- Jun; 8(2): 97-101.

16. Radmanesh M. Paradoxical hypertrichosis and terminal hair change after intense pulsed light hair removal therapy. J Dermatolog Treat 2009;20(1):52–54.

C-reactive Protein and its Relationship with Lipid Profile in Suicidal and Non Suicidal Adults with Major Depression

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ABSTRACT

Objectives: We tested whether C-reactive protein and lipid profile might be associated with suicide attempts in subjects with major depressive disorder, after controlling for relevant individual characteristics.

Design And Method: Plasma levels of C-reactive protein and lipid profile; as well as Total Cholesterol (TC), and Triglyceride (TG), were determined in 60 patients meeting DSM-IV criteria for Major depression (22 suicidal attempters and 38 patients without suicidal behavior), and 30 healthy controls. Study participants were evaluated using Hamilton Depression Rating Scale and the Beck's Suicidal Ideation Scale.

Results: At univariate analyses, plasma level of C-reactive protein was significantly higher in suicide attempters (SA) than non-suicidal attempter depressed patients (NSA) and healthy control ($p<0.05$), while the plasma level of TC among SA were significantly lower than those NSA or healthy control subjects ($p<0.05$). Also, TG level was significantly higher in both SA and NSA ($p=0.009$ and $p<0.001$ respectively) compared with healthy control. After adjustment of potential confounders, suicide attempters were still had significantly lower levels for TC than NSA.

Conclusions: Our findings support the hypothesis that CRP, and TG are associated with suicide attempts in patients with major depressive disorder. The identification of valid and accessible biological markers of suicidal behaviors still represents a challenge for future research.

Keywords: *Depression, Suicide, CRP, Lipid*

Introduction

Suicide is a significant public health issue and a major cause of death throughout the world [1]. In Iraq, the suicide rate is a current health problem exacerbated by the fact that it is a country suffered war and destruction in all fields of life. Although most of Iraqi people are Muslim and Islam forbids suicide, it has presented an increase in its suicide rate. For example, between 2015 and 2018 there was an increase in the suicide rate from 1.09 to 3 cases per 100,000 inhabitants [2]. This is a worrying and alarming phenomenon need to strategies of prevention.

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Among the underlying biological changes, accumulating studies indicate that a dysregulated immune system could be a contributing factor to depression, and possibly specifically to suicidality [3].

One possible pathway implicating the immune system is through the action of inflammatory cytokines, signaling molecules that mediate important steps in humoral and cellular immunity and that can cross the blood brain barrier and influence complex brain functions[4].

Due to the short half-life of cytokines, CRP is a relevant alternative for research to focus on interrelationships between inflammation and suicide because of its long half-life and detectability at lower levels. CRP is an acute-phase inflammatory protein synthesized by hepatic Kupffer cells signaling other body cells for destruction by the complement system and generated in response to increases in serum IL-6

[5]. Several studies have assessed CRP levels in patients with suicidality, with contradictory results [5-8]. One of these studies was designed an inflammatory index, consisting of CRP, IL-6, IL-10 and TNF-α, in patients with depression. They found that SI was significantly associated with an elevated inflammatory index, and this was independent of both the severity of depression and whether the patients had recently attempted suicide[7].

Alteration in lipid levels has been found not only in medicated, chronic patients, but also in drug-naive patients with first-episode of psychiatric disorders, as demonstrated in a recent meta-analysis comprising 19 studies, which revealed lower levels of TC in patients with MD compared to healthy controls [9]. Although some human studies have investigated a possible connection between low TC and suicidal behavior [10-12], others studies have shown no relationship between suicide and lipid parameters [13, 14]. Because of the conflicting results of the CRP and lipid profile on suicide, we want to focus on these subjects. The aim of current study were (1) to verify whether an alteration in the CRP, and lipid profile increase the risk of suicide in patients with MD or not, and (2) to exam the correlation between these variables in patients with MD. To our best knowledge, this is the first study that has been achieved in Iraq.

Subjects and Method

A. Subjects: After the approval of protocol by the Ethical Review Board for human studies, faculty of nursing/university of kufa/Iraq (No. 4-04/01/2017), a case-control study was conducted in emergency departments and Psychiatric Clinic at two large teaching hospitals (Al-Sader hospital and Al-Hakeem hospital) in Al-Najaf province, Iraq, from October 2017 to July 2018. All patients gave their written informed consent before enrollment.

1. **MD patients with Suicidal Attempter (SA):** 22 patients (16 men and 6 women) were enrolled on admission to emergency departments of two large teaching hospital (Al-Sader hospital and Al-Hakeem hospital) after a failed suicide attempt. Mean age of the patients was 36.91 years (range 18 to 48; standard deviation (SD) 10.3 years) and mean body mass index (BMI) 25.98 kg/m2 (range 16-36, SD 6.34 kg/m2).
2. **Control group I (MD patients with Non-Suicidal Attempter (NSA)):** 38 patients (24 men and 14 women) were recruited during the consultations in the Department of Psychiatry, Al-Hakeem Hospital. Mean age of the patients were 30.76 years (range 18 to 70, SD 14.1 years) and mean BMI 24.24 kg/m2 (range 19-33, SD 4.01 kg/m2).
3. **Control group II:** 30 healthy controls subjects (13 men and 17 women) without any symptoms or signs of MD based on a clinical examination were randomly selected from the municipal population. Mean age of the healthy controls was 31.1 years (range 20 to 67, SD 15.4 years) and mean BMI 24.1 kg/m2 (range 16-35, SD 4.65 kg/m2).

The exclusion criteria were as follows: (1) Patients with self-injurious behaviors were determined to have no suicidal intention or ideation, any past or present major medical or neurological illness, and a current axis I comorbidity and/or comorbid personality diagnosis. (2) Patients with chronic diseases such as hepatic disorders, diabetes mellitus, hypertension, cardiovascular disease, common cold, influenza, or any other inflammation. Finally (3) Patients who receiving anti-inflammatory, statin and/or immunosuppressive therapy.

All study participants went through a structured interview by a specialist in psychiatry and were diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and evaluated using Hamilton Depression Rating Scale (HDRS) and the Beck's Suicidal Ideation Scale (BSSI). The scale had acceptable reliability in our sample (Cronbach's $\alpha = 0.93$). Five ml blood sample was obtained between 7.30 and 8.00 by venous puncture from each controls after an overnight fasting period, while for SA, five ml blood sample was collected at the time of admission to the emergency room after the failed attempt. The blood was set in an EDTA tube, and then plasma was separated by centrifugation at (3000 rpm) for 15 minutes. Human CRP were assayed using the DuoSet ELISA Development System (R&D Systems, Minneapolis, MN, USA). Total Cholesterol and Triglycerides were determined by enzymatic CHOD-PAP and GPO-PAP calorimetric method.

B. Statistical Analyses: Numerical data were presented as mean ± standard deviation (SD). Categorical variables were presented as proportions. Differences among SA, NSA, and control group (healthy subjects) were estimated using ANOVA (Kruskall Wallis test for skewed data) for numerical variables with an additional Bonferroni post-hoc test. All statistical analyses were performed using the statistical package SPSS version 20 (SPSS Inc., Illinois, USA). The alpha-level of significance was set at $p < 0.05$.

Results

A total of 60 patients with MD (40 men and 20 women) and 30 healthy controls (13 men and 17 women) were included in the study. The patients were categorized into two groups according to suicide attempts. Means and Standard deviations of CRP and lipid parameters are summarized in (Table 1). The comparative analysis of the CRP and lipid profile among three studied groups showed significant differences in the CRP, TC, and TG (all $p<0.05$).

Post-hoc analysis for CRP, showed that SA had significantly higher CRP production than Non-suicidal MD patients and normal controls ($X2 = 30.921$, $df = 2$, $p < 0.001$). When examining CRP as a categorical measure [high CRP (=>3) vs. normal CRP (<3)], we did not find any significant differences in the CRP subgroups ($X2 = 2.003$, $df = 2$, $p=0.367$).

Furthermore, TG level was significantly higher in both SA and NSA ($p=0.009$ and $p<0.001$ respectively) compared with healthy control. No significant difference for TG level was observed between SA and NSA ($p>0.05$).

Table 1: Mean ± Standard deviation for Levels of CRP and lipids in SA, NSA and HC

	SA n=22		NSA n=38		HC n=30				Post-hoc analysis
	Mean ± SD		Mean ± SD		Mean ± SD		Statistics	p value	
CRP	6.41 ± 2.76		2.71 ± 0.48		2.40 ± 0.33		$X^2 = 30.921$, df =2	<0.001	SA>NSA, HC[ab]
TC	155.55 ± 8.65		172.02 ± 7.71		174.07 ± 8.82		F=36.733	<0.001	SA<NSA, HC[c]
TG	166.19 ± 36.77		175.98 ± 29.13		140.90 ± 37.35		F=9.185	<0.001	SA, NSA>HC[c]
	n	%	n	%	n	%			
CRP status									
Normal	12	54.5%	24	63.2%	22	73.3%	$X^2 = 2.003$, df =2	0.367	
High	10	45.5%	14	36.8%	8	26.7%			

Abbreviations: [a]=Those data were analyzed by using the Kruskal–Wallis test; [b]=The Dunnett C method was used for post hoc comparisons; [c] =The Bonferroni method was used for post hoc comparisons; SA=Suicidal attempter; NSA=Non-Suicidal attempter; HC=Healthy control; TC=Total Cholesterol; TG=Triglycerides; and SD=standard deviation.

C. Correlations among CRP, lipid profile, depression symptoms and suicidal severity in SA and NSA: As shown in (Table 2), SA had significantly positive correlations between CRP and total HDRS scores ($r=0.524$, $p=0.012$). Moreover, SA had significantly positive correlations between CRP and BSSI scores ($r=0.610$; $P=0.003$). For non-suicidal MD patients, No correlations were observed among all studied parameters.

Table 2: Correlation among CRP, lipid profile and Clinical scores (HDRS and BSSI)

	CRP	TC	TG
SA			
TC	0.050		
TG	0.143	0.258	
HDRS	0.524*	0.018	0.423
BSSI	0.610**	0.010	0.323

* $p < 0.05$

** $p < 0.001$

Discussion

We measured CRP and lipid profile in plasma of healthy control subjects, non-suicide major depressive disorder and suicide attempters with well-defined

clinical psychiatric profiles. In this study, while the levels of CRP was significantly higher in suicide attempters than non-suicidal MD patients and healthy controls, the level of TC among suicide attempters were significantly lower than those among non-suicidal depressed patients or healthy control subjects. Other studied parameters did not show any statistically significant difference among study groups.

Our finding was agreement with a study showed that depressed patients with suicidal attempter had higher serum CRP levels compared with depressed patients with non suicidal attempter and healthy controls [7]. Although Courtet *et al*. recently reported increased CRP levels in depressed patients with history of suicide attempts, they found no difference in the CRP levels of suicide attempters who had CRP measured within 7 days of the attempt or later [15]. Vargas *et al*. did not find differences in CRP levels between patients with and without history of suicide attempts [8]. However, specific alleles in the CRP gene are more common among depressed patients with history of suicide attempt. Lastly, in psychiatric populations, a CRP level of 5 mg/L differentiated responders and non-responders to anti-inflammatory treatment of depressive disorders (infliximab) [7].

Our second finding of decreased levels of total cholesterols and low density lipoproteins in suicide attempters with MD compared to control depressive patients or healthy control subjects is consistent with a recent study [1] as well as, coincide with the conclusions of a meta-analysis published in 2015, which included a total of 65 different studies, found overall association among lower TC level, and suicidality [12]. However, other reports did not find an association between plasma TC, and suicidality [16].

With respect to triglyceride levels, our results showed higher levels of triglycerides in suicide attempters and non suicidal attempters with MD. Our finding coincides with previous studies, which found a significant association between triglyceride levels and depression [1, 17], but not with other reports that observed decreased levels of triglycerides in subjects with suicidal attempts [11]. However, other authors report conflicting findings, even suggesting a positive association between triglyceride levels and the risk of suicidal behavior [18].

Previous studies demonstrated the imperative necessity of membrane cholesterol in the function and organization of the 5-HT1A receptor [19]. Results from additional studies showed that the fluidity of lipids considerably regulates the binding of serotonin (5-HT) in murine brain membranes. It is therefore expected that decreased levels of cholesterol would increase the fluidity of the cellular membrane. While, at the same time, minimal exposure of the 5- HT receptors would be found in the synaptic cleft [12].

The present findings ought to be viewed as preparatory in light of many limiting factors: First- the small size of the sample limits causal conclusions in regards to the correlation between inflammation and suicidilty. Second- MD Patients in current study were doctor's facility in-patients get upper and other psychotropic medicines and a few members were utilizing calming pharmaceuticals, all of which could have impacted levels of our needy factors [20]. Finally, current study can't represent lifetime stretch introduction or comorbid psychiatric disorders that could have added to our watched example of results.

Conclusions

Our findings support the hypothesis that CRP, and TG are associated with suicide attempts in patients with major depressive disorder. The identification of valid and accessible biological markers of suicidal behaviors still represents a challenge for future research.

Conflict of Interest: Nil

Source of Funding: Self.

Ethical Clearance: After the approval of protocol by the Ethical Review Board, university of kufa/Iraq (No. 4-04/01/2017) and before enrollment, all subjects gave their written informed consent.

References

1. Segoviano-Mendoza M, Cárdenas-de la Cruz M, Salas-Pacheco J, et al. Hypocholesterolemia is an independent risk factor for depression disorder and suicide attempt in Northern Mexican population. *BMC Psychiatry.* 2018;18:7.

2. Abbas MJ, Alhemiary N, Razaq EA, Naosh S, Appleby L. The Iraqi national study of suicide: Report on suicide data in Iraq in 2015 and 2016. *Journal of affective disorders.* Mar 15 2018;229:56-62.

3. Grudet C, Malm J, Westrin A, Brundin L. Suicidal patients are deficient in vitamin D, associated with a pro-inflammatory status in the blood. *Psychoneuroendocrinology.* Dec 2014;50:210-219.

4. Gabbay V, Klein RG, Guttman LE, et al. A preliminary study of cytokines in suicidal and nonsuicidal adolescents with major depression. *Journal of child and adolescent psychopharmacology.* Aug 2009;19(4):423-430.

5. Ekinci O, Ekinci A. The connections among suicidal behavior, lipid profile and low-grade inflammation in patients with major depressive disorder: a specific relationship with the neutrophil-to-lymphocyte ratio. *Nordic journal of psychiatry.* Nov 2017;71(8):574-580.

6. Gibbs HM, Davis L, Han X, Clothier J, Eads LA, Caceda R. Association between C-reactive protein and suicidal behavior in an adult inpatient population. *Journal of psychiatric research.* Aug 2016;79:28-33.

7. O'Donovan A, Rush G, Hoatam G, et al. Suicidal ideation is associated with elevated inflammation in patients with major depressive disorder. *Depression and anxiety.* Apr 2013;30(4):307-314.

8. Vargas HO, Nunes SO, Pizzo de Castro M, et al. Oxidative stress and lowered total antioxidant status are associated with a history of suicide attempts. *Journal of affective disorders.* Sep 25 2013;150(3):923-930.

9. Misiak B, Stanczykiewicz B, Laczmanski L, Frydecka D. Lipid profile disturbances in antipsychotic-naive patients with first-episode non-affective psychosis: A systematic review and meta-analysis. *Schizophrenia research.* Dec 2017;190:18-27.

10. Troisi A. Low cholesterol is a risk factor for attentional impulsivity in patients with mood symptoms. *Psychiatry research.* Jun 30 2011;188(1):83-87.

11. da Graca Cantarelli M, Nardin P, Buffon A, et al. Serum triglycerides, but not cholesterol or leptin, are decreased in suicide attempters with mood disorders. *Journal of affective disorders.* Feb 1 2015;172:403-409.

12. Wu S, Ding Y, Wu F, Xie G, Hou J, Mao P. Serum lipid levels and suicidality: a meta-analysis of 65 epidemiological studies. *Journal of psychiatry & neuroscience : JPN.* Jan 2016;41(1):56-69.

13. Baek JH, Kang ES, Fava M, et al. Serum lipids, recent suicide attempt and recent suicide status in patients with major depressive disorder. *Progress in neuro-psychopharmacology & biological psychiatry.* Jun 3 2014;51:113-118.

14. Pompili M, Innamorati M, Lester D, Girardi P, Tatarelli R. Nearly lethal resuscitated suicide attempters have no low serum levels of cholesterol and triglycerides. *Psychological reports.* Jun 2010;106(3):785-790.

15. Courtet P, Giner L, Seneque M, Guillaume S, Olie E, Ducasse D. Neuroinflammation in suicide: Toward a comprehensive model. *The world journal of biological psychiatry : the official journal of the World Federation of Societies of Biological Psychiatry.* Dec 2016;17(8):564-586.

16. Bartoli F, Crocamo C, Dakanalis A, et al. Association between total serum cholesterol and suicide attempts in subjects with major depressive disorder: Exploring the role of clinical and biochemical confounding factors. *Clinical biochemistry.* Apr 2017;50(6):274-278.

17. Huang TL, Chen JF. Lipid and lipoprotein levels in depressive disorders with melancholic feature or atypical feature and dysthymia. *Psychiatry and clinical neurosciences.* Jun 2004;58(3):295-299.

18. Brunner J, Bronisch T, Pfister H, Jacobi F, Hofler M, Wittchen HU. High cholesterol, triglycerides, and body-mass index in suicide attempters. *Archives of suicide research : official journal of the International Academy for Suicide Research.* 2006;10(1):1-9.

19. Jafurulla M, Tiwari S, Chattopadhyay A. Identification of cholesterol recognition amino acid consensus (CRAC) motif in G-protein coupled receptors. *Biochemical and biophysical research communications.* Jan 7 2011;404(1):569-573.

20. Hiles SA, Baker AL, de Malmanche T, Attia J. Interleukin-6, C-reactive protein and interleukin-10 after antidepressant treatment in people with depression: a meta-analysis. *Psychological medicine.* Oct 2012;42(10):2015-2026.

Considered Absorption Spectra for Identification of Blood Constituents

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ABSTRACT

This research is the first which it contains the considered absorption spectra for identification of blood constituents and biological liquids. The spectrophotometer is used for measuring the absorption spectra of blood constituents and determining the peaks of its absorption. The agreement of the peaks and wavelengths is demonstrated for more clinical analysis. The blood or plasma and some biological liquids are used for detection of clinical constituents from unknown samples. This way is very useful for diagnosis and for clinical analysis. It was prepared a large number of test samples for group persons (female & mate) in different ages. It is measured the results of more analysis that considers absorption spectra for identification of blood constituents.

Keywords: *Absorption spectra, blood constituents, clinical analysis, peak absorption, biological liquids.*

Introduction

The present work is the first that considers the absorption spectra for identification of blood constituents. There are some significant advantages as following[1, 2]:

1. It refers to laser possibility in clinical analysis which locating within the wavelength of laser which it used and compared with the peak absorption which it is corresponds to the magnitude for the wavelength of that laser source.
2. High accuracy in the test samples method and in the added chemical materials, that gave a good evidence for errors detection[3, 4].
3. When adding chemical materials with incorrect ratios, that it refers to wavelength or absorption errors[5-7].

The present work is significant because it is possible to determine known chemical constituents from unknown samples, therefore it is helpful in diagnosis the disease cases.

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Spectrophotometer Description: The optical diagram of the spectrophotometer that used for measuring the spectra absorption for test samples is shown in the Figure 1[8]. The spectrophotometer contains tow lamps, one of them is tungsten lamp with wavelength range (322.5-800) nm; and the other is deuterium lamp with wavelength range (190-322.5) nm.

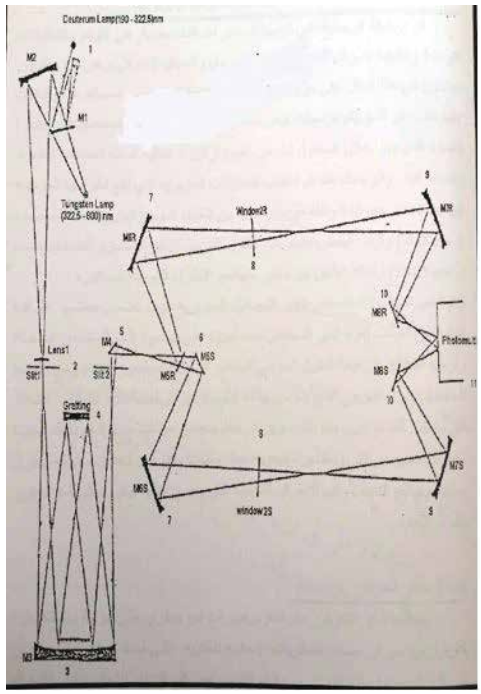


Figure 1: Optical diagram for spectrophotometer[8]

Absorbance Spectroscopy Measurement: The spectrophotometer was used in this research to measure the absorbance spectroscopy for blood constituents and some biological fluids and determine the absorption peaks[9]. A good agreement had been observed between these values and wavelength of used Argon laser (488-514.5) nm. In the approach of the present work, the absorption spectra helped in detection of known constituents from unknown solutions which help to diagnosis the clinical feature of the results that had a significant value. To calculate the concentration or activity for those clinical analyses, one can prepare the test samples for many times and different cases for group of people (male and female) in different ages and putting the samples in the spectrophotometer and measure the absorbance.

Results and Discussion

The present work can be summarized through mixing two or more of known samples with equal amounts for each type after preparing and putting in the spectrophotometer. Through measuring absorption spectra, it was noted that the peak absorption of some types are overlapped because approaching the values of its wavelengths. Also these wavelengths of samples gave an agreement with the deviation in some values such as wavelengths and absorption. In Table 1 was shown the known chemical analysis form unknown samples with one-peak as demonstrated for each type in the figures.

Through figures (2, 3), a good agreement was demonstrated between the absorption peaks and wavelengths. This is positive indicator for measurements of each clinical analysis for appropriate wavelength.

This scientific and experimental fact leads to diagnosis the diseases cases by the specialists after noting the absorption peak with its wavelength which refers to that type of analysis.

& is this lie in normal or abnormal values for concentration or activity.

From Table 1 and Figures (2, 3), one can distinguish known clinical analysis from unknown samples with one-peak because of the overlapping in its wavelengths.

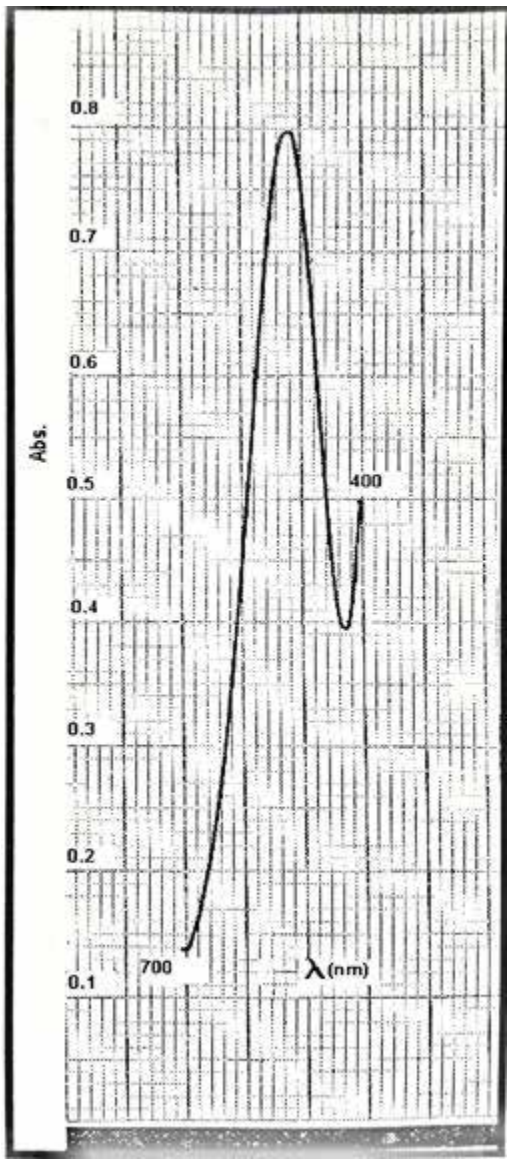
Table 1: Clinical composition from overlap samples (1. Peak)

No.	Species Overlap in Situ	Overlapped wavelengths (nm)	The Resulting wavelength (nm)
1.	Sugar, Fluid protein	500, 540	520
2.	Cholesterol, Uric Acid	500, 520	500
3.	Sugar, Uric Acid	500, 520	480
4.	Creatinine, Fluid Protin, Urea	492, 540, 580	600

Conted…

The deviation of the wavelength from its real value is given by two reasons:

1. In case of ($\lambda_1 < \lambda_0 < \lambda_2$), it is called mass shift, which follows the molecular weight.
2. In case of ($\lambda_0 > \lambda_2$ and $\lambda_0 > \lambda_1$), this is leads to new formation.



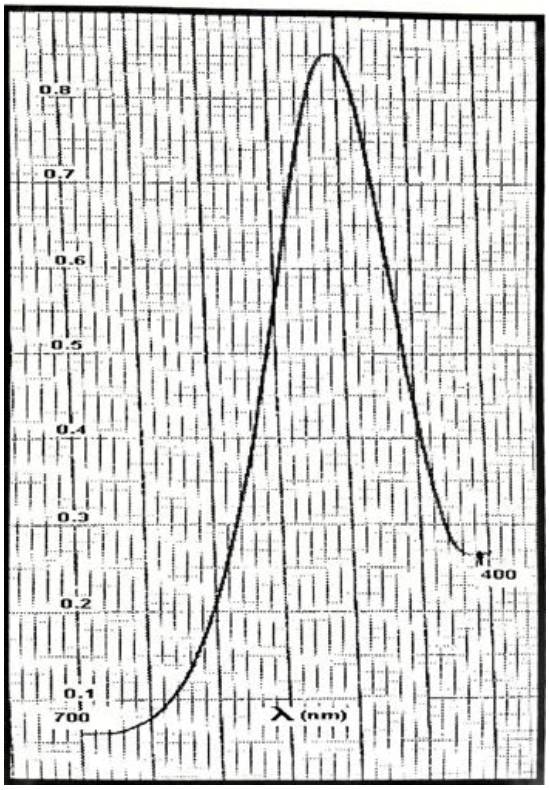
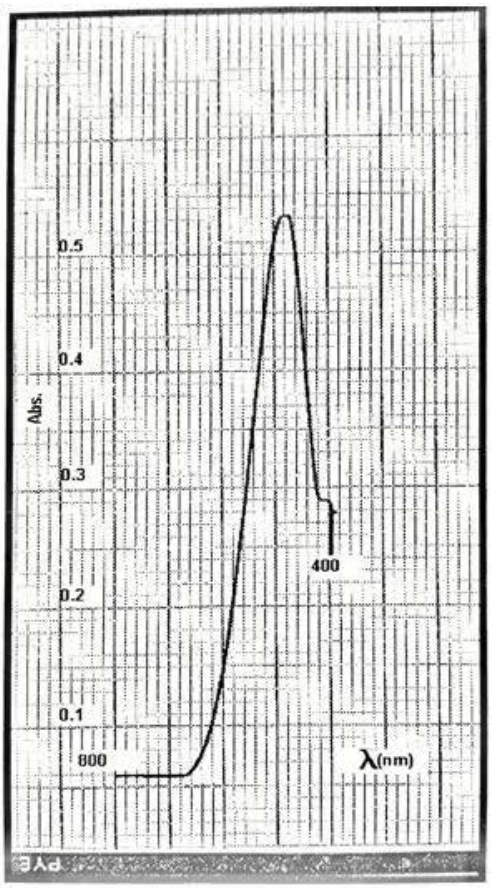


Figure 2: Determination of clinical composition from overlapped samples a: (Sugar, Fluid protein); b: (Cholesterol, Uric Acid)



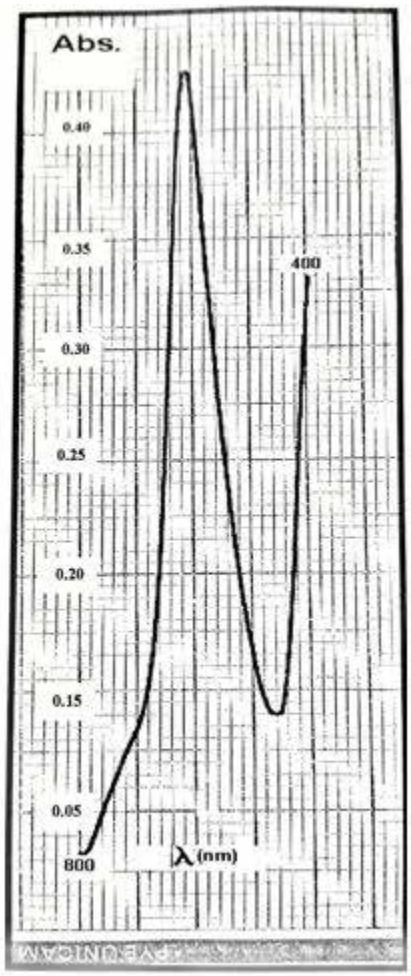


Figure 3: Determination of clinical composition from overlapped samples a: (Sugar, Uric Acid); b: (Creatinine, Fluid Protin, Urea)

Conclusions

The present work can be concluded as follows:

1. Inventing a new method in clinical analysis by considering absorption spectra for identification of blood constituents.
2. It is considered that this method is a basis for constructing a specialized laboratory for clinical blood analysis and some biological liquids.
3. Determining known clinical constituents from unknown samples, which it help to diagnosis the disease cases with high accuracy.
4. The absorption spectra is a conclusive evidence for the correct or incorrect results of analysis, also it is possible to determine the errors when happen by using this method.

5. By using this method, it is not needed to add chemical materials into samples according to the usual ways. Therefore, this way is an economy way because there is no need to add more of chemical materials.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Physics/College of Science/Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

1. Ehlotzky F. Fundamentals of laser interactions, 1985.
2. Wilson J. and Hawkes J. F. B. Optoelectronics an introduction, 1987.
3. Tietz N. M. Fundamentals of clinical chemistry, 1976.
4. Gary M. Hieftje, Lasers in chemical analysis, 1981.
5. Bradlev Moore C. Chemical and Biological applications of lasers, 1977.
6. Breck Hitz C. Understanding laser technology, 1990.
7. Glenn F. Knoll. Radiation detection and measurement, Joun Wiley and Sons, 1979.
8. Beckman A. O., Gallaway W. S., Kaye W., Ulrich W. F. History of spectrophotometry at Beckman Instruments, Inc, Analytical Chemistry. 1977; 49 (3).
9. Wormell P., Rodger A. Absorbance Spectroscopy: Overview. In: Roberts G.C.K. (eds) Encyclopedia of Biophysics. Springer, Berlin, Heidelberg, 2013.

Evaluation of the Concentration of Some Heavy Elements of Selected Soils from Shatrah City

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ABSTRACT

The study aimed to measure the concentration of five heavy elements in the soil of Shattrah City. Attempt to detect the number of pollution levels of heavy metal and make comparisons between this level and international standard determinants.Using Atomic Absorption Spectrophotometer device (Flam Atomic absorption (FAA)) We were selected (7) different stations in the city, including (old crowded residential, industrial, modern crowded residential, Industrial, area exposers bombed in 2003, and areas closed to the busy streets to vehicles) samples were collected during the month of June and July of 2016 -2015, Values were arranged[(171.6857 ppm), (12.27 ppm), (66.4142 ppm), (21.5 ppm), (20.928 ppm)] respectively, the present results indicate that there were high ratio of lead, cadmium and zinc in all study areas and this other evidence of soil contamination.

Keywords: *The Soil, The heavy metals and The Shattrah city.*

Introduction

Heavy metals are among the most dangerous environmental pollutants due to their high toxicity and their easy accumulation in the tissues of different organisms. The continuous increase in these minerals is due to the effluents from sewage treatment plants, power plants, processing, mining and agriculture [1]. Heavy elements include a wide range of elements, including what is necessary for the vital activities of living organisms in fixed proportions, including what is unnecessary and which are substances contaminated and high toxicity of living organisms [2]. Heavy metals are known to have high densities of more than 5 gm/cm and are very low in living systems and have high stability. These elements can be classified into low toxic elements such as manganese with moderate toxicity such as chromium, copper, nickel and severe toxicity such as uranium and lead And cadmium. [3,4,5]. The toxicity of these mineral elements is related to their physical-chemical composition. Minerals can be found in nature on multiple images, such as the iconic image associated with water or in multiple complexes with organic and inorganic compounds. These compounds are based on electrostatic, [6]. The chemical properties of metals as well as their degree of toxicity are related to the problems caused by the environment closely related to their positions in the periodic table. Their gravity is due to the fact that they are transitional elements and have the ability to form stable complexes with a large group of organic and inorganic compounds in living organisms [7].Soil is one of the major repositories of human waste and the processes that biochemical can be mobilized to contaminate water supplies and the impact on food chains [3]. Heavy metals are released from their sources far from their emission point with the help of the atmospheric (wind). PH is also an important measure in the soil system as it directly or indirectly affects absorption, sedimentation, decomposition, complex formation, oxidation and reduction reactions and is important in determining the behavior of these elements In the soil [7]. As well as the importance of organic matter in the soil, which consists of living organisms and biochemical (amino acids, proteins, carbohydrates and organic acids) and affect these materials on soil construction and water retention [3].

Study Area: The Shattrah is located on a branch of the Gharraf River, which descends from the Tigris River in the central Euphrates region of southern Iraq about 350 Km south of the capital Baghdad at latitude (31,4175) the latitude (46,1777),Its population is (254,000) people

according to the statistics of 2014. The following administratively and geographically in the province of Thi-Qar is located midway between Baghdad and the southern provinces and the Arabian Gulf. This is what enabled it to occupy a vital geographical location for its control of the transportation and road transport between Baghdad and the Arabian Gulf on the one hand and between Baghdad and the rest of the southern city on the other. The district of Shattrah is the second largest district in Iraq, with an area of (2,384 Km^2), administratively bordered by Maysan Province and the west by Al-Nasr. On the north side is the district of Rifai the south is Nasiriyah. The judiciary includes three administrative areas Dawa [8], as illustrated in Figure (1).

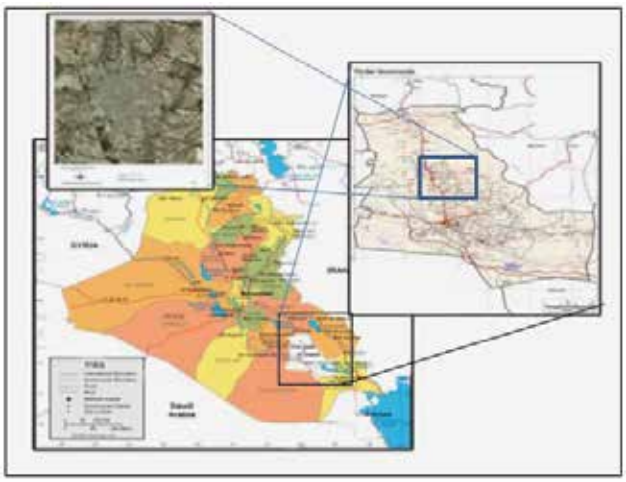


Figure 1: Thi-Qar Governorate Map shows an aerial view of shattrah Cities[9]

Materials and Mode of Pperation: Various samples of the soil for each station for (7) different stations [Industrial neighborhood, Imam Sadiq neighborhood, hospital district, Technical Institute neighborhood, Baghdad district, Mashtal, Imam Hussein neighborhood (p) During the months of June and July of 2016-2015, industrial, residential and commercial areas, the samples were stored in nylon bags after modeling [10] was used to calculate the concentrations of heavy elements in selected soil samples. The following are the basic stages of processing samples and preparing them for final analyzes:

1. Grinding the soil sample using a ceramic mortar after drying in a 100 ° C oven for two hours.
2. Screening of samples using a sieve (0.63 µm)
3. Place (1 g) of the dried sample in a 250 ml clean beaker using a delicate balance
4. Collect the sample by adding 15 mL of hydrochloric acid with 5 mL of concentrated nitric acid HNO3
5. Put in a sand bath for 60-45 minutes
6. Refrigerate the baker to laboratory heat and add 5 ml of hydrochloric acid and heat in a sand bath to dry, for 5-10 minutes.
7. Cool the cup and add 5 ml of hydrochloric acid and 50 ml of hot distilled water
8. Heat the mixture to boiling point for 2-3 minutes
9. filtration with filter paper. 42, located in a bottle size of 100 ml
10. Wash the insoluble precipitation with distilled water and add the washing water to a site and complete the volume to 100 ml and then send it for analysis by Flam Atomic Absorption Spectrometer.

Results and Discussion

The results of the study showed a high concentration of the lead element in the soil samples (7 stations) from different areas in Shatrah compared to the Iraqi determinants of 150 ppm [11], as in Table (1). Where the industrial area recorded the highest concentration of the lead element because of the large number of cars and blacksmith shops and the spread of ice factories. The bombing during the 1991 and 2003 wars also contributed to the explosion of bombs and missiles.[12] [13]. Resulting from the combustion of fuel containing tetraethyl, which uses lead or the fourth generation to reduce the engine helps to increase the lead pollution in the environment of the combustion of fuel used in local power generators deployed in residential neighborhoods is a source only as well as lack of health and environmental services, Resulting in degradation and increased heavy concentrations [Pb, Cd, Ni, Cu, Cr] insisted in soil [14] When comparing the results of the current study with local studies according to Table (2), we noticed that lead concentrations recorded higher results than the Iraqi determinants [15] and higher than recorded [16] in the soil of Kufa and recorded [17] From the record [18] in the soil of Baghdad - Nahrawan and recorded [19] in the soil of Basra and recorded [20] in the

soil of architecture and recorded [21] in the soil of Kut and higher than recorded [22] in the soil of Nasiriyah And recorded by [12] in the soil of Baghdad and recorded [23] in the soil of the city of ancient Ur We also noted the increase in concentrations of cadmium compared to the Iraqi determinants of 5ppm per million [11]. In his study, [24] pointed to the role of temperature rise and wind direction, and the effect of pollutants on it, And [25] That fuel combustion products used in brick factories are working to increase trace elements in the atmosphere and then deposition on the soil surface. According to [26], one of the reasons for increased concentration of cadmium in soil is the burning of plastic materials. Note that the cadmium concentration record highest rate [15.3 ppm] in the industrial zone, which ranks first. This is due to fuel combustion products in transportation and a number of kashi, block, ceramics and fuel combustion products in civil power generators and cadmium concentration in the Baghdad area [14ppm]. As well as the exposure of the region to a US missile strike in 2003, poor sanitation services and household waste Rh on the surface of the soil. When comparing the results of the current study with local studies, we observed that zinc concentrations were recorded [66.4142 ppm], higher than Iraqi determinants [15] and higher than global determinants (50 ppm) [11] and higher than recorded in Jabbar [21] And recorded [22] in the soil of Nasiriyah and recorded [23] in the soil of the ancient city of Ur. We observe the rise of the zinc element in the same areas where the concentration of lead and cadmium increased by the fact that zinc is not available individually but is uniformly present. In areas with poor health and environmental services. [27] The zinc content of the soil is highly heterogeneous and due to the resulting rocks in terms of the concentration of nickel and copper, we note that the current study rates recorded fewer results than the Iraqi determinants [15] Of the recorded [16] in the soil of Kufa and recorded [17].And recorded by [20] in the soil of architecture and recorded [21] in the soil of Kut and higher than recorded [22] in the soil of Nasiriyah and recorded [12] in the soil of Baghdad and recorded [23] in the soil of the city of Ur archaeological and slightly higher than recorded [19] in the soil of Basra. The concentration of this element in the industrial area is confirmed by the fact that the pollution is the result of the burning of fuel used in local electric power generators, which are widespread in the residential areas and constitute a major source of pollution of the surrounding heavy elements, as well as the lack of health and environmental services such as the discharge of wastewater and the accumulation of waste and household waste. Which are complex and heterogeneous and thrown into the soil, leading to their degradation and increased concentration of heavy metals [Pb, Cd, Ni, Cu, Cr] in the soil [14]. The region is located near the filling station of Benzin and was hit by missiles in 2003 and has been suffering from environmental and health neglect for many years.[28] confirmed in their study that the concentration of nickel and copper Is higher in the summer season than in other seasons due to the high temperature and the effect of the effect on the behavior of pollutants if it works to lift pollutants to the upper layers and thus increase the spread to long distances, illustrate the forms (3) Concentrations of heavy elements in the soil of the study areas.

Table 1: Concentration of heavy metals in the study area

No.	Area	Concentration				
		Pb(ppm)	Cd(ppm)	Zn(ppm)	Ni(ppm)	Cu(ppm)
1	Industrial District	204.8	15.4	82.4	34.5	31
2	Imam al-Sadiq neighborhood(p)	117.2	13	55	24.8	18
3	Hospital	195.7	11.2	66.2	17	13
4	Technical Institute neighborhood	124.8	9	56.2	19	21.4
5	Baghdad District	205.3	14	72.6	22.3	28
6	Arboretum	167	10.3	65	14	15.9
7	Imam Hussein neighborhood (p)	187	13	67.5	18.9	19.2
The average		171.6857	12.2714	66.4142	21.5	20.928

Table 2: Comparison of the concentrations of heavy metals in the study area with the Same in local soil and the global average

No.	Soil source	Concentration					Researcher and year
		Pb(ppm)	Cd(ppm)	Zn(ppm)	Ni(ppm)	Cu(ppm)	
1	Iraqi determinants	-	5	-	50	20	Aziz (1995)[15]
2	Global determinants	150	0.06	50	40	30	Lindsay (1979)[11]
3	Kufa	10	-	-	96	-	(AL-Obeidi, 2000) [16]
4	Baghdad -Nahrawan	38	2	-	98	-	(Shanshel, 2004) [17]
5	Baghdad -Nahrawan	20	12.6	-	174.6	29.41	(AL-Sultani, 2006)[18]
6	Basra	62.3	5.5	-	20.9	16.9	(Khuwaydem,2007)[19]
7	Baghdad	39.4	5.33	-	54.53	-	(Alwan, 2009)[12]
8	Architecture	158	15.68	-	48.94	-	(Ismail, 2010) [20]
9	Kut	58	1.419	71	-	-	(Jabbar, 2011)[21]
10	Nasiriyah	43.777	8.846	49.036	-	20.3	(Kadhim, 2012) [22]
11	Nasiriyah-Ur archaeological sites	61.121	10	50.55	-	21.25	(Kadhim, 2013) [23]
12	Thi Qar -the shattrah city	130.777	12.27	49.036	21.5	20.928	Current study

Conclusions

This study shows the increase in lead, cadmium and zinc concentrations in the samples. Due to several factors,mainly the quality of fuel used in cars and local power generators, poor health and environmental services and the accumulation of household waste, which led to deterioration and increased concentration of heavy metals [Pb, Cd, Ni, Cu, Cr] All of which contributed to increasing the concentrations of pollutants on the surface of the soil as well as to the incorporation of chemical fertilizers and pesticides and their role in the pollution of agricultural land,

Recommendations

1. Afforestation of residential areas near the general street with different types of trees, especially environmentally friendly trees because of its beautiful appearance and calm the atmosphere in addition to its work as a wind, reducing the proportion of pollutants and plankton that increase the proportions of heavy elements, as well as their role in preventing soil erosion And stability.
2. To comply with instructions concerning the transfer of waste of solid and liquid power generation operations.
3. Use of scientific and practical methods in the recycling of waste using solid and liquid wastes resulting from the process of generating electricity and allocate areas far from the city for sanitary landfill and removal of construction waste

Conflict of Interest: None of the authors have any conflicts of interest to declare.

Source of Funding: The research was performed independently, there is no funding, influence over study design, analyses, manuscript preparation, or scientific publication.

Ethical Clearance: The project was approved by the local ethical committee (Biology Science Department, College of Education for women/University of The- Qar.

REFERENCES

1. Adulhay H S, and Rathi Lead M H Cadmium and Nickel contamination of Radioed Soil and Plant Level in Baghdad city. Journal of chemical Pharmaceutical Research.2017; 9(8).
2. Emamverdian AY, Ding M and Xie Y.Heavy Metals stress and Heavy Metal Stress and Some Mechanisms of Plant Defense Response. The Scientific World Journal.2015; Vol. 2015, Article ID 756120, 18 pages
3. Yousif A M. Association of Angina Pectoris with some Heavy Metals Hospital Based study Diyala Journal Medicine.2015;.9(1):70.
4. Sabih S.Traffic congestion and its impact on the high rates of pollution in the city of Baghdad.

Mustansiriya Journal of Arab and International Studies.2016;No 54, pp 243.

5. Al-Saffar N M and Rasoul A.Environmental Pollution Study of Some Heavy Elements of the Soil of Daulat Al-Jadriyah Power Plant-Baghdad University.Iraqi Journal of Market Research and Environmental Protection.2016; (8)1.
6. Xinwell Lu,Huiyun fan and Yiwen Wang. Pollution evaluation and source analysis of heavy metal in roadway dust from a resource-typed industrial city in Northwest China. Atmospheric Pollution Research.2017;(8) 3:pp 587-595.
7. Kumar AR, M Vij, Gupta, Sharma S, Singh S. RIs assessment of exposure to radon concentration and heavy metal analysis in drinking water samples in some areas of Jammu & Kashmir.India Journal of Radioanalytical and Nuclear Chemistry.2015; (304) 3: pp 1009.
8. Al-Eidani A A and Al-Khalidi Q M.The reality of public services for rural residents of shattrah district and their regional relationship with the researchers.Journal of Literature Basra.2011; No 56, p 239.
9. Helali I A A. (Production of a map on the cover of the city of shattrah) (2007).
10. Jackson D R and Watson A P.Distribution of nutrient pools and transport of heavy metals in watershed near a lead.1977; (6) 4, p:331.
11. Lindsay W L. Chemical equilibrium of soil.John Wiley and Sons: New York.1979; p :449.
12. Alwan A M.Measuring the concentration of heavy elements Pb, Cd, Ni and uranium in the Soil of Some areas in Baghdad.M.Sc thesis. University of Baghdad.2009; p:105.
13. Fahd A A, Mohammed R and Abdul Hussein A.Study of the movement and transfer of depleted uranium in the soil of the southern regions of Iraq (decisions of the scientific conference on the impact of the use of uranium in humans and the environment in Iraq Calculation of concentrations of heavy metals (lead, cadmium, zinc, copper, uranium) in selected samples of the Ur area of the archaeological region of Dhi Qar.M.Sc thesis. University.Kufa. iraq.2000.
14. AL-Fatlawi S M G and AL-Alwani M.Heavy metal Pollution of Roadside dust samples with different traffic volumes In Hilla city The Iraqi.Journal for Mechanical and Material engineering.2012; (12)4.
15. Aziz A M.Effect of some heavy elements in solid waste and sewage on the growth of lettuce and soil pollution.MSC. University.Baghdad. iraq.1995.
16. Obeidi A K.Effect of Kufa Cement Plant on Plant Soil and Environment of the Surrounding Areas. PhD Thesis.University of Baghdad.iraq.2000.
17. Towfiq L N M, Jasim K A and Abdulhmeed E O.Pollution of Soil by heavy metals in East Baghdad in Iraq.International Journal of Innovative Science & Engineering &Technology.2016;(2)6.
18. Emad A,Salah Kadhim M,Yassin H.and Safa Abd-Alsalaam.level,distribution and Pollution assessment of heavy metals in urban community garden soil in Baghdad city, Iraq. International Journal of scientific & Engineering Research.2015;(6)10.
19. Musa S A and AL-Musawi M M. Qualitative study of Discharge Waste Water from Babil/2 Batteries Factory in Baghadad Ibn AL-Haitham.journal for Pure & Applied Science. 2015;(28)1.
20. Ismail Z A. Measure concentrations of lead, nickel, cadmium, chromium and uranium in the soil of some areas of Maysan province.MABaghdad University. 2010.
21. Jabbar S J. Assessment of the level of radioactive contamination of uranium and radon and the concentration of some heavy elements in the soil of the city of Kut.MA Baghdad. University. 2010.
22. Kazem Z J.Radiation Activity and the level of contamination of uranium and radon gas and concentration of some heavy elements in the soil of the city of Nasiriyah. MSC Baghdad University. 2012.
23. Kadhim I A.Calculation of concentrations of heavy metals (lead, cadmium, zinc, copper, uranium) in selected samples of the Ur area of the archaeological region of Dhi Qar. MSC University Kufa.iraq 2013.
24. Abdul Hameed, M J AL-Oaidy, Athmar A.M. AL-Mashhadi, Heavy Metal Concentrations in

Urban soil within Baghdad city.Iraq Journal of Environmental protection.2013; (4)1.

25. Ali H.G.Study heavy metals concentration in Drinking water in ad DiwanIyah city (Muthanna Journal of Engineering and Technology.2017; (5) 2.
26. AL- Hassani M H. Agricultural Waste Adsorbent for Removal Lead and Cadmium Ion from Agueous Solutions.AL-Khwarizmi Engineering Journal.2013;(9)2, PP 69.
27. Dunya A AL-Jiry and Salman K. Essa Using pollution Indexes to Assessment of heavy metals pollution in highway-side soils around Baghdad City. Journal of Environment and Earth Science.2010; (6)10,p 224-321.
28. Al-Asadi A, Al-Khafaji B Y and Al-Rikabi H Y.Concentration of some trace elements in the air and soil minutes in the vicinity of the brick making plant in Al-Islah, Thi Qar (Proceedings of the Fourth Conference of the College of Education for Pure Sciences.Journal of the College of Education for Pure Sciences.2010; (4)1,p 431.

The Effect of Theory of Planned Behavior Models to Behavior of Cadres as the First Aiders of Stroke Attacks

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ABSTRACT

Background: Identification of stroke patients as early as possible is very important, this can help improve prehospital management and the accuracy of treatment. Public awareness can contribute to increasing the speed of arrival at the hospital after the attack.

Research Objective: to analyze the effect of model-based on the theory of planned behavior training on knowledge, attitudes, subjective norms, perceived behavioral control, intention and behavior of cadres as the first aider in identifying stroke.

Method: This study uses the true experimental method pre and post test control group design. This study included one experimental group (22 health cadres) and one control group (22 health cadres). Sampling uses simple random sampling. Training based on the model theory of planned behavior is carried out for 5 sessions. Data collection was conducted twice, namely before training, 1 week after training and measuring behavior 1 month after training.

Results: Training based on the model of the theory of planned behavior affects knowledge (0,000 < 0,05), attitudes (0,006 < 0,05), perceived behavioral control (0,000 < 0,05), intention (0,007 < 0,05) and behavior (0,000 < 0,05). Training does not affect subjective norms (0.057 > 0.05). Differences in the two groups only occurred in the variables perceived behavioral control (0.002 < 0.05) and behavior (0.000 < 0.05).

Conclusion: Continuous training is very important in improving cadre behavior in carrying out its role, namely the ability to identify and respond to stroke quickly. This is expected to support the success of the prehospital care system in the community.

Keywords: *stroke, first aider, theory of planned behavior*

Introduction

Provision of rapid treatment can be achieved by reducing patient time in making decisions, increasing early identification and rapid examination [(1)]. Lack of understanding of the introduction of stroke symptoms results in delayed treatment [(2)]. The evidence shows that public awareness regarding stroke is less optimal.

According to data from the Malang City Health Office in 2017, 379 stroke patients were found in the Janti Community Health Center work area. Patients with risky diseases, including 1,895 diabetes mellitus and 2,426 people with hypertension. These data indicate that handling prehospital is of particular concern to the community. The presence of a community can increase knowledge about stroke signs and risk factors[(4)].

Increasing prehospital handling can be done by training local residents. Local programs can help nursing staff to work with first aid workers and community health workers. Activities include increasing skills to local residents to recognize disease and doing first aid[(5)]. The right target in implementing community-based education is cadres. Cadres can help professional health workers in areas that have limited resources [(6)]. Cadres have a role in carrying out first aid measures for patients. The obstacles faced by cadres are that the level of education that is still lacking and inadequate[(7)].

The training provided should not only focus on increasing knowledge, but increasing the behavior of cadres as the first aider. One effort to improve health education is to utilize the use of the theory of planned behavior (TBP) [(8)]. This theory can design and implement educational interventions to change behavior. Increased

preparedness for stroke and self-efficacy which are steps needed to increase the speed of treatment of acute stroke[9]. Educational intervention based on the TBP has a significant influence on subjective norms and behavioral intentions [10]. Based on the evidence of the effectiveness of the theory, the research applied training based on the theory of planned behavior on cadres as the first aider in dealing with stroke.

Method

This study uses the true experimental method pre and posttest control group design. There were experimental groups and control groups, each consisting of 22 health cadres. Sampling uses simple random sampling. Data collection was conducted twice, namely before training, 1 week after training and measuring behavior 1 month after training. The questionnaire used was designed based on the theory of planned behavior with a Likert scale of 1 to 7 (not agreeing to strongly agree). Data were analyzed using parametric and non-parametric tests. The training based on the model of the TBP was carried out for 5 sessions with a duration of 10-60 minutes. This research has passed ethical conduct tests at the Ethics Committee of the Faculty of Medicine, Brawijaya University no 345/EC/KEPK-S2/12/2018.

Results and Discussion

Table 1: Characteristic Distribution of Respondent

No.	Characteristic	Total	(%)
1.	**Gender**		
	Female	44	100
2.	**Age**		
	25-35	5	11
	36-45	15	34
	46-55	24	55
3.	**Education**		
	Junior high school	20	45
	Senior high school	19	43
	University	5	11
4.	**Duration of being cadre (year)**		
	-5	24	55
	>5-10	2	5
	>10	18	41
5.	**Type of Work**		
	None	26	59
	Private	5	11
	entrepreneur	13	30

Table 2: Effects of Theory of Planned Behavior Based Training on Experimental Groups

Variable	Experiment		Control		Uji Wilcoxon
	Median	Min-Max	Median	Min-Max	p value
Knowledge	60	33-80	87	53-100	0.000
Attitude	49	-30-75	62	21-75	0,006
Subjective Norms	36,5	-9-91	65	5-81	0,057
PBC	10,7	-18-27	36	-20-64	0,000
Intensity	12	2-13	13	10-14	0,007
Behavior	10	0-50	40	10-100	0,000

Table 3: Effect of Lecture Method on Knowledge, Attitude and Subjective Norm

Variable	Before Training		After Training		p	Test
	Mean	SD	Mean	SD		
Knowledge	56,59	15,46	83,59	13,48	0,000	*Paired t-test*
Attitude	46.36	21.92	47.50	16.60	0.862	*Paired t-test*
Subjective Norms	60.00	24.76	58.55	26.51	0.783	*Paired t-test*

Table 4: Effect of Lecture Method on PBC, Intention and Behavior

Variable	Before Training		After Training		p value	Test
	Median	Min-Max	Median	Min-Max		
PBC	7.5	-33-48	3.5	-30-84	0.795	Wilcoxon
Intention	12.5	6-14	12	10-14	0.570	Wilcoxon
Behavior	10	0-40	10	0-70	0.066	Wilcoxon

Table 5: Comparison of Analysis Results on Knowledge and Subjective Norm

Variable	Experiment		Control		p value	Test
	Mean	SD	Mean	SD		
Knowledge	21,27	15.30	27	17,9	0.261	*Independent sample test*
Subjective Norm	16,95	38,41	-1,45	24	0.066	*Independent sample test.*

Table 6: Comparison of Analysis Results Attitute, PBC, Intention and behavior

Variables	Experiment		Control		P	Test
	Median	Min-Max	Median	Min-Max		
Attitude	9,5	-27-93	-6	-48-76	0.067	*Mann-Whitney*
PBC	34	22	-4,5	-68-105	0.002	*Mann-Whitney*
Intention	1	-2-8	0	-4-8	0.087	*Mann-Whitney*
Behavior	35	0-70	0	-20-30	0.000	*Mann-Whitney*

*Perceived Behavioral Control= PBC

Table 1 shows that all respondents were female (100%). The highest age in this study was in the range of 46-55 years (54%). The most characteristic of education is]junior high school graduates (46%). All respondents have never attended training or education related to the concept of stroke and first aid in stroke.

The results showed that before the training-based model of the theory of planned behavior (TBP) cadres had less knowledge of 60.59 ± 23.05. Inaccurate knowledge is found in questions regarding stroke risk factors, including smoking habits, old age and obesity, stroke signs and symptoms and actions to be taken when meeting patients with stroke. Lack of knowledge related to stroke risk factors and stroke symptoms can be influenced by education level and age[11]. The respondents' knowledge of stroke risk factors that are very low can be related to the status of education as a related factor [12].

Data shows that there is an increase in cadre knowledge after training (p = 0,000). There were no differences in the two groups (p = 0.261). This shows that both training methods can increase knowledge. 90.9% of cadres knew of stroke risk factors, 81.8% of cadres knew the signs and symptoms of stroke and 100% of cadres knew the act of contacting an ambulance. Efforts to increase knowledge in the TBP training model are carried out by brainstorming and group discussion in solving the given cases and demonstrating stroke assessment steps to draw conclusions from the results of the assessment.

This is in accordance with the statement that, knowledge is the result of the process of knowing and happening after someone feels a certain object. This happens through human imagination, namely the senses of sight, hearing, smell, taste and touch [13]. Knowledge or cognitive is domain which is very important in shaping actual behavior.

Understanding signs, symptoms and complications is a part that supports faster and better identification of strokes [14]. This can lead to an increase in attitude and if it is associated with health behaviors it will result in a better improvement in the patient's final condition. Knowledge of risk factors and prevention strategies will be very helpful in reducing morbidity and mortality due to stroke. Interventions to educate the public about the correct response to symptoms of stroke have a high success in helping the community make the right response when finding a acute stroke[15] This finding shows that first aid education must be disseminated in every segment of society.

Model-based training TBP has an effect on cadres' attitudes as the first aider in stroke (p = 0.006). There were no differences in the two groups (p = 0.067). This shows that the two methods used do not have an effect on improving attitudes. The activity in the experimental group aims to ensure the positive outcome as the first aider. The series of activities was carried out by giving the topic a discussion to the cadres regarding the impact of the delay in identifying strokes, how strokes could change the lives of people and family members. This session also provides an opportunity for cadres to share experiences in dealing with patients with stroke.

This activity is based on the findings of Pooreh and Hosseini, that attitudes toward the subject come from one's beliefs about the subject. That is, the beneficial consequences of a behavior will increase the individual's attitude towards that behavior[16]. Attitudes towards stroke are influenced by knowledge and supported by actions taken to prevent and treat stroke. Accurate knowledge of stroke risk factors and stroke warnings, appropriate stroke prevention measures or immediate actions needed to treat stroke patients [17].

Model-based training TBP has no effect on subjective norms (p = 0.057). The two groups did not show differences (p = 0.066), so the two methods in this study did not increase subjective norms. The results of this study are in line with the findings of Skolarus et al, that training related to reducing the delay in stroke care has no effect on subjective norms [9]

There are low and negative perceptions on social support that is felt in their role as the first aider. To increase subjective norms were carried out by forming social media groups by utilizing social media to provide motivation. The formation of subjective norms in their application in the field of education or training is through the practice of forming groups and providing motivation[18]. The lack of support and motivation of cadres was disclosed during the assignment evaluation. The results of this study pay special attention to the quality and motivation of health cadres in carrying out their roles.

The feeling and support of a community is an important influence on the satisfaction of a first aider in carrying out his role. Perceptions about the belief in their performance abilities, feelings of belonging and being bound to a place can be beneficial to the first aider [19]. The lack of recognition and appreciation for achieving health cadres can reduce their motivation. Social acceptance, enthusiasm for serving the community and achieving something useful for the community are the factors that motivate health cadres to continue to play a role in health services[20].

The effect of model-based training on TBP occurs in increasing the PBC (p = 0,000). There were differences in the two groups (p = 0.002). These results indicate that training based on TBP model is more effective in improving PBC. Perceived behavioral control refers to the existence of necessary resources and opportunities for certain behaviors and is influenced by a number of factors, such as previous experience[21]. In this study efforts were made to improve the perceived behavioral control through brainstorming. Provide opportunities for cadres to identify constraints within the group and present the results of the discussion, explain constraints and strengths in carrying out roles as cadres and make collective agreements through the formulation of strategies to overcome these obstacles. Activities that can develop perceived behavioral control are identifying constraints, making collective agreements to make strategies in dealing with these obstacles and providing motivation[18].

Training based on the TBP has an influence on intention (p = 0.007). There were no differences between the two groups (p = 0.087). Increased intention in the experimental group was influenced by high knowledge, attitudes, PBC after being given training based on the TBP. Stability of intention can occur if there is a lag between the measurement of intention and observation of behavior. The difference between the initial and final intentions will occur. After measuring intention, things will be found that can change one's intentions. The greater the intention will change if the longer the time interval[22]. Karimy et al. expressing TBP is useful for changing attitudes, subjective norms, perceived behavioral control and behavioral intentions for healthy lifestyles among patients with myocardial infarction[23].

The theory of planned behavior is one of the key theories in the application of first aid. After training most cadres assessed four to five patients from ten patients. The assessment not only included blood pressure, pulse, breathing, but all respondents assessed their ability to make conclusions and recommend further treatment for patients. Short stroke education interventions have the potential to positively influence stroke recognition and behavioral intention. This behavior contributes to the delay in the treatment of prehospital strokes[24]. Health care providers should emphasize the importance of contacting help if they find signs and symptoms of stroke rather than seeking care at a service provider.

Conclusion

Training of cadres as the first aider based on the theory of planned behavior model can significantly influence knowledge, attitudes, perceived behavioral control, intention and behavior. The results of the study show the importance of ongoing training to improve cadre behavior in carrying out their roles.

Conflict of Interest: None

Source of Funding: This study was fully funded by STIKES DIRGAHAYU SAMARINDA

REFERENCES

1. Herlitz J, Wireklintsundstrom B, Bang A, Berglund A, Svensson L, Blomstrand C. Early identification and delay to treatment in myocardial infarction and stroke: differences and similarities. Scand J Trauma Resusc Emerg Med. 2010;18:48.
2. Kim HJ, Ahn JH, Kim SH, Hong ES. Factors associated with prehospital delay for acute stroke in Ulsan, Korea. J Emerg Med [Internet]. 2011;41(1):59–63. Available from: http://dx.doi.org/10.1016/j.jemermed.2010.04.001
4. Kilkenny MF, Purvis T, Werner M, Reyneke M, Czerenkowski J, Cadilhac DA. Improving stroke knowledge through a "volunteer-led" community education program in Australia. Prev Med (Baltim) [Internet]. 2016;86:1–5. Available from: http://dx.doi.org/10.1016/j.ypmed.2016.01.015
5. Orkin AM, Vanderburgh D, Ritchie SD, Curran JD. Community-Based Emergency Care : A Model for Prehospital Care in Remote Canadian Communities. 2018;18(5):385–8.
6. Khetan AK, Purushothaman R, Chami T, Hejjaji V, Madan Mohan SK, Josephson RA, et al. The Effectiveness of Community Health Workers for CVD Prevention in LMIC. Glob Heart [Internet]. 2017;12(3):233–243.e6. Available from: https://doi.org/10.1016/j.gheart.2016.07.001
7. Tse ADP, Suprojo A, Adiwidjaja I. Peran Kader Posyandu Terhadap Pembangunan Kesehatan Masyarakat. Kesehat Masy. 2017;6(1):60–2.
8. Bensley RJ B-FJ. Community health education methods: A practical guide. Jones & Bartlett Learning; 2009.
9. Skolarus LE, Zimmerman MA, Bailey S, Dome M, Murphy JB, Kobrossi C, et al. Stroke Ready Intervention: Community Engagement to Decrease Prehospital Delay. J Am Heart Assoc. 2016;5(5):1–8.
10. Soorgi Z, Miri M, Sharifzadeh G. The Impact of Planned Behavior Theory-Based Education on Female Students ' Obesity-Related Behaviors. 2015;12(4).
11. Aldebasi KA, Alamri NM, Alqahtani AM. Knowledge, Attitude and Practicetowards Stroke Risk Factors and Warning Symptoms in Saudi Arabia, 2017 Do you have stroke ? Yes No. 2017;69(October):2082–7.
12. Olorukooba AA, Mohammed Y, Yahaya SS, Amadu L, Ibrahim JM. Awareness of Stroke and Knowledge of Its Risk Factors among Respondents in Shika Community, Kaduna State, Nigeria. 2018;(January).
13. Pratiwi NL. Pemberdayaan Masyarakat dan Perilaku Kesehatan (Teori dan Praktek) Strategi Percepatan Pencapaian MDG's-Post MDG's. Surabaya: Airlangga University Press(AUP); 2013. 64-69 p.
14. Adusumilli D, Syed S. Community stroke awareness: Knowledge, attitude, and health-seeking behavior of adults in an urban slum of Hyderabad, India. Int J Med Sci Public Heal. 2018;7(10):848–53.
15. Mellon L, Doyle F, Rohde D, Williams D, Hickey A. Stroke warning campaigns : delivering better patient outcomes ? A systematic review. 2015;61–73.
16. Pooreh S, Nodeh ZH. Impact of Education Based on Theory of Planned Behavior : An Investigation into Hypertension-Preventive Self-care Behaviors in Iranian Girl Adolescent. 2015;44(6):839–47.
17. Das, S., & Das SK. Knowledge, attitude and practice of stroke in India versus other developed and developing countries. Ann Indian Acad Neurol. 2013;16(4):488–493.
18. Handarbeny WR, Mahmudiono T. Pengaruh Pendidikan Gizi Berbasis Theory of Planned Behavior untuk Mempromosikan Pembatasan Konsumsi Fast Food pada Siswi The Effectiveness of Nutrition Education Based on Theory of Planned Behavior to Promote Limited Fast Food Consumption in Girl Students. 2017;351–60.
19. Pietrantoni L, Prati G. Resilience among first responders Resilience among first responders. 2008;(May 2014).
20. Jigssa HA, Desta BF, Tilahun HA, Mccutcheon J, Berman P. Factors contributing to motivation of

volunteer community health workers in Ethiopia : the case of four woredas (districts) in Oromia and Tigray regions. 2018;3(2347):1–11.

21. Ajzen I. The theory of planned behavior. 2014;(January 2012).
22. Ajzen I. Attitudes, Personality and Behaviour. Open University Press; 2005.
23. Karimy T, Saffari M, Sanaeinasab H, Khalagi K H-AM. Impact of Educational Intervention Based on Theory of Planned Behavior on Lifestyle Change of Patients with Myocardial Infarction. Iran J Heal Educ Promot. 2016;3(4):370–80.
24. Phan Q, Bentley GW, Joshua T V, Williams LB. Increasing Stroke Recognition and Behavioral Intent to Call Emergency Management Services in a Vietnamese American Population. 2018;7(3):8–12.

Factors Associated with Women's Treatment for Urinary Incontinence in Hasan Sadikin Hospital

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ABSTRACT

Urinary incontinence is a highly prevalent and burdensome condition among women. However, fewer than half of women with symptoms talk to a physician about incontinence. The factors, including knowledge, culture, education, and income, the most dominant factor influence and the reason patient of urinary incontinence not to go to the hospital. The method used in this research is mixed methods with cross-sectional research design. The sample amounted to 70 patients suffering from urinary incontinence. The patients interviewed were 10 patients/informants.The quantitative research with the Kolmogorov test is known that on the variable of educational and income factors, with P >0,05. The knowledge and cultural factors result with P <0,05. There is correlation between knowledge and eastern culture with urinary incontinence patient not treatment at polyclinic RS Hasan Sadikin Bandung, the most dominant factor influencing is the culture factor, as well as the reasons patients with urinary incontinence do not go to the hospital, is due to not knowing that urinary incontinence is a disease and a shame.

Keywords: *Urinary Incontinence, Knowledge Factor, Cultural Factor, Educational Factor, Income Factor.*

Introduction

Urinary incontinence (IU) includes pelvic floor dysfunction, namely pelvic nerve denervation due to labor or lower back trauma.[1] According to The International Continence Society (ICS), complaints of inability to hold urine out involuntarily (Complain of involuntary loss of urine).[1,2.3]

The prevalence of IU in Indonesia is known to be 5.8%.[4] For IU patients, the financial burden that must be borne is not cheap and tends to be expensive from year to year.[5] In addition to financial problems, other problems including the patient's opinion about the severity of the disease, shame to consult regarding incontinence, and trust that incontinence is a normal part of the aging process.[6]

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The factor that causes an IU sufferer not to seek treatment or medical help is the lack of wrong knowledge and opinions about IU, this is the biggest obstacle to treatment-seeking behavior.[7-12]

The research conducted by Basu et al. Stated that several things that make women in the UK consider the problem of IU to be less important than other health problems, do not want to see a doctor with the same complaints, busy work, and shame to consult with doctor.[8]

According to the United Nations World Population Prospect: The 2010 Revision Population Database, the life expectancy of women in the world and Indonesia continues to increase.[9] The lack of understanding and understanding of IU is assumed because they assume that this condition is normal from increasing age and can heal on its own. This is a false assumption because IU can be prevented or treated. Delaying treatment even with mild symptoms can lead to a decreased quality of life.[10]

Through in-depth questionnaires and interviews, an analysis of the factors that affect an IU sufferer is not done medically.

Method

This study uses mixed methods (mixed methods). The study was observational analytic and unpaired categorical comparative analysis, with cross-sectional research design. The study was conducted in the Gynecology Obstetrics section with a quantitative method (questionnaire) to determine the factors that influence an IU patient not seeking treatment. The study population was adult women (18-49 years) who came to the RSHS polyclinic and suffered from IU since May 2017 as many as 70 people suffering from IU from 109 people who filled out the questionnaire. Data were analyzed by Chi-square test or by alternative Exact Fisher test and Kolmogorov Smirnov test and binary logistic regression p-value <0.05 was considered statistical significance. The data obtained is recorded in the form then processed using SPSS version 24.0 for Window.[11]

Result

The results of the descriptive study on the test showed in table 1

Table 1: Overview of Knowledge Factors, Cultural Factors, Educational Factors, Factors Income and willingness of patients to seek treatment in a group of patients suffering from IU

Variable		N = 70
No.	**Knowledge Factors**	
1.	Very Low	0(0.0%)
2.	Low	49(70.0%)
3.	Medium	7(10.0%)
4.	High	14(20.0%)
5.	Very High	0(0.0%)

Conted…

No.	**Cultural Factors**	
1.	Very Low	3(4.3%)
2.	Low	10(14.3%)
3.	Medium	27(38.6%)
4.	High	28(40.0%)
5.	Very High	2(2.9%)
No.	**Educational Factors**	
1.	Basic Education	0(0.0%)
2.	Middle Education	39(55.7%)
3.	High Education	31(44.3%)
No.	**Income Factors**	
1.	Under the Minimum wage	54(77.1%)
2.	Above the Minimum wage	16(22.9%)
No.	**Willingness to treat patients**	
1.	Still want to seek treatment	15(21.4%)
2.	Do not want to seek treatment	55(78.6%)

Description: For categorical data, it is presented by number or frequency and proportion while numerical data is presented with mean, median, standard deviation and range

Table 1 describes the patient's In the table above shows that the level of knowledge of patients suffering from the largest IU is in the low category of 70%. In the cultural variable namely eastern culture that is still inherent in Indonesian society, it is seen that most patients suffering from IU have a high eastern culture of 40%.

For education variables, respondents obtained by researchers tended to be the same between patients with IU and patients without IU. In the respondent's monthly income variable, the highest income is below the minimum wage of 77.1%. The patients who suffer from the biggest IU are patients who do not want to seek treatment, amounting to 78.6%, while the remaining 21.4% still want to seek treatment.

Table 2 : Influence of Knowledge, Culture, Education, and Income Factors with Patients who still want treatment and patients who do not want treatment in patients who suffer from IU

Variable		The group suffers from IU		Value P
		Take medication	Do not take madication	
		N = 15	N = 55	
No.	**Knowledge Factors**			
1.	Very Low	0(0.0%)	0(0.0%)	<0.001**
2.	Low	3(20.0%)	46(83.6%)	
3.	Medium	1(6.7%)	6(10.9%)	
4.	High	11(73.3%)	3(5.5%)	
5.	Very High	0(0.0%)	0(0.0%)	

Conted…

No.	Cultural Factors			
1.	Very Low	3(20.0%)	0(0.0%)	<0.001**
2.	Low	9(60.0%)	1(1.8%)	
3.	Medium	2(13.3%)	25(45.5%)	
4.	High	1(6.7%)	27(49.1%)	
5.	Very High	0(0.0%)	2(3.6%)	
No.	**Educational Factors**			
1.	Basic Education	0(0.0%)	0(0.0%)	0.834
2.	Middle Education	8(53.3%)	31(56.4%)	
3.	High Education	7(46.7%)	24(43.6%)	
No.	**Income Factors**			
1.	Under the minimum wage	11(73.3%)	43(78.2%)	0.692
2.	Above the minimum wage	4(26.7%)	12(21.8%)	

Description: For categorical data, the value of p is calculated based on the *Chi-Square* test with an alternative *Kolmogorov Smirnov* and *Exact Fisher* test if the terms of *Chi-Square* are not met. Sign * shows statistical significance.

Table 2 explains the comparison between knowledge, culture, education, and income factors in the group of patients who still want treatment and patients who do not want treatment in patients with IU. In the table above shows that the level of knowledge of patients suffering from IU who still want the highest treatment is in the high category that is equal to 73.3% while those who do not want to seek treatment, the highest level of knowledge is in a low category at 83.6%. In the cultural variable namely eastern culture that is still inherent in Indonesian society, it can be seen that most patients suffering from IU who still seek treatment have a low eastern culture of 60%, whereas in patients who do not want treatment most respondents have a high eastern culture of 49, 1%.

For the education variable, for IU patients who still want to have a lot of treatment are 53.3% of secondary education, then 46.7% of higher education, Whereas the majority of patients who do not want to seek treatment also have a secondary education background, which is 56.4%, followed by a higher education background of 43.6%.

In the respondent's monthly income variable, the highest percentage of income is below the minimum wage, which is 73.3% and the remaining only 26.7% earns above the minimum wage while the largest respondents are those who do not seek treatment. earning above the minimum wage which is equal to 78.2% while 21.8% earns below the minimum wage.

There is a statistically significant percentage difference between the variables of knowledge and cultural factors in the group of patients who are still willing to seek treatment and patients who do not want to seek treatment in patients suffering from urinary inconsistencies.

Table 3: Simultaneous Influence of Knowledge and Culture Factors with Patients who still want treatment and patients who do not want to seek treatment in patients who suffer from IU

Variable	No.	Multivariable Analysis			
		B	SE	OR CI (95%)	Value P
Knowledge Culture	1.	0-.868	0.675	0.420	**0.199**
	2.	2.440	0.963	11.469	**0.011****

Description: Multivariate analysis with binary logistic regression. The independent variables included in the logistic regression model are the independent variables which in the bivariate analysis have a p-value of <0.25. The value of significance is based on the value of p <0.05. The * sign indicates a value of p <0.05, meaning significant or statistically significant.

From the multivariable analysis in table 3, It can be concluded that multivariable only cultural factors affect

patients who still want treatment and patients who do not want treatment in patients with IU.

Discusion

Subjects in the study were 109 patients with 70 people with IU. age 41-49 years which is equal to 61.43%. In the aspect of the respondent's marital status, IU patients were married at 65.71%. In the last aspect of the education of respondents, IU sufferers had the most education with senior high school education at 51.43%. In the aspect of the respondent's work, it can be seen that the greatest number of patients suffering from IU is housewife work of 45.71% while in the aspect of family income per month, respondents who suffer from IU are mostly patients with income below the minimum wage of 77.1%.

Therefore, for those with IU, the financial burden that must be borne due to IU is considered not small and tends to increase from year to year. Daily maintenance costs around 0.3% of Indonesia's 2015 APBN due to the large financial burden, this has caused less than 20% of IU sufferers seeking help medical conditions.[10]

Based on the results it is known that there are many different reasons that cause a person to suffer symptoms of complaints. educational factor, and the reason that the husband's income is not enough. In the reason of the informant who said that she did not know that IU was a disease. Based on research by Setiati and Pramantara, it was explained that in Indonesia urinary incontinence is often not reported by patients or their families. Health authorities, both doctors and other medical personnel also sometimes do not understand the management of patients with IU properly. Even though IU is a health problem that can be resolved.[5,18-22]

The reason for the informant who said that he was embarrassed and taboo was because the customs of the Indonesian East were still considered taboo on such matters. So this makes an IU sufferer find it difficult to seek treatment, especially if IU is experienced by young people. Hatchett's study, et al., In 32 African-American and Latin-American women said that they had a wrong understanding of pelvic floor dysfunction, one of which was urinary incontamination and had not previously known the causes, symptoms, and treatment available for IU. The subjects were very enthusiastic to receive information, especially regarding how to prevent it.[13,15,20]

Educational factors, some women feel embarrassed to discuss it, especially those who have a low educational background.

The reasons for not being treated because the husband's income is only enough to meet the daily needs and needs of the child's school. In addition, even though the respondent has a BPJS (Health Insurance), respondents are afraid of additional costs. This means that the respondent does not have enough costs for treatment. However, there were also respondents who felt they needed treatment, only this would be done later on. Subak's study, et al., On the impact of improving cost-per-individual incontinence revealed that the average cost of individuals decreased by 23% per decrease from seven incontinence episodes per week.[24]

Table 4: Descriptions of four factors which are Knowledge, Cultural, Educational, and Income Factors in ten respondents

No.	Initial Name	Knowledge Factors	Cultural Factors	Educational Factors	Income Factors
1.	S	As a result of giving birth, laugh	Shy	Upper secondary education	Less Income
2.	I	Think of not being a dangerous disease, drinking lots of water	Taboo	Upper secondary education	Less Income
3.	M	Due to drinking lots of water	Shy	Junior secondary education	Income is enough
4.	HN	As a result of giving birth	Shy	Upper secondary education	Income is enough
5.	F	Due to aging, lots of activity, sneezing	Shy	Upper secondary education	Less Income
6.	TH	Due to aging, laugh	Shy	Upper secondary education	Income is enough
7.	RN	Not a disease	Shy	Upper secondary education	Less Income
8.	R	Due to cold, due to coughing and sneezing	Shy	Junior secondary education	Less Income
9.	A	Due to a lot of activity, laugh	Taboo	Upper secondary education	Less Income
10.	NS	Due to aging	Shy	Upper secondary education	Less Income

The limitations of this study in the form of an interview schedule for informants were carried out at the same time the informants were treated at RSHS as patients so that there was the limited time when conducting interviews. Besides being limited by time, informants were also considered to be less comprehensive in answering the researchers' questions so that they had an effect on the quality of the research results.

Conclusion

Based on the description that has been stated, the conclusion is that there is a relationship between knowledge, eastern culture with IU patients who do not seek treatment at the Hasan Sadikin Hospital clinic in Bandung. But there was no relationship between education level and income with IU patients who did not seek treatment at the Hasan Sadikin Hospital polyclinic in Bandung. The most dominant factor affecting urinary incontinence patients who do not go to the hospital is a cultural factor. They did not know that IU was a disease and a shame so it was necessary to disseminate information or counseling from the health staff to the community, or mothers in particular, to be able to educate them that if there were symptoms IU symptoms should be able to immediately seek medical treatment or treatment.

Conflict of Interest: Nil

Ethical Clearance: Not Required

Source of Funding: Self

REFERENCES

1. Jahanlu D. Hordaland Women's Cohort - A longitudinal study on Urinary Incontinence in the Middle aged woman. Oslo: University of Bergen; 2014. 1; 1-4.
2. Minassian VA, Drutz HP, Al-Badr A. Urinary incontinence as a worldwide problem. International Journal of Gynecology & Obstetrics. IJGO. 2003; 82 (3): 327-38.
3. Abrams P, Blaivas J, Stanton S, Andersen J. The International Continence Society Committee on Standardization of Terminology. The standardization of the terminology of the lower urinary tract function. Scand J Urol Nephrol. 1988; 114 (Suppl): 5-19.
4. Abrams P, A W. Understanding Stress Urinary Incontinence. In: Berlanij L, editor. Editions: Ismar Healthcare; 2004. 2; 19-86.
5. Fernandes D,. Relationship Between Urinary Incontinence and the degree of depression in elderly women: Sebelas Maret State University; 2010
6. Kinchen KS, Burgio K, Diokno AC, Fultz NH, Bump R, Obenchain R. Factors associated with women's urinary incontinence seek treatment. J Womens Health. 2003; 12 (7): 687-98.
7. Fenner DE, Trowbridge ER, Patel DL, Fultz NH, Miller JM, Howard D, et al. Establishing the prevalence of incontinence study: racial differences in women 's patterns of urinary incontinence. The Journal of urology. J. Urol. 2008; 179 (4): 1455-60
8. BP Statistics. West Java Poverty Level September 2015. In: West BPJ, editor. West Java: Official Statistics News; 2016. p. 5.
9. Santoso BI. Urinary Incontinence in Women. Maj. Medicine Indonesia. 2008; 58 (7): 258-64.
10. Balci E, Gürlevik Ö, Gün İ, Günay O. The effects of stress urinary incontinence on quality of life in Turkish women in the reproductive age group. Turkish Journal of Medical Sciences. TURK J MED SCI. 2012; 42 (5): 845-51.
11. Sugiyono. Combined Research Methods (Mixed Methods). Bandung: CV. Alfabeta; 2011. 12; 47-52
12. Holroyd-Leduc JM, Straus SE. Management of urinary incontinence in women: scientific review. JAMA. 2004; 291 (8): 986-95.
13. Jayani LPD. The relationship between overweight and urinary incontinence in women in Surakarta: Sebelas Maret University; 2010
14. BP statistics. Population according to Age Group, Urban/Rural Area, and Gender. Central Bureau of Statistics; 2010 [updated 2010; Downloaded 2016 06/01/2016]; Available from: Http:/bps.go.id.
15. National Institute for Health and Clinical Excellence (NICE). Urinary Incontinence: the management of urinary incontinence in the woman.2014 89; 1-3.
16. Hasan B. Management of Urine Incontinence in Women. The Latest Scientific Development

Meeting in the Field of Obstetrics and Gynecology. 2001. 2; 15-20.

17. Menefee SA, Wall LL. Incontinence, prolapse and disorder of the pelvic floor. In: Berek JS, Adashi EY, Hillard PA., Editor. Novak's Gynecology. Edition. california; 2002. h. 654-84.
18. Suparman E. Pathophysiology/Clinical Symptoms of Perimenopause. Scientific Meeting: Endocrinology Reproductive Fertility. Edition. ; 2002. 29; 45-49
19. Harvey M-A, Kristjansson B, Griffith D, Version E. The Incontinence Impact Questionnaire and the Urogenital Distress Inventory: a revisit of their validity in women without a urodynamic diagnosis. Am J Obstet Gynecol. 2001; 185 (1): 25-30.
20. Sugiyono. Combined Research Methods (Mixed Methods). Bandung: CV. Alfabeta; 2011. 12; 47-52
21. Arikunto S. Procedure for Research A Practice Approach. Editions: Rineka Cipta; 1998. 9; 10-16
22. Sopiyudin D. Statistics for medicine and health. Edition. Jakarta: Salemba Medika; 2010. 5; 12-18.
23. Hebbar S, Pandey H, Chawla A. Understanding King's Health Questionnaire (KHQ) in assessment of female urinary incontinence. International Journal of Research in Medical Sciences. IJRMS. 2017; 3 (3): 531-8.
24. FitzGerald MP, Kenton K, Shott S, Brubaker L. Responsiveness of quality of life measurements to change after reconstructive pelvic surgery. Am J Obstet Gynecol. 2001; 185 (1): 20-4

Histopathological Changes in the Liver and Kidney of Albino Mice on Exposure to Zinc Toxicity

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ABSTRACT

Background: Zinc is one of an essential trace element, it has an important role in many enzymes of the body. It is less harmless in comparison with several other metal ions. Acute zinc intoxication occurs only if there is an exposure to high doses of zinc. Zinc poisoning may be mostly from dietary supplements, including multivitamins, or results from an accidental ingestion of zinc-containing household products.

Aim: The present study was designed to evaluate the histopathological changes of zinc toxicity in liver and kidney of albino mice.

Materials and Method: Fourty-eight male Albino mice divided into four similar groups, the first three groups exposed during 15 days to different zinc concentrations in the form $ZnSO_4$ (60 mg/kg, 80 mg/kg and 100 mg/kg) intraperitoneally. Fourth group set as a control group, treated with saline (0.9%) for the same period of intraperitoneal injection. Sections of liver and kidney were stained with hematoxylin-eosin and examined by light microscopy.

Results: Several changes in the liver and kidneys sections like cell necrosis, congestion, swelling, disappearing of cell borders and others was observed during histopatological examination. It appears from the results that the intensity of tissues defects increased with increasing of zinc toxic concentration.

Conclusion: Results of study suggest that zinc may be toxic for use in mice and cause many toxicological changes in the liver and kidney.

Keywords: *zinc sulfate, toxicity, mice, liver, kidney*

Inroduction

Zinc is an essential micronutrient that almost found in all tissues of the body and is important for DNA synthesis, growth and differentiation of cell, in addition, zinc is essential for the immune system[1,2,3], protein metabolism so, it has an indispensable role for human health[4]. Zinc is less harmless in comparison with several other metal ions. Acute zinc intoxication occurs only if there is an exposure to high doses of Zinc[5]. It has recognized zinc deficiency for many years, but currently, there are limited toxicological data available for zinc[5]. In eukaryotic cells, the physiologically Zn^{2+} concentration is about 10 ng/L but if the level of zinc below 0.06 ng/L lead to trigger of apoptosis and when level rises above 60 ng/L toxicity can ensure[6]. Excessive zinc can cause as many problems in the body as the deficiency. The first signs of zinc toxicity include reduced feed intake, reduced weight gain, bone resorption[7], vomiting, nausea, epigastric pain, fatigue and anemia[6] and excessive Zn may reduce the absorption of calcium or phosphorus [8]. Recent studies improved that free ionic zinc (Zn^{2+}) is a powerful killer of neurons, glia and other cell types[6]. In a study to Servet et al.[9] on 119 autopsy cases to determine the levels of toxic metals (cadmium and lead) and trace elements (zinc and copper) in the liver tissues, they found the average liver levels of metals and trace elements were found 29.5 µg/g, 216 µg/g, 0.39 µg/g and 4.38 µg/g dry weight for copper, zinc, lead and cadmium, respectively. In other study about zinc toxicity, Nilukshana et al.[10] improved that when a person attached

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directly for any cause with zinc phosphide which is a rodenticide caused severe acute kidney injury, abnormal liver profile, pancreatitis and possible myocarditis. The renal biopsy revealed.

As the animal receives higher levels of zinc or toxic amount for long periods of time, the animal will suffer from diarrhea, internal hemorrhage and even death[7]. The more remarkable pathological lesions of zinc poisoning in liver and kidney were focal mononuclear degeneration, necrosis and derangement of liver and kidney[6]. Liobet et al.[11] studied the effect of subchronic oral administration of zinc in Sprague-Dawley rats. Forty female rate were exposed to 0, 160, 320, and 640 mg/kg-day zinc acetate hydrate in drinking water for twelve weeks. The described renal lesions included flattened epithelial cells in the Bowmans capsule, desquamation of the proximal convoluted tabulated tubule and pyknotic nuclei in the 640 mg/kg-day. Intraperitoneal administration of zinc may result an increase in liver mass due to hypertrophy of the hepatocytes[12],[13]. In other study of the effect of zinc toxicity on the liver and kidney of rats for Emmanuel et al.[14]the results were hepatic cells degeneration especially at the portal areas of the livers and glomerular degeneration, mononuclear cells infiltration into the interstices of the tubules and tubular necrosis of the rats kidneys[15].

Aims of this study are:

1. To look at the importance of poisoning of the zinc element and its impact on human and animal health.
2. Study of histopathological changes in liver and kidneys because of zinc toxicity.

Materials and Method

All procedures conducted in this experiment were approved by the local authorities (Faculty of Veterinary Medicine, Basrah University, Iraq).

Experimental Animals: Forty-eight adult male albino mice, 12 weeks old and 20-25 g body weight. They were obtained from the animal house of the Animal House of the Veterinary medicine College, Basrah, Iraq. They were housed in the Animal Room of the Veterinary medicine College, Basrah, Iraq, for 2 weeks before the commencement of the experiment which lasted for 2 weeks. The mice fed appropriately using standard mice chow and water provided ad libitum. All procedures conducted in this experiment approved by the local authorities (Faculty of Veterinary Medicine, Basrah University, Iraq).

Design of the study: Forty-eight adult male albino mice used for the study divided into four groups with 12 mice in each. The first three groups were daily dosed via intraperitonial injection with 60, 80 and 100 mg/kg zinc in the form $ZnSO_4$ for 15 days. An equivalent volume of saline (0.9% NS) administered to the fourth group which set as the control group.

Histopathological examination: We took the sections of liver and kidneys for histopathological preparation and examination. The samples collected and fixed in 10% buffered formalin. Each tissue trimmed to the thickness of 5mm in size, fixed and dehydrated in a series of alcohol concentration, and embedded in paraffin by using an automatic tissue processor. Then the tissue sectioned to a thickness of 5mm micrometer on a microtome. After that, the liver and kidney tissues mounted on the glass slide, de waxed and stained with hematoxylin and eosin (EH). Finally, we examined the liver and kidney tissues using 4x, 10x, and 40x objectives for histological changes, depend on Hair-Bejo et al.[13].

Results

Figure (1) presents the liver section of the control group in which the mice exposed to 0.9% NS only. Note no observable microscopic lesions in the hepatic cells and the central vein of the liver. Figures (2-3) shows changes of liver sections against zinc toxicity. The results show that there were different stages of necrosis in the hepatic cell nuclei, swelling of hepatic cells, congestion of the central vein, and there is a disappearance feature of some hepatic cells. So The results explained that the worse histopathological changes were direct proportion with increasing doses of zinc.

Figures (4) is a section of the kidney of mice set as control croup which exposed to 0.9% NS, shows a normal glomerulus in the Bowmamn's capsule with normal tubules. While the Figures (5-6) present the results for changes of kidney sections against zinc toxicity. They show that there were different stages of swelling in tubular cells that lead to narrowing of the tubular lumen, presence of a proteinous material in the lumen of proximal and distal tubules, and also the pictures show unclearance of the cell borders especially in T3 group which treated with (100 mg/kg zinc).



Fig. 1: liver section of control group (0.9 N.S). H&E 400X. Normal central vein (⟹) and normal hepatic cell (⟹)

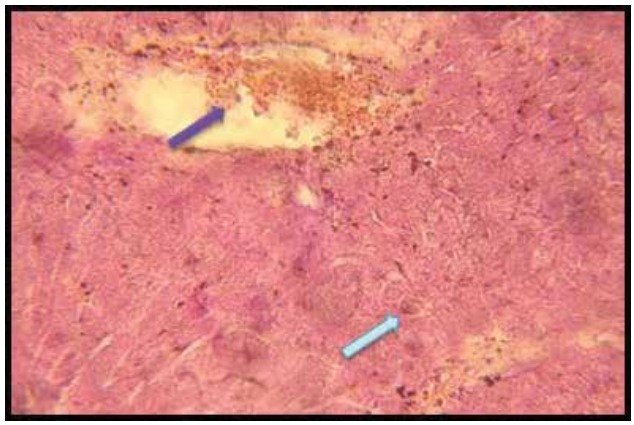


Fig. 2: liver section of T1 treatment after 15 days (60 mg/kg zinc). H&E 400X.
Swelling hepatic cell (⟹) and congestion central vein (⟹)

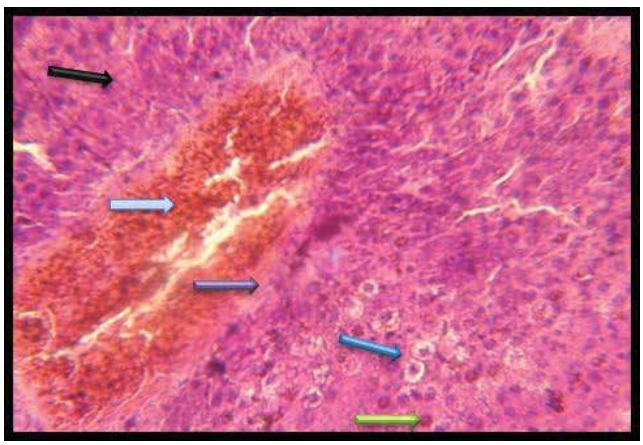


Fig. 3: liver section of T3 treatment after 15 days (100 mg/kg zinc). H&E 400X.
Congestion central vein (⟹); inflammatory edge (⟹); swelling hepatic cell (⟹); necrosis hepatic cell (⟹), and disappearing the features of hepatic cells (⟹)

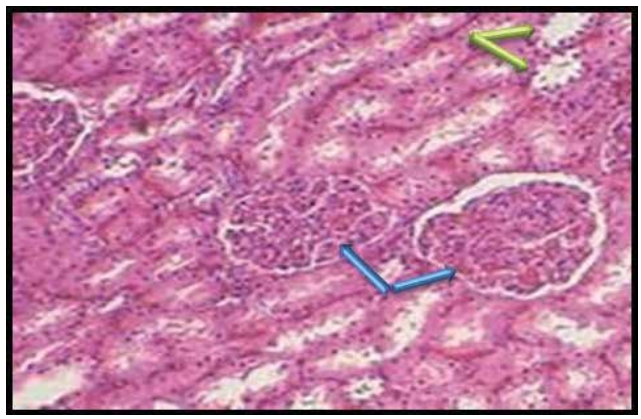


Fig. 4: kidney section of control group (0.9% N.S). H&E 400X.
Normal glumerulus (⟹) and normal tubule (⟹).

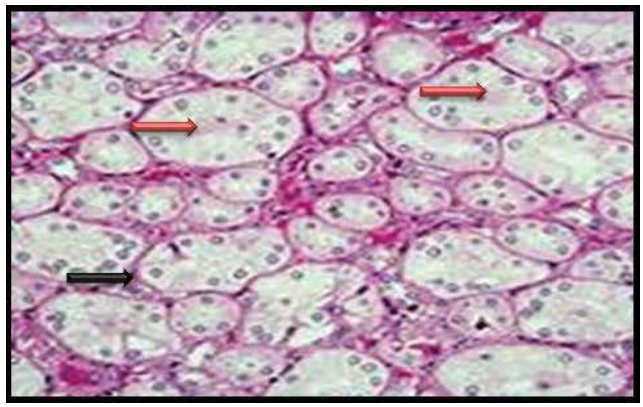


Fig. 5: kidney section of T1 treatment after 15 days (60 mg/kg zinc). H&E 400X.
Swelling tubule (⟹) and proteinous materials (⟹).

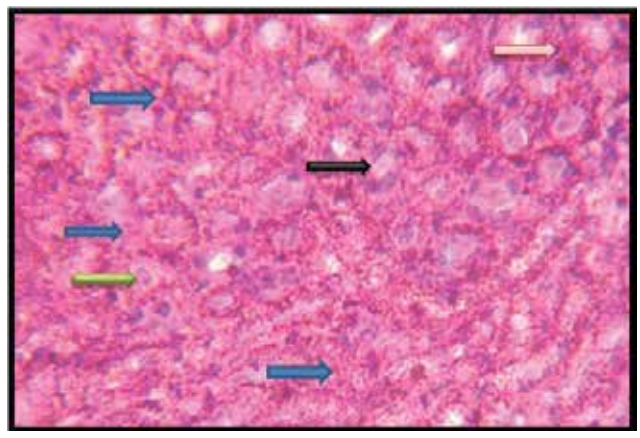


Fig. 6: kidney section of T3 treatment after 15 days (100 mg/kg zinc). H&E 400X.
Swelling tubule (⟹), proteinous materials (⟹), congestion area (⟹) and unclearance of cell borders (⟹).

Discussion

The histo-pathological changes of the liver and kidneys showed a vascular congestion. The result showed also a swelling of the cells with cell necrosis represented by condensation, division and analysis of the nucleus. It may result from the effect of zinc toxicity on the thyroid gland causing hypothyroidism[17] that leads to a decrease of the metabolism rate and then appearance of hepatic changes, or due to a decrease of the blood stream because of anemia, secondary to hypocupremia from zinc toxicity, which the commonest symptom of the zinc toxicity[18]. The administration of the gradual concentrations of zinc toxicity lead to the swelling of the tubular cells, appearance of the cells without the nucleus, which may be because of the accumulation of zinc-metallothionein complex[19] after its reabsorption by the tubules in the kidney, and this complex analysis by lysosome enzymes liberating the zinc ion which is related again with the kidney's metallothionein[19].

The intensity of the toxicity increases with increasing of the zinc dosed, and this leads to an increase in the accumulation of the zinc ions in large quantities till they become more than the ability of the kidney to form the metallothionein synthesis in the kidney is less than in the liver[19].

Conclusion

The present study highlights significant of hepatic and kidney injury after acute zinc sulfate toxicity. We can conclude that the zinc toxicity cause histopathological changes in the liver and kidneys, exacerbated by increased zinc concentration within the body.

Conflict of Interest: The researchers declares that there is no conflict of interests with any other party.

Source of Funding: This article is self- Funding

Ethical Clearance: According to Scientific Research Ethical Committee. ID: 1/19. Dated on 7.April. 2019. Email:Pathology.mcm@uomisan.edu.iq

REFERENCES

1. Christa F., Philip H. Low risk of adverse effects from zinc supplementation. The USAID Micronutrient Program, 2005.
2. O'Dell B.L. History and status of zinc in nutrition. Federation Proc.1984;43: 2821-2822.
3. Kincaid Z., DEMİR N., Abdennour C., BOUZERNA N. Effect of low dietary intake and experimental diabetes on the zinc and carbohydrate metabolism in rats. Turk J Med Sci. 2002;32: 101-105.
4. Plum L.M., Rink L., Haase H. The Essential Toxin: Impact of Zinc on Human Health. Int. J. Environ. Res. Public Health. 2010; 7:1342-1365.
5. Fosmire G.J. Zinc toxicity. The American Journal of Clinical Nutrition 1990;51: 225–227.
6. Jerome N. Zinc Toxicity in Humans. School of Public Health, University of Michigan. 2007. Elsevier B.V. All rights reserved.
7. Kincaid R.L., Chew P.B., Cronrath D.j. Zinc oxide and amino acids as sources of dietary zinc for calves: effects on uptake and immunity. J. Dairy Sci.1997; 80: 1381-1388.
8. Najafzadeh H., Ghoreishi S.M., Mohammadian B., Rahimi E., Afzalzadeh M.R., Kazemivarnamkhasti M., Ganjealidarani H. Serum biochemical and histopathological changes in liver and kidney in lambs after zinc oxide nanoparticles administration. vetworld.2013; 534-537.
9. Iritas S.B., Dinc A.H., Dip A., Unal B.M., Ertan B., Soylemezoglu T. Levels of toxic metals and trace elements in autopsy liver tissue samples. Medicine Science.2017;6(2): 242-8.
10. Yogendranathan N., Sivasundaram T., Constantine R., Kulatunga A. A case report of zinc phosphide poisoning: complicated by acute renal failure and tubulo interstitial nephritis. BMC Pharmacology and Toxicology. 2017;18: 37.
11. Liobet J.M., Domingo J.L., Colomina M.T. Subchronnic oral toxicity of zinc in rats. Bull environ contam toxicol. 1988;41 :36-43.
12. Smalinskiene A., Gaileviciute L.R., Sadauskiene I., Abdrakmanov O., Ivanov L. Effect of cadmium and zinc ions on mitotic activity and protein synthesis in mouse liver. Medicina (Kaunas).2005;41(6).

13. Hair-Bejo M., Saline S., Haifiza H., Julaida, A. Inovo vaccination against infectious bursal disease on broiler chickens. J. Vet. Malaysia. 2000;12: 63-69.

14. Tizhe E.V., Ibrahim N.D., Fatihu M.Y., Onyebuchi I.I, George B.D.J., Ambali S.F., Shallangwa J.M. Influence of zinc supplementation on histopathological changes in the stomach, liver, kidney, brain, pancreas and spleen during subchronic exposure of Wistar rats to glyphosate. Comparative Clinical Pathology. 2014; 5:1535–1543.

15. Shilpa G., Rama N., Reddy A. Toxicological studies of zinc oxide nanomaterials in rats. Journal. Toxicological & Environmental Chemistry. 2012; 94:9.

16. Dean C.E., Hargis B.M., Hargis P.S. Effects of zinc toxicity on thyroid function and histology in broiler chicks. Toxicology Letters. 1991;57(3): 309-318.

17. Johnsrud J., Abdallah A., Schichman S.A., Xiang Z. Image Diagnosis: Zinc-Induced Copper Deficiency Causing Pancytopenia Recognized on Bone Marrow Examination.. Perm J.2017; 21: 16-077.

18. Palmiter D.R. Protection against zinc toxicity by metallothioneine and zinc transport. PNAS. 2004; 101 (14): 4918-4923.

19. Hempe J.M., Cousins R.J. Cysteine–rich intestinal protein and intestinal metallothionein: An inverse relationship as a conceptual model for zinc absorption in rats. J Nutr. 1992; 122: 89-95.

Microbial Inhibition to Water Hyacinth (*Eichhornia Crassipes* [Martius] Solms-Laubach) in Abu Zirk Marsh by Using Selected Fungi

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ABSTRACT

Native fungi associated with water hyacinth have been identified and evaluated the potential of biological control against waterhyacinth in Abu zirk marsh (south of Iraq).Twelve species of fungi associated with different parts of the waterhyacinth (leaf, petiole) were isolated under sterile conditions in the laboratory.These fungi belong to genera Ascomycota (*Alternaria alternate, Stemphyllium* sp**,,***Aspergillus niger,A.flavus,A.ostianus,A.candidus,A.fumigatus,Penicillumfumiculosum.Trichodermharzianum,T. lignorum*,Basidiomycota (*Rhizoctonia solani)* Zygomycota(*Rhizopus stolinifer*) environmental parameters such as temperature, relative humidity, pwere measured in field and in laboratory,the total occurrence of fungi reached to (146 colony *)A. alternata* and *R.solani* was more frequency *R.solani* showed the severity of disease 91.8%,and ability to change in the wet weight, number of leaves and the height of plant.Thus,evaluated *R. solani* more effective and severe plant death. And can be developed as an effective biological control.

Keywords: *Mycoherbicide, water hyacinth, Native bioagent, Abu zirk marsh*

Introduction

Water hyacinth was found originally from the Amazon basin, and its entry into Africa,Asia,Australia,and North America has been facilitated through human activities,is belongs to the family Pontederiaceae, monocotyledon and aquatic macrophyte, free floating with beautiful clusters of violet and yellow flowers. Various methods to control water hyacinth include manual, mechanical,chemical and Biological control [1],which involves the use of natural enemies (insects and fungal pathogens)[2].Fungal pathogens have gained acceptance as a practical, safe environmentally friendly. Various strains in the genera *Acremonium, Alternaria*, *Cercospora,* and *Myrothecium* have been studied intensively as biocontrol agents and shown to be effective under experimental conditions. First appeared of Eichhornia *crassipes* in Iraq was in the mid-1980s, in Baghdad, after then spread to the Diyala river and parts of the Tigris river and attacked marshes, Including Abu Zirk marsh, which exposed to the invasion of water hyacinth in 2016.The amount of area infection with water hyacinth plants was about 2265875 $Km^2$and thus the percentage reached to 18% [3].The rapid and intensive growth of the water hyacinth plant has caused environmental and economic damage in the marsh. The main objective of this study is development of an effective bio-control strategy for water hyacinth by using fungal pathogens as bioagents, in Abu Zirk marsh by isolating and diagnosing the native fungi associated with the water hyacinth and its pathogenic capacity. The article is the first study in the marshes of southern Iraq.

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Materials and Method

Area Study: Abu Zirk marsh is located in Al-Islah District (50 km) east of Al-Nasiriya city. They were located between latitude lines (33°00'-31°40') N, and between longitude lines(45°10'-48°14') E. The marshes are located in a natural depression of an estimated size120 million cubic meters, and the marsh is filled with grasses of reed, papyrus and run through by a stream of a head called Shatt Abu Lahya Figur(1)

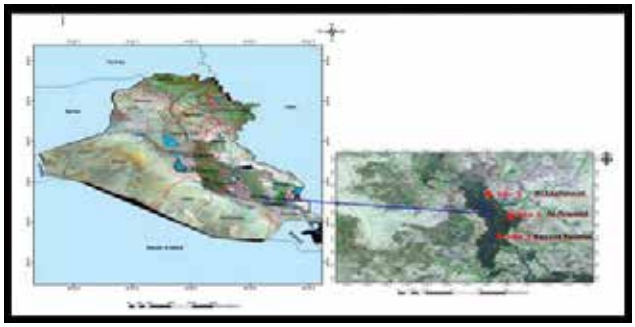


Figure 1: Abu zirk marsh (Google Earth, 2018)

Sampling Collected and Isolation Pathogen: Diseased water hyacinth leaves (showing browning, wilting, yellowing, spots, blights, or combinations thereof) were collected from water bodies in three sites within Abu zirk marsh this site called (1) Al-laghawat, site (2) Al-Rramid, site (3) Sayyid yashua. Infected leaves were collected in sterilized plastic container. Isolation of the pathogen followed the standard procedure on water hyacinth dextrose agar (WHDA) medium. The constituents were as follows (Water hyacinth leaves-200.0 g, Dextrose-15.0 g, Agar-agar- 20.0 g, Distilled water- 1000.0 ml, pH-5.6. Water hyacinth leaves (200 g) were washed in running tap water and then in distilled water. These were boiled for 15-20 min in 500 ml distilled water and filtered through thin gauze cloth for the collection of extract. The rest of the procedure was similar to the PDA pre-paration) [4]. The infected leaves were washed in running tap water to remove soil particles. The infected portions of leaf tissue were from the margins of necrotic or lesions cut into 3-mm pieces by using a sterile scalpel and surface-disinfected for one minute in 10% sodium hypochlorite. The tissue pieces were rinsed three times with sterile water and dried with sterile blotting-pape. Four tissue pieces were done on (WHDA) enriched with chloramphenicol (0.1 mg/l) in order to avoid bacterial growth, pieces were aseptically transferred to the inoculated plates were incubated at 25C° for 3-5 days**.** The fungal colonies were sub cultured individually by using a cork borer (5-mm diameter) and transferred on to freshly prepared PDA media amended with in chloramphenicol (0.1 mg/l) in 80-mm Petri dishes. The plates containing each isolate were arranged in a completely randomized design. The Petri dishes were checked for fungal growth after 4 -7 days and thereafter on a daily basis for 20–30 days. This action was repeated three time until pure cultures were obtained pure colonies of the isolates were grown by single-spore or hyphal-tip techniques. The isolates were stored on agar slants in 6 C° in a refrigerator. Microscopic observation of each isolate was done with an optical microscope at a magnification of40× and fungal isolates were characterized morphologically under a microscope based on their mycelium, fruiting structures and spores and identified according reference to the key of [5], The frequency of occurrence of the isolates were rated as very frequent (>20%), frequent (10%–20%) and infrequent (<10%) according to [6].

Pathogenicity test: Young healthy leaves of water hyacinth were washed under running tap water and then wiped with cotton swab dipped in 70% alcohol. The surface of leaves was injurey by pricking with a sterilized needle. One mycelial disc of 7days old culture was placed on both injured and healthy leaf each, and then covered these leaves with moist sterilized cotton. After these leaves were placed in a sterilized petri dish. At the bottom of the petri dish, sterilized moist filter paper was kept. Plates were incubated at 25 C °. After verifying the disease on the health water hyacinth leaf, the disease was tested on the growing water hyacinth in plastic container measuring (45 cm, 35cm, 20 cm), was kept in Marsh Research Center, Thiqar University. And fill a soil from the same sites was weighed with a kilogram of weight with field water 10 liters, and provided with an oxygen compressors throughout the study period, plants were placed in a plastic container, one plant homogeneous in weight and size as three replicates for each plant. After 7days of acclimate follow the growth Characterizes had taken such as wet weight/gm, total length of plant/cm, total length of root/cm, numbers of leaves/cm) addition to the daily monitoring of air and water temperatures and the relative humidity ratio. Corn oil emulsions were prepared with 35% v:v corn oil amended with 15% lecithin and 5% Tween 20, was diluted in sterile distilled water containing the spores (at a concentration of $1x10^4$ spores/ml in the final oil-water emulsion) [7], 20 ml of the suspension was applied on to water hyacinth leaves by using hand sprayers. The various plant species were also left untreated as controls. Plants were rated for disease symptoms including leaf spots, leaf lesions, and leaf death, and identification of the severity of the pathogenicity of the selected fungus such as *Alternaria alternata* and *Rhizoctonia solani*.

Statistical analysis: $P<0.05$ was chosen as a level of significance for all analyses. SPSS version 17.0 was used for all statistical tests (t- test)

Results and Discussion

Isolation of Fungi: Twelve fungal isolated from different parts in water hyacinth (leaves and petioel). These fungi belong to three genera. The common genera was Ascomycetes (*Alternaria alternata*, *Stemphyllium* sp**,** *Aspergillus niger, A.flavus, A.ostianus, A. candidus, A. fumigatus, Penicillum fumiculosum. Trichoderma harzianum, T. lignorum* the second genera was *Basidiomycota* (*Rhizoctonia solani***),** and third genera was zygomycota (*Rhizopus stolinifer).* The total colony reached to (146 colony).Table (1)showed that *Rhizoctonia solani* was more frequency(61.49%),also *Alternaria alternate* reached to, (60%),but the frequency of *Penicillum fumiculosum* (28.6%), *Trichoderma harzianum* (12.87%), *T. lignorum, Rhizopus stolinifer* reached to (8.58%)*,,Aspergillus niger, A.ostianus*(5.7%), *A. flavus, A. candidus*, *A. fumigatus* and *Stemphyllium* sp reached to (4.2%). For tests and evaluated of severity disease and determined as biocontrol agents waterhyacinth. The statistical methods showed significant differenced were found between the *A. alternata* (leaves), (petiol) and *R.solani* (leaves), (petiol).

Table 1: Isolated fungal species associated with water hyacinth in Abu zirk marsh

Fungal species	S (1) Number		S (2) Number		S (3) Number		Total Colony	Frequency %
	P	L	P	L	P	L		
Alternaria alternate	4	10	2	12	5	9	42	60 %*
Rhizoctonia solani	6	10	4	9	3	11	43	61.49%*
Penicillum fumiculosum	2	5	1	3	2	7	20	28.6%*
Aspergillus niger	0	1	0	1	1	1	4	5.7%*
A.fumigatus	0	1	0	1	0	1	3	4.2%
A.candidus	0	1	0	0	1	1	3	4.2%
A.flavus	0	1	0	1	0	1	3	4.2%
A. ostianus	0	1	1	1	0	1	4	5.7%
Trichoderma lignorum	1	2	0	1	1	1	6	.58%*8
Trichoderma harzianum	1	2	1	1	1	3	9	*% 12.87
Stemphyllium sp	0	1	0	1	0	1	3	4.2%*
Rhizopus stolinife	1	1	0	1	1	2	6	8.58%
Total	15	36	9	32	15	29	146	
L)leaves,(p), Petoile, (S)site, (0)No recored, (*) significant p <0.05)								

The total occurrence of fungi colony reached to (146 colony).These are widely distributed taxa,. A alternata has been described as a pathogen of water hyacinth in Bangladesh Australia, India and Egypt [8] in the present study have also been reported from El-Morsy screened 22 fungal isolates for their ability to infect waterhyacinth out of which Alternaria alternata, showed 79%, tissue death after four weeks post inoculation[6]. In the present study, Rhizoctonia solani has increased its susceptible of diseases severity to the water hyacinth compared with the rest of the accompanying fungi. [9].

Pathogenecity test: Table (2) showed, the growth development of water hyacinth.The same wet weight was selected in all treatments,with air temperature 40 °C and relative humidity 17%. The other growth parameters were different between the three treatments (1, 2, 3). The total plant height in treatments (1,2,3),were (34 cm,35 cm, 30 cm), root length (23 cm, 20 cm, 16 cm),Numbers of healthy leaves were (60, 57, 40) and the total chlorophyll concentration was(35, 32, 35) respectively in the present study have also been reported from Yirefu [7]. The statistical method showed that significant differences between treatment.

Table 2: Growth characters of water hyacinth as a control

Growth characters	Control		
	Container 1	Container 2	Container 3
Air temperature	40	40	40
Relative humidity	17	17	17
wet weight gm./m^2	105*	105*	105*
Plant height/cm	34	35	30
Root length/cm	23	20	16
Numbers of leaves in plant/cm^2	*60	*57	*40
Total Chlorophyll	35	32	*35
(*) significant *p <0.05*			

Table (3) showed that *R. solani* was more effected with treatment *A.alternata* in plant growth. The wet weight was deceased to 85gm/cm when comparative with control (treatment 3). The statistical method showed that significant difference between these treatment, also plant height was 10 cm,but the numbers of infections leaves were increased to 53/m^2 when compared with control,in the same time the chlorophyll concentration was decreased to 2,but the disease severity was increased to 92.98% also the statistical method showed that significant differences between these treatment.

Table 3: Growth characters of water hyacinth after treatment with *Alternaria alternata* and *Rhizoctonia solani*

Growth characters	Treatment		
	1	2	3
Air temperature ċ	40	40	40
Relative humidity	17	17	17
wet weight gm/cm^2	*94	*85	*120
Plant height/cm	15	10	37
Root length/cm	23	19	17
Numbers of infected leaves/m^2	*52	*53	3
Total Chlorophyll	5	2	*33
disease Severity **DS%**	86	*92.98	*7.5
treatment (1) *A. alternata* suspension, treatment (2*) R. solani* suspension, treatment (3 *)* control (*) significant $p < 0.05$			

We have focused on two fungal pathogens (*Alternaria alternata* and *Rhizoctonia* solani) isolated from diseased hyacinths to develop them as effective agents in biological control. According to [10], the effect of mycoherbicide on water hyacinth can be determined based on its ability to limit host plant development, fewer living, leaves, and more death leaves on individual plants, rather than producing new clones. Analysis of the disease test results indicated that most fungal species effect on water hyacinth. The results showed that there were differences between isolates in the severity of the disease on the water hyacinth were recorded after 6 weeks of treatment in vitro. The severity of the disease for both *Alternaria alternata* and *Rhizoctonia* solani has played an important role in reducing biomass (wet weigh) and plant growth number of leaves, daughters plant. *Alternaria alternata* and *Rhizoctonia* solani as pathogens that will lead to a decrease in plant productivity of biomass. On the other hand, lead to major changes in the physiological characters such as low carbohydrate and chlorophyll and changes in water content [11]. Refer that this fungus caused disintegration of original water hyacinth mats into smaller mats, stunted growth, decline in water hyacinth biomass, reduced flowering potential, reduced daughter plants production and finally rotting of the petioles followed by sinking.

Infected water hyacinth leaves showed necrotic type spots, zonate leaf spots and blight symptoms with varying severities,

Histopathology of plant tissue: Figure (2,3) showed the infection of water hyacienth by treatment with *R.solani* and *A. alternata* and also the penetration of both fungi the epidermis of the upper surface and the lower surface of the leaf through the stomata and penetration of tissue petiole led to damage in the tissues of the palisade layer, and the stability of the fungi in the aerenchyma tissue of the leaf and tissues petiole,these infection with pathogenic fungi causes change in the size spongy layer compared to control,The Transmission Electron Microscopy (TEM) also demonstrates the stability of the fungus hyphae of *Rhizoctonia solani* and spores of *Alternaria alternata*

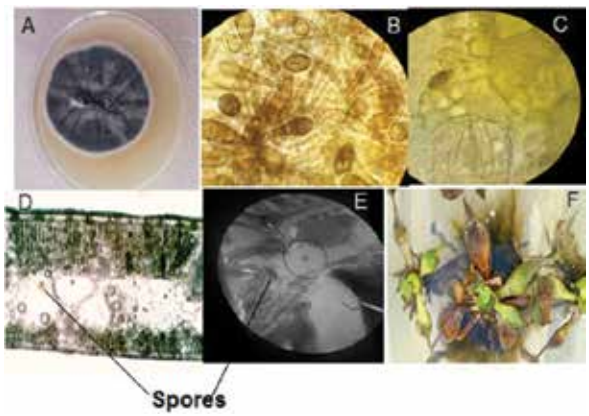


Figure 2: (A) Colony of *Alternaria alternata* on PDA (B) Conidia of *A.alternata* under light microscope (C, D) *Alternaria alternata* spores penetration the epidermis leave of water hyacinth and causing damage in the tissue of leaf (E) TEM micrograph of a spores of *A. alternata* located in the intercellular space of water hyacinth leaf (F) water hyacinth after infection with *A.alternata*.

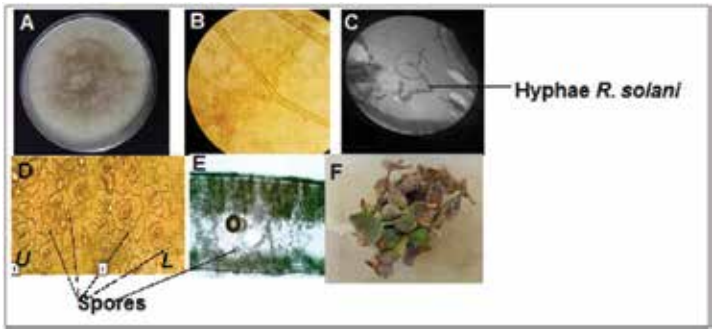


Figure 3: (A) Colony of *Rhizoctonia solani* on pDA (B) hyphae of *R.solani* under light microscope (C) TEM micrograph of a hypha of *R.solani* located in the intercellular space of water hyacinth leaf (D.E) *Rhizoctonia solani* spores penetration epidermis leave of water hyacinth and causing damage in the tissue(F)water hyacinth after infection with *Rhizoctonia solani*

Conclusion

Based on the current findings, we can conclude that, *Alternaria. alternata, Rhizoctonia solani,* could be used as an effective bio control agent against water hyacinth following performance evaluation under natural environmental conditions and their host specificity test.

Conflict of Interest: None of the authors have any conflicts of interest to declare.

Source of Funding: The research was performed independently, there is no funding, influence over study design, analysis, manuscript preparation, or scientific publication.

Ethical Clearance: The project was approved by the local ethical committee in University of Baghdad.

REFERENCES

1. Adegunloye DV, Olosunde SY, Omokanju AB. Evaluation of ratio variation of water hyacinth (*Eichhornia crassipes*) on the production of pig dung biogas. Int. J. Biol. Sci., 2013, 2: 44-48.
2. Firehun Y, Struik PC, Lantinga EA, Taye T.Joint use of insects and fungal pathogens in the management of water hyacinth (Eichhornia crassipes): perspectives for Ethiopia. J Aquat Plant Manage. 2013, 51:109–121
3. Marshlands Rehabilitation Center and wetland of Iraqi. Report, to the Ministry of Water Resources Iraq. 2018.
4. Aneja KR. *Experiments in Microbiology, Plant Pathology and Biotechnology*. 4th ed. New Delhi: New Age International Publishers. 2003.
5. Ainsworth GC, Sparrow FK, Sussman AS. The Fungi, an Advanced Treatise. Vol. IV A: A Taxonomic Review with Keys: Ascomycetes and Fungi Imperfecti. 621 S., 39 Abb., 78 Tafeln. New York-London. Academic Press Inc. 1973.
6. El-Morsy ME. Evaluation of microfungi for biological control of water hyacinth in Egypt. Fungal Diver. 2004, 16:35–51.
7. Yirefu Firehun, Struik PC, Lantingaa EA, Taye Tessema. Occurrence and diversity of fungal pathogens associated with water hyacinth and their potential as biocontrol agents in the Rift Valley of Ethiopia, Journal International of pest management, 2017 vol. 63,No.4,355-363
8. Elwakil MA, Fayzalla EA, Sadik EA, Shabana YM. Biological control of water hyacinth with fungal plant pathogens in Egypt. In: Proceedings of the 7th International Symposium on Biological Control of Weeds (ed. E.S. Delfosse) Rome, Italy. 1989.
9. Opand GT, David M Musyimi, Hillary T Nyanganga. Isolation and Identification Rhizoctonia Solani on the Water Hyacinth (Eichhornia Crassipes [Mart] Solms. Laubach) in the Winam Gulf (Lake Victoria, Kenya). IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) e-ISSN: 2319-2380, p-ISSN: 2319-2372. 2017. Volume 10, Issue 8 Ver. I (August 2017), PP 39-43
10. Shabana YM. The use of oil emulsions for improvising the efficacy of *Alternaria eichhorniae* as a mycoherbicide for water hyacinth (*Eichhornia crassipes*). Biol. Control. 2005, 32 (1): 78-89. 149:21-27
11. Julien MH, Griffiths MW, Stanley JN. Biological control of water hyacinth: The moths *Niphograpta albiguttalis* and *Xubida infusellus*: biologies, host ranges, rearing, releasing and monitoring techniques. ACIAR Monograph, 2001. pp. 79-91

Complications and Lipid Parameters Status among 50 Years and above Age Group Hypertension Population at Primary Health Care Centres of Buraidah City

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ABSTRACT

Background: As we all know that Hypertension problem increasing in all over the world. Being Family Medicine specialists, in addition to detection of hypertension problem at early stage and also need to focus more and more on complications identification at the earliest and suggesting proper remedial and life style measures periodically insisting and educating them, minimizing the burden on spending amount by the government and also good quality of life of the individual.

Objectives: To identify the complications of hypertension and lipid profile status among study population.

Materials & Method: A cross sectional institutional based record review study conducted at primary health centers of Buraidah City from January 2018 to June 2018 among 170 persons records 50 years old and above in the concerned primary health care centers. After getting institutional ethical committee clearance, data entered in Statistical package for Social Sciences (SPSS) and necessary statistical tests like simple proportions and chi square tests were applied.

Results: In the study population, about 47.7% were having abnormal triglycerides. among the abnormal triglycerides study group, the prevalence of hypertension with complications was 33.3%. About 20.6% (35/170) individuals were having different complications. Of which, Ischaemic heart disease (IHD) was identified as common complication which accounts 15.3% of all complications noticed in the study population.

Conclusions: Based on the study results, majority of the people were having abnormal lipid parameters and most common complication identified in the study population was ischaemic heart disease. Need strategies to identify the complications at the early stage at primary health care centers for the guidance in the management of the complications.

Keywords: *Triglycerides, serum cholesterol, complications, annual health check up.*

Introduction

The rampant increase of hypertension in the society is due to undergoing socioeconomic and epidemiological transition, increasing life expectancy is burdened with increasing prevalence of hypertension in urban areas, due to urbanization, less physical activity,unhealthy life style and stress. Hypertension as a significant cause of serious health complications, morbidity and mortality has been recognized in most nations globally particularly in the Western world. It is currently estimated that hypertension affects more than a quarter of the world adult population

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including the Kingdom of Saudi Arabia. It contributes to the burden of heart disease, stroke, Kidney failure, hypertensive retinopathy, premature mortality and disability. According to the World Health Organization global fact sheet on global burden of diseases, increased blood pressure was one of the leading causes of death and disabilities globally in 2014[1].

The Kingdom of Saudi Arabia government has been increasing funds allocated to the health care sector in the past decade with about $ 61 billion in 2011 which was 12% of the entire national budget and 5 % of the entire gross domestic product in the year 2014with a health per capita of approximately $ 2500 in the same year based on world bank values [2]. The healthcare burden is expected to increase owing to the expanding population, increasing number of elderly persons and the development of related lifestyle diseases such as obesity, hypertension and cardiovascular complications.

Hypertension is one of the leading causes of morbidity, mortality and socioeconomic burdens worldwide particularly among persons above 55 years where its prevalence is between 51-70 % in Saudi Arabia. In terms of associated life complications, hypertension caused about 50% of stroke, heart failure and heart diseases in addition to another 40% deaths among diabetic patients globally in 2013. The highest number of complications arising from hypertension are mainly cardiovascular and include conditions like myocardial infarction, heart failure, cerebrovascular accidents together with visual disturbances, and kidney problems[3].

The complications arising from hypertension in addition to the disease itself creates a huge economic stress on the affected individuals and their families, national health systems, countries and the world at large. It is therefore, an modern epidemic in the public healthcare sector. The global costs for treating hypertension and its complications assessed in various world Bank region was estimated to be about $370 billion which is about 10 % of the overall world budget. The Eastern European regions and Asia spends about 20% of their total budget on high blood pressure and the associated sequelae. Even though the developed nations and high–income countries have the largest share in hypertension spending, there is continuous increase in the expenditure among the developing nations as well.[4]

It is widely accepted that cardiovascular disease is associated with hypertension and increased blood levels of lipids. In relation to the above study results and situations, the following research was carried out to determine the complications of hypertension and together with the associated lipid profile status among individuals records at the primary health care centers of Qassim region. Gravity of complications that cripple the person in physical, mental agonies and leads to drain the family and country resources.

Aims and Objectives

1. To identify the complications of hypertension in the study population.
2. To find the lipid profile parameters association with hypertensive population.
3. To know the annual check up status in hypertensive population.

Materials and Method

Study Design and Setting: This was a institutional based record review cross sectional study carried out in the primary health care centres (PHCC) in Buraidah city. There are 44 primary heath care centres in the city all are functioning and providing the services to the needed people of Buraydah city.

Study Period: This study was conducted from 1st January 2018 to 30th June 2018.

Target Population: All patients above 50 years old visited to the Primary health centre (Based on availability of the records).

Sample Size Calculation: Meta-analysis of prevalence of hypertension in Saudi Arabia among above 50 years age group was reported as 51% per cent. This prevalence is considered to find out the sample size in my study. Finally sample size arrived 170 by using the formulae of $4pq/l^2$ in qualitative studies.

Sampling Method: Simple random sampling method.

Sampling Procedure: Out of 44 primary health care centers in Buraidah City,10 PHCC were selected randomly. As per the requirement, 17 patients records to be collected from each PHC. The selection of the records also used by simple random method. After selection of the record, verified all my study variable and filled in our questionnaire. The pilot study was done on 34 samples. Same process was used to complete the requirement of the sample size of 170.

Exclusion Criteria: Hypertensive patients less than 50 years.

Ethical Clearance: Regional Research Ethics Committee -Qassim Province, issued the ethical clearance certificate to initiate this study.

Method of Data Collection: An questionnaire was prepared based on the availability of information in the records of hypertension files in PHCs and also taken consultation and discussion with the experts in the department and under supervision of the guide. One day before visited to the concerned PHC and met the director of PHC and file room manager and taken appointment and explained in detail about the purpose and methodology of the present study and assured strict confidentiality of information. First 10 PHC selected randomly to initiate the study. From the each PHC, 17 files were selected by simple random method. The pilot study conducted among 34 samples from 2 PHCs.

Data Analysis: Statistical analysis was done by using the statistical software spss -21.0 version. Necessary statistical tests like simple proportions, chi square tests were applied for inferential statistical interpretation.

Results

Table 1: Lipid profile parameters association with Hypertension study population (n = 113)

Triglycerides	Hypertension without complications	Hypertension with complications	Total	P value
Normal	50 (84.7%)	9 (15.3%)	59 (100%)	X^2-5.07, 1df, P-0.02
Abnormal	36 (66.7%)	18 (33.3%)	54 (100%)	
Total	86 (76.1%)	27 (23.9%)	113 (100%)	
Serum cholesterol				**P value**
Normal	74 (74.7%)	25 (15.3%)	99 (100%)	X^2-2.35, 1df, P-0.12.
Abnormal	33 (86.8%)	5 (13.2%)	38 (100%)	
Total	107 (78.1%)	30 (21.9%)	137 (100%)	

Table 1 revealed that in the study population, among the abnormal triglycerides study group the prevalence of hypertension with complications was 33.3% and normal triglycerides study group, the prevalence of hypertension with complications was 15.3%. In the study population, among the abnormal cholesterol study group the prevalence of hypertension with complications was 13.2% and normal cholesterol study group, the prevalence of hypertension with complications was 15.3%. As the sample is small and also having complications sample also very less and hence statistical applications may be inappropriate.

Table 2: Type and duration of complications in study population

Type of complication	Number	Percentage
Retinopathy	7/170	4.1%
Stroke	2	1.1%
IHD	26	15.3%
Total	35	20.6%
Duration of complications		
< 5 yrs	16	45.7%
5-10 yrs	15	42.9%
> 10 yrs	4	11.4%
Total	35	100%

Table 2 highlighted that in the study population about 20.6% (35/170) individuals were having different complication. Of which, ischaemic heart disease (IHD) was identified as common complication which accounts 15.3% of all complications noticed in the study population. In the study population, 42.9% of complications reported between 5-10 years of the duration.

Table 3: Health education versus Hypertension (n = 168)

Health education	Hypertension without complications	Hypertension with complications	Total
Yes	123 (79.3%)	32 (20.7%)	155 (100%)
No	12 (92.3%)	1 (7.7%)	13 (100%)
Total	135 (80.3%)	33 (19.7%)	168 (100%)

Table 3 depicts that in the study population, about 92.2% (155/168) were received health education. Of which about 20.7% were having hypertension with complications.

Table 4: Annual health Check up versus Hypertension (n = 169)

Annual health Check up	Hypertension without complications	Hypertension with complications	Total
Yes	114 (79.7%)	29 (20.3%)	143 (100%)
No	20 (76.9%)	06 (23.1%)	26 (100%)
Total	134 (79.2%)	35 (20.8%)	169 (100%)

Table 4 revealed that in the study population, about 84.6% (143/169) were received annual health check up. Of which about 20.3% were having hypertension with complications.

Discussion

The present cross sectional record review study was conducted at different primary health care centres to study the complications of hypertension and lipid profile status association with hypertension in Buraidah city. In the present study, among the abnormal triglycerides study group the prevalence of hypertension with complications was 33.3%. There was statistically significant association was observed between triglycerides status and hypertension complications (P<0.05). In the study group, among the abnormal cholesterol study group the prevalence of hypertension with complications was 13.2%. As the study record based review study and some records were not having all the parameters. As the sample size is small and due to not available of other lipid parameters not interpreted in the study. In the present study, lipid abnormality individuals itself is less and one of the limitation of the present study findings cannot be generalized into the entire Buraidah population.

But record review studies sometimes will act as eye opener for the better planning strategies for the improvement. Study conducted in Bangladesh by C. M Reza Qureshi Forhad, Asma Kabir et al [5] revealed that it was a cross sectional study in which 159 diagnosed hypertensive patient and 75 with normal blood pressure (normotension) were enrolled for comparison. These patients sought a through health cheek up including blood pressure assessment between May 2012 to April 2013 in Tairunnessa Memorial Medical College and Hospital. Lipid parameters total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDLc) and high density lipoprotein (HDLc) were estimated by enzymatic colorimetric test. Study revealed the results of the mean of Systolic blood pressure and Diastolic blood pressure of hypertensive were higher than normotensive (p<0.001). The serum levels of total cholesterol, triglyceride and LDL-C in hypertensive subject were higher than normotensive persons and statistically significant (p<0.001).

The logistic regression analysis indicates hypertensive were 1.2 times higher total cholesterol, 1.3 times higher triglyceride and 1.2 times higher LDL-C than normotensive persons and was statistically significant (p<0.001). Another study conducted in Riyadh, Saudi Arabia by Abdalla A Saeed et al [6] with background of this study aims to assess the association between lipid profile and obesity among adults in Kingdom of Saudi Arabia

and identify anthropometric predictors of dyslipidemia. overall prevalence of obesity ranged from 33.8 to 44.4 % and the overall dyslipidemia prevalence ranged from about 25 to 44% depending on type of dyslipidemia and anthropometrics used. Prevalence of dyslipidemia and mean concentration of lipids profile were generally significantly higher in obese than non obese. About 45.7% of complications occurred in < 5 years duration of hypertension.

In the present study, about 20.6% (35/170) individuals were having different complications. Of which, ischaemic heart disease (IHD) was identified as common complication which accounts 15.3% of all complications noticed in the study population. Another study on complications and hypertension conducted in Saudi Arabia by M. E. K. Ahmed and I. B. El-Awad [7] carried out a cross-sectional study involving known hypertensive patients so as to find out about its complications. WHO Stage II and Stage III total organ complications were evident in 37.1% of the patients. From the study, mild-retinopathy accounted for 21.6%, followed by albuminuria (15.1%), urea elevation of more than 50mg/dl in 12.9% of the patients and 10.3% had left ventricular hypertrophy and these were the most common stage II complications [7]. Complications record availability at specialist hospitals is different from complication record at primary health centres. As more specialist availability and competency and laboratory facilities availability at primary health centre is different from the specialist hospitals. Family Medicine specialist introduction and periodical trainings and exposure certainly make some difference in complications diagnosis, management and records maintenance in the coming days.

In the study population, about 92.2% (155/168) were receiving health education. Study conducted in Makkah region highlighted about health education versus hypertension by Elzubier, Ahmed G et al [8] revealed that the problem of hypertension in diabetes could be sizeable. Many patients may remain undetected. A diligent search for diabetic subjects with elevated blood pressure should be made through an efficient system of follow up in the PHCC centers through effective health education about the disease and also about possible complications of hypertension [8]. Education also one of the important tool for bringing many changes in the health seeking behaviour of the individuals.

In the present study, about 84.6% were receiving annual health check up. study done in Aseer region by Al-Khaldi, Yahia M et al revealed that the rate of defaulter was high, which indicated an ineffective recall system. A high percentage of patients did not have annual check-ups because of assumption of the lack of laboratory facilities and poor coordination with hospitals. study revealed that the majority of hypertension patients had poorly controlled and reason could be multifactorial [9,10]. In spite of providing all basic health services at the primary health care centres timely improvement, quality annual checkups and timely laboratory facilities, patient and health care team attitude towards regular treatment, identification of the complications, record maintenance and goal towards increase life expectancy to be developed and ultimately minimizing the wasteful resources and cost effectiveness. Need large sample similar studies are required to substantiate the present study findings.

Conclusions

Based on the study results, number of hypertension complications people itself is less. Among them, ischaemic heart disease (IHD) was identified as common complication which accounts 15.3% of all complications noticed in the records. Among the hypertensive individuals, lipid profile abnormality was more. Not only hypertension and even hypertension complications itself exhibits as a “ice berg phenomenon of the disease”.

Source of Funding: None.

Conflict of Interest: None.

Ethical Clearance: Institutional ethical Committee clearance taken.

REFERENCES

1. Anderson TD. Awareness and Knowledge on Hypertension in a Rural Population, 2013. (Doctoral dissertation, Brandman University).
2. Samargandi TH. The Attitudes of Saudi Teachers Toward Teaching Physical Education for Girls at Public Schools in Jeddah, 2015.
3. Saudi Hypertension Management Society (2018). Saudi Hypertension Guidelines 2018. doi:161020170004948.

4. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, Gülmezoglu AM, Temmerman M, Alkema L. Global causes of maternal death: a WHO systematic analysis. The Lancet Global Health. 2014 Jun 1;2(6):e323-33.

5. Forhad CR, Kabir A, Biswas T, Choudhury KN, Rahman MZ, Hussain DA, Ghosh SK. Status of Lipid Profile among the Hypertensive Patients in Bangladesh. University Heart Journal. 2014;10(2):73-7.

6. Saeed AA. Anthropometric predictors of dyslipidemia among adults in Saudi Arabia. Epidemiology, Biostatistics and Public Health. 2013;10(1).

7. Ahmed ME, El-Awad IB. Blood pressure control and target organ complications among hypertensive patients in southern Saudi Arabia. Eastern Mediterranean health journal= La revue de sante de la Mediterranee orientale= al-Majallah al-sihhiyah li-sharq al-mutawassit. 2001;7(4-5):689-96.

8. Elzubier AG. Hypertension in diabetics registered in primary health care centers in Makkah district, Saudi Arabia. Journal of family & community medicine. 2000 Sep;7(3):23.

9. Al-Khaldi YM. Quality of hypertension care in the family practice center, Aseer Region, Saudi Arabia. Journal of Family and Community Medicine. 2011 May;18(2):45.

10. Al-Nozha MM, Abdullah M, Arafah MR, Khalil MZ, Khan NB, Al-Mazrou YY, Al-Maatouq MA, Al-Marzouki K, Al-Khadra A, Nouh MS, Al-Harthi SS. Hypertension in Saudi Arabia. Saudi medical journal. 2007;28(1):77-84.

Cardiac Failure in Misan, Iraq

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ABSTRACT

Background: Categorization of heart failure patients depending on left ventricular ejection fraction (by using echocardiography) is important because there are different causes, comorbid conditions, and response to management. In addition, identifying and treating these comorbidities are the main steps in managing patients with heart failure.

Objectives:

- To determine the types and stages of heart failure in Misan.
- To determine its comorbidities, consequently, reaching better management and prognosis.

Patients and Method: A cross-sectional study was conducted in Al-Sader Teaching Hospital from October 2017 to February 2018. A total number of 60 patients were diagnosed as HF cases according to the full workup (including history, thorough clinical examination, Chest x-ray, electrocardiography, and echocardiography).

Results: A total of 60 patients were diagnosed as heart failure. The distribution of patients was equal in both genders with a predominance of patient aging more than 60 years. Approximately, half of the patients had heart failure with reduced left ventricular ejection fraction and stage D. As comorbidities; about three-quarters of patients had hypertension followed by diabetes mellitus and coronary artery disorders.

Conclusion: The incidence of heart failure and comorbid conditions are increasing with age. The presence of comorbidities is more with the progression of stages in heart failure. Therefore, a frequent medical follow up with 2-Dimensional Echocardiographic evaluations should be encouraged, especially, with older patients.

Keywords: *heart failure, stages, Misan, Iraq*

Introduction

Heart failure (HF) is a clinical syndrome and can be defined as the inability of the heart to pump adequately to maintain a blood flow that can meet the total needs of the body and usually, referred to as a congestive HF [1, 2].

Commonly, patients with HF present with dyspnea, tachypnea, tachycardia, fatigue, excessive tiredness, decreased ability to exercise, and leg edema. The dyspnea is usually getting worse while doing exercise, lying down, and can awake the patient at night [3, 4].

The ejection fraction is usually used to determine the pumping effectiveness of the heart, as well as, to classify the types of HF. Additionally, it can indicate the severity of HF [5]. Therefore, the categorization of HF patients depending on left ventricular ejection fraction (LVEF) is important because there are different causes, comorbid conditions, and response to management [6].

At 2016, European Society of Cardiology classified HF into three types according to LVEF [7]:

- HF with preserved LVEF (≥50%).
- HF with mid-range LVEF (40–49%).
- HF with reduced LVEF (<40%).

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Moreover, the New York Heart Association classified HF into 4 stages: Stage A, B, C, and D depending on the objective assessment [8].

Furthermore, the comorbid conditions are highly important in patients with HF and may have a role in the treatment decision for HF (some medicines that are used in HF treatment may lead to worsening the symptoms and exacerbating the condition of HF). It is well recognized that HF with preserved LVEF is at more occurrence of comorbidities than HF with reduced LVEF. So, identifying and treating these comorbidities are the main steps in managing patients with HF [9].

For these reasons, this study had arisen to study the HF in Misan province, classifying those patients and to identify their comorbidities, consequently, reaching better management and prognosis.

Patients and Method

A cross-sectional study was conducted in Al-Sader Teaching Hospital in Misan province (South East Iraq) during a period of four months from October 2017 to February 2018.

The patients were selected from the out-patient department, from the echocardiographic unit, and from the in-patient medical department. A total number of 60 patients were diagnosed as HF cases according to the full workup (including history, thorough clinical examination, Chest x-ray, electrocardiography, and echocardiography). The required data was collected through face to face interview with patients.

Finally, an echocardiographic imaging study was done for all patients by a specialist doctor. The first echocardiographic evaluation was done to confirm the diagnosis of HF followed by a second detailed echocardiographic evaluation after the patient was stabilized.

Echocardiographic imaging was performed with GE machine, model vivid, version E9 following the recommendations and the guidelines of American Society of Echocardiography [10]. Categorization and staging of HF were done for every patient following the recommendations and guidelines [7, 8].

Exclusion criteria: any other diagnosis other than HF. In addition, any case rejected to be involved in this study or did not complete the follow-up evaluations was excluded.

The study protocol was reviewed; ethical approval and official permission were obtained from Ministry of Higher Education, College of Medicine in Misan, Misan directorate of health and Al-Sader Teaching Hospital to carry out this study. Informed written consent was obtained from each patient or from their parents. The analysis of data was carried out using Microsoft Excel and was presented in form of tables that interpreted by numbers and percentages.

Results

A total of 60 patients were diagnosed as HF. The distribution of patients was equal in both genders with a predominance of patient aging more than 60 as shown in table 1.

Regarding echocardiographic finding in this study; the patients were classified depending on LVEF. Half of the patients had HF with reduced LVEF and only 10 (16.7%) had HF with preserved LVEF as shown in table 2.

Approximately, half of the patients had stage D followed by C and B stages reaching (35.0%) and (15.0%) respectively as shown in table 3.

Regarding comorbidities associated HF; approximately, three-quarters of patients had hypertension followed by diabetes mellitus and coronary artery disorder reaching (53.3%) and (48.3%) respectively as shown in table 4.

Table 1: General characteristics of patients with HF

Characteristics	Number (%)
Age in years:	
< 60	10 (16.7%)
> 60	50 (83.3%)
Gender:	
Male	30 (50.0%)
Female	30 (50.0%)

Table 2: Classification of HF patients depending on LVEF that determined by echocardiography

Types of HF	Number (%)
HF with preserved LVEF	10 (16.7%)
HF with mid-range LVEF	20 (33.3%)
HF with reduced LVEF	30 (50.0%)
Total	60 (100%)

Table 3: Stages of HF patients depending on the objective assessment

Stages of HF	Number (%)
Stage A	1 (1.7%)
Stage B	9 (15.0%)
Stage C	21 (35.0%)
Stage D	29 (48.3%)
Total	60 (100%)

Table 4: Cardiac and non-cardiac comorbidities in patients with HF

Comorbid condition	Number (%)
Hypertension	42 (70.0%)
Diabetes Mellitus	32 (53.3%)
Coronary artery disorder	29 (48.3%)
Rheumatic fever	13 (21.7%)
Atrial fibrillation	13 (21.7%)
Chronic obstructive pulmonary disease	12 (20.0%)
Chronic renal failure	10 (16.7%)
Cerebrovascular accident	9 (15.0%)
Anemia	7 (11.7%)
Metabolic syndrome	5 (8.3%)
Thyroid disease	1 (1.7%)

Discussion

The current study revealed that there was more risk of developing HF with increasing age of patients in which there were 50 cases (of total 60) older than 60 years and this was in accordance with different studies [11, 12].

Additionally, this study showed that the distribution of patients was equal in both genders whereas Gerber et al study reported a predominance of the male gender in HF cases, especially, in HF with reduced LVEF [12].

Regarding echocardiographic finding in this study; the patients were classified depending on LVEF. The prevalence of HF with preserved LVEF increased significantly in the last decades [13] but the present study revealed that half of the patients had HF with reduced LVEF and only 16.7% had HF with preserved LVEF. These rates were different from other studies which reported about 30–55% of patients had HF with preserved LVEF [14, 15]. Nevertheless, more morbidity and mortality were reported in HF patient with preserved LVEF than those of reduced LVEF [15, 16].

The presence of comorbid conditions was more with the progression of stages in heart failure. Additionally, imaging studies, especially, the 2-Dimensional Echocardiography was essential in categorizing and staging the cases of heart failure.

Approximately, the vast majority (70.0%) had hypertension in this study followed by diabetes mellitus and coronary artery disorder reaching (53.3%) and (48.3%) respectively. The same sequence of commonest comorbid condition was seen with a similar study in Brazil but with fewer rates [17].

Some patient had one or two combined diseases or more together and this would increase the morbidity and make a worse prognosis.

It is of note that such diseases like hypertension, diabetes mellitus, and coronary artery disease are usually increasing with aging and most of the patients in the current study were older than 60 years so more risk to have HF and more risk for comorbidities, subsequently, poor outcome.

In addition, this study revealed the presence of non-cardiac diseases like renal, metabolic, anemia, and thyroid disease associated with HF. It was found that even the non-cardiac comorbidities would increase the risk of death, particularly, in HF patient with preserved LVEF [13, 18].

A further study to follow up those patients to report their outcome is recommended in the future.

Conclusion

The incidence of heart failure and comorbid conditions are increasing with age. The presence of comorbidities is more with the progression of stages in heart failure. Therefore, a frequent medical follow up with 2-Dimensional Echocardiographic evaluations should be encouraged, especially, with older patients.

Conflict of Interest: No conflict of interest

Source of Funding: Not funded.

REFERENCES

1. Tavazzi L. Towards a more precise definition of heart failure aetiology. Eur Heart J; 2001; 22: 194–5.
2. Zile MR, Baicu CF, Bonnema DD. Diastolic heart failure: definitions and terminology. Prog Cardiovasc Dis. 2005;47(5):307–13.
3. Ponikowski P, Jankowska EA. Pathogenesis and clinical presentation of acute heart failure. Rev Española Cardiol (English Ed. 2015;68(4):331–7.
4. Shiba N, Nochioka K, Miura M, Kohno H, Shimokawa H, Investigators C-2. Trend of westernization of etiology and clinical characteristics of heart failure patients in Japan. Circ J. 2011;75(4):823–33.
5. Cikes M, Solomon SD. Beyond ejection fraction: an integrative approach for assessment of cardiac structure and function in heart failure. Eur Heart J. 2015;37(21):1642–50.
6. Butler J, Fonarow GC, Zile MR, Lam CS, Roessig L, Schelbert EB, et al. Developing therapies for heart failure with preserved ejection fraction: current state and future directions. JACC Hear Fail. 2014;2(2):97–112.
7. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JGF, Coats AJS, et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. Eur J Heart Fail. 2016;18(8):891–975.
8. Levin R, Dolgin M, Fox C, Gorlin R. The Criteria Committee of the New York Heart Association: Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. LWW Handbooks. 1994;9:344.
9. Paulus WJ, Tschöpe C. A novel paradigm for heart failure with preserved ejection fraction: comorbidities drive myocardial dysfunction and remodeling through coronary microvascular endothelial inflammation. J Am Coll Cardiol. 2013;62(4):263–71.
10. Hahn RT, Abraham T, Adams MS, Bruce CJ, Glas KE, Lang RM, et al. Guidelines for performing a comprehensivetransesophagealechocardiographic examination: recommendations from the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. J Am Soc Echocardiogr. 2013;26(9):921–64.
11. Young JB. The global epidemiology of heart failure. Med Clin. 2004;88(5):1135–43.
12. Gerber Y, Weston SA, Redfield MM, Chamberlain AM, Manemann SM, Jiang R, et al. A contemporary appraisal of the heart failure epidemic in Olmsted County, Minnesota, 2000 to 2010. JAMA Intern Med. 2015;175(6):996–1004.
13. Henkel DM, Redfield MM, Weston SA, Gerber Y, Roger VL. Death in heart failure: a community perspective. Circ Hear Fail. 2008;1(2):91–7.
14. Hogg K, Swedberg K, McMurray J. Heart failure with preserved left ventricular systolic function: epidemiology, clinical characteristics, and prognosis. J Am Coll Cardiol. 2004;43(3):317–27.
15. Owan TE, Hodge DO, Herges RM, Jacobsen SJ, Roger VL, Redfield MM. Trends in prevalence and outcome of heart failure with preserved ejection fraction. N Engl J Med. 2006;355(3):251–9.
16. Curtis JP, Sokol SI, Wang Y, Rathore SS, Ko DT, Jadbabaie F, et al. The association of left ventricular ejection fraction, mortality, and cause of death in stable outpatients with heart failure. J Am Coll Cardiol. 2003;42(4):736–42.
17. Koike MK, Silva V, Romanek FARM, Shirassu MM. Relationship of comorbidities and heart failure mortality in the city of São Paulo, Brazil. MedicalExpress. 2016;3(2).
18. Lee DS, Gona P, Albano I, Larson MG, Benjamin EJ, Levy D, et al. A systematic assessment of causes of death after heart failure onset in the community: impact of age at death, time period, and left ventricular systolic dysfunction. Circ Hear Fail. 2011;4(1):36–43.

Dilated Cardiomyopathy in Children

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ABSTRACT

Background: Dilated cardiomyopathy in pediatrics age group is considered as a serious problem with variable prognosis. There are few studies for this issue in Iraq and no previous local study.

Objectives:

- To determine the associated risk factors, clinical presentation in dilated cardiomyopathy.
- To determine its characteristic electrocardiographic and echocardiographic findings.

Patients and Method: A hospital-based cross sectional study conducted during a period of three years from 2009 to 2012 in Misan, Iraq. The diagnosed cases of dilated cardiomyopathy were selected from the referred patients for an echocardiographic evaluation in Al-Sader Teaching Hospital with suspicion of either dilated cardiomyopathy or heart failure. A full history, thorough clinical examination, Chest X-ray, electrocardiography, 2D-Echocardiography were done for all cases.

Results: Children with dilated cardiomyopathy presented with variable symptoms but congestive heart failure was the most common. Male was more predominant than female with median age of 11 ± 2.605 years. Different electrocardiographic findings but tachyarrhythmia was the commonest.

In echocardiography, left atrial size was positively correlated with left ventricular function and the majority had mitral valve regurgitations.

Conclusion: Dyspnea and heart failure were the most common presenting symptoms in children with dilated cardiomyopathy. NYHA class III heart failure was common causing more morbidity and mortality in those patients. Additionally, imaging studies, especially, the 2-Dimensional Echocardiography was essential in confirming the diagnosis.

Keywords: *Dilated cardiomyopathy, children, Misan*

Introduction

Dilated cardiomyopathy (DCM) is the commonest type in pediatrics [(1)]. The incidence in children is reported to be 0.34 to 0.73 per 100.000 per a year [(2)] while in adult; it was found to be 6.95/100.000 per a year as reported by another study in Europe [(3)]. Patients with DCM is usually presented with progressive heart failure with insidious onset but may present as acute onset in about 25% of patients, if associated with lower respiratory infection [(2)]. Cough, shortness of breath, wheezing, irritability, and poor feeding are usually the primary symptoms. Easy fatigability, growth failure, decreased urine output, and pallor may occur [(4)]. Other clinical presentations which occur in about 20% of patients are the following: palpitation, chest pain, orthopnea, hemoptysis, abdominal pain, neurologic deficit, and syncope [(4)]. About half of cases of DCM are preceded by a history of upper respiratory tract infection which is usually of viral origin [(5)]. Coxsackie B (serotypes 1 to 6) is the commonest virus causing DCM in children. Other viruses such as enterovirus, adenovirus, influenza,

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and rubella are implicated in myocarditis [5]. In addition, familial cardiomyopathy is positive in about 25% of patients [6].

Sometime, DCM is misdiagnosed in pediatrics age group as an upper respiratory tract infection and patient may receive false management for a long time [7]. Moreover, DCM has substantial morbidity, as well as, mortality [8]. Initially, it is well known that one-third of affected DCM cases would die, other third would improve, and the last third would have a chronic disease [7]. So predicting the outcome of DCM is an important in its management as revealed by different studies [9, 10, 11]. For these reasons, this study had arisen to have a baseline data about the natural history of DCM in children in Misan and to determine the characteristic echocardiographic findings.

Patients and Method

A hospital-based cross sectional study conducted during a period of three years from 2009 to 2012 in Misan province (South East Iraq).

The diagnosed cases of DCM were selected from the referred patients (54 cases) for an echocardiographic evaluation in Al-Sader Teaching Hospital with suspicion of either DCM or heart failure. A full history, thorough clinical examination, Chest x-ray, electrocardiography, 2D-Echocardiography were done for all cases. Finally, only 44 cases were diagnosed as DCM and included in the current study.

The first echocardiographic evaluation was done at the referral time to confirm diagnosis of DCM followed by a second detailed echocardiographic evaluation after the patient was stabilized.

Echocardiographic imaging was performed with GE machine, model vivid, version E9 following the recommendations and the guidelines of American Society of Echocardiography [12].

Different electrocardiographic and echocardiographic characteristics of those patients were recorded.

According to the New York Heart Association (NYHA) classification [13], the patients were classified into 4 groups:

NYHA 1: angina, dyspnea, syncope, or palpitation (ADSP) at more than usual physical activity

NYHA 2: ADSP at usual/ordinary physical activity.

NYHA 3: ADSP at less than usual physical activity.

NYHA 4: ADSP at rest or with minimal activity.

Inclusion criteria: age is between 1-12 years, both gender, symptomatic, all patients had left ventricular 2D- ejection fraction (2D-LVEF) < 0.45.

Exclusion criteria: shortness of breath and/or heart failure due to asthma, congenital heart disease, valvular heart lesion, anemia, active pulmonary tuberculosis, and any other diagnosis other than DCM. In addition, any case rejected to be involved in this study or did not complete the follow-up evaluations was excluded.

The study protocol was reviewed; ethical approval and official permission were obtained from Ministry of Higher Education, College of Medicine in Misan, Misan directorate of health and Al-Sader Teaching Hospital to carry out this study. An informed written consent was obtained from each patient or from their parents.

The analysis of data was carried out using Microsoft Excel and was presented in form of tables and figures.

Results

A total of 44 patients with median age of 11 ± 2.605 years were diagnosed as DCM. A predominance of male and negative family history of the same illness was seen as shown in table 1.

All patients were symptomatic and the majority was presented with congestive heart failure at the time of evaluation as shown in figure 1.

According to the NYHA classification**;** the patients were classified into 4 groups: the majority was from NYHA 3 reaching 55% followed by NYHA 2 (32%) as shown in figure 2.

Regarding electrocardiographic finding in this study; tachyarrhythmia was the commonest. Irregular rhythm was recorded in a total of 15(34%) patients while atrial fibrillation only was found in 6(13.6%) patients. On the other hand, all the characteristic findings of echocardiography were shown in table 2.

Valvular regurgitation was a common problem. The majority has mitral and tricuspid valve regurgitations as shown in table 3.

Table 1: Characteristics of patients with dilated cardiomyopathy

Characteristics	Number (%)
Age in years:	
1-5	4 (9.1%)
5-12	40 (90.9%)
Mean Age ± SD	11 ± 2.605
Gender:	
Male	27 (61.4%)
Female	17 (38.6%)
Family history of DCM:	
Yes	4 (9.1%)
No	40 (90.9%)

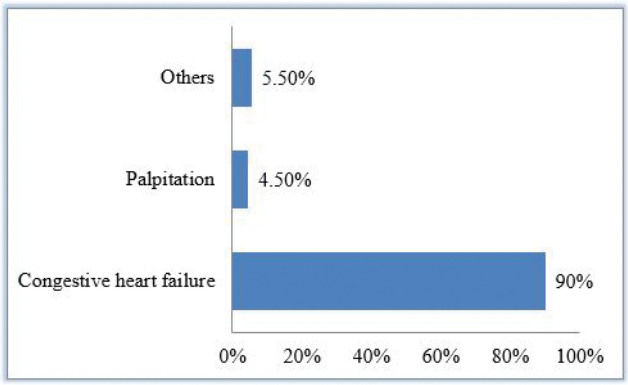


Figure 1: The clinical presentation in patients with DCM

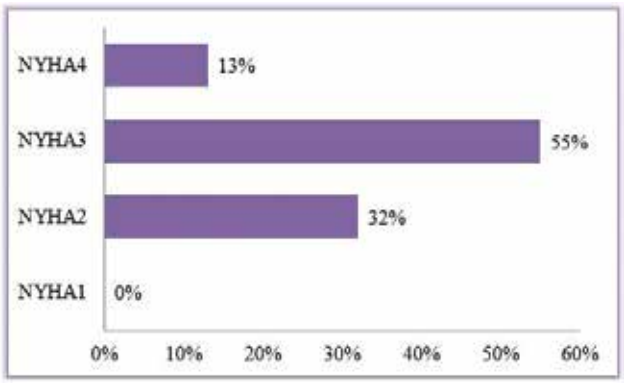


Figure 2: Functional classification of heart failure at the referral time according to NYHA classification

Table 2: Characteristic findings of electrocardiographic and echocardiographic evaluations

Parameter/ECG findings		Number (%)
Heart rate (beats/minute)	≤ 100	4 (9.09%)
	101-120	14 (31.82%)
	121-130	21 (47.73%)
	≥ 131	5 (11.36%)
Rhythm	Regular	29 (65.9%)
	Irregular	15 (34.1%)
Irregular rhythm	Atrial fibrillation	6 (13.6%)
Bundle branch block (BBB)	Lt.BBB	6 (13.6%)
	Rt.BBB	3 (6.9%)
Parameter/echocardiographic findings		Number (%)
2D- Ejection fraction %	<30%	3 (6.82%)
	30-40%	15 (34.09%)
	>40-50 %	22 (50.0%)
	>50 %	4 (9.09%)
*Mean LA dimension (cm)	≤ 2.6	0
	2.7-3.1	8 (18.18%)
	3.2-3.6	32 (72.73%)
	3.7- ≥ 4.1	4 (9.09%)
*LVID (cm) Mean	4.0-4.5	3 (6.82%)
	4.6-5.0	15 (34.09%)
	5.1-5.5	22 (50.0%)
	≥ 5.5	4 (9.09%)
*LVIDs (cm) Mean	1.35- 1.85	3 (6.82%)
	1.86-2.1	15(34.09%)
	2.2-2.7	22 (50.0%)
	2.8-3.2	4 (9.09%)

Conted…

*Normal value (range) for echocardiographic measurements from reference guidelines [14].

Table 3: Types of valve regurgitations detected by echocardiography

Valve	Number (%)
Mitral	17 (36.36%)
Tricuspid	15 (34.09%)
Combined mitral and aortic	5 (11.36%)
Aortic	1 (2.27%)

Discussion

The current study enrolled a total number of 44 pediatrics age group patients with median age of 11 ± 2.605 years and male predominance. Those cases were presented with dyspnea and during clinical evaluation aided by other imaging studies were diagnosed as DCM.

Different clinical presentations were found but dyspnea and congestive heart failure were the commonest

clinical presentation of DCM. Unfortunately, more than half of congestive heart failure patients were of NYHA class III heart failure (according to NYHA classification) [13] in which more morbidity and mortality were found.

These findings were against Puggia et al study, in which it revealed that pediatrics DCM had less severity in comparison with adult, less LBBB, and short duration of heart failure. This may be explained by the late diagnosis in this study, because most of cases presented initially with NYHA class III heart failure [15].

Regarding electrocardiographic finding in this study; tachyarrhythmia was the commonest. Irregular rhythm was recorded in a total of 15(34%) patients while atrial fibrillation only was found in 6(13.6%) patients. Arrhythmia was a common cause of death in DCM with heart failure functional Class NYHA class III and this was compatible with Dimas et al study [16].

This study revealed that most cases are of idiopathic origin and associated with negative family history of DCM which was in accordance with different studies [15, 17, 18].

According to the World Health Organization, DCM is characterized by dilatation and impaired contraction of the left ventricle or both ventricles [19].

Regarding echocardiography, the present study showed that left atrial size was positively correlated with left ventricular function and the majority had mitral valve regurgitations. Therefore, 2-Dimensional Echocardiography is essential in the diagnosis, as well as, a good predictor in prognosis.

Conclusion

Dyspnea and heart failure were the most common presenting symptoms in children with dilated cardiomyopathy. NYHA class III heart failure was common causing more morbidity and mortality in those patients. Additionally, imaging studies, especially, the 2-Dimensional Echocardiography was helpful in confirming the diagnosis.

Conflict of Interest: No conflict of interest.

Source of Funding: Not funded.

REFERENCES

1. Lipshultz SE, Sleeper LA, Towbin JA, Lowe AM, Orav EJ, Cox GF, et al. The incidence of pediatric cardiomyopathy in two regions of the United States. N Engl J Med. 2003;348(17):1647–55.
2. Towbin JA, Lowe AM, Colan SD, Sleeper LA, Orav EJ, Clunie S, et al. Incidence, causes, and outcomes of dilated cardiomyopathy in children. Jama. 2006;296(15):1867–76.
3. Elliott P, Andersson B, Arbustini E, Bilinska Z, Cecchi F, Charron P, et al. Classification of the cardiomyopathies: a position statement from the European Society Of Cardiology Working Group on Myocardial and Pericardial Diseases. Eur Heart J. 2007;29(2):270–6.
4. Daubeney PE, Nugent AW, Chondros P, Carlin JB, Colan SD, Cheung M, et al. National Australian Childhood Cardiomyopathy Study. Clinical features and outcomes of childhood dilated cardiomyopathy: results from a national population-based study. Circulation. 2006;114(24):2671–8.
5. Vishwanathan L, Sridhar M. Preventable cause of dilated cardiomyopathy in children. Apollo Med. 2011;8(4):315–6.
6. Keeling PJ, Gang Y, Smith G, Seo H, Bent SE, Murday V, et al. Familial dilated cardiomyopathy in the United Kingdom. Heart. 1995;73(5):417–21.
7. Nogueira G, Pinto FF, Paixao A, Kaku S. Idiopathic dilated cardiomyopathy in children: clinical profile and prognostic determinants. Rev Port Cardiol orgao Of da Soc Port Cardiol Port J Cardiol an Off J Port Soc Cardiol. 2000;19(2):191–200.
8. Weng K-P, Lin C-C, Huang S-H, Hsieh K-S. Idiopathic dilated cardiomyopathy in children: a single medical center's experience. J Chinese Med Assoc. 2005;68(8):368–72.
9. Huh J, Noh C Il, Yun YS. The usefulness of surface electrocardiogram as a prognostic predictor in children with idiopathic dilated cardiomyopathy. J Korean Med Sci. 2004;19(5):652–5.
10. Azevedo VMP, Albanesi F, Manes F, Santos MA, Castier MB, Tura BR. How can the echocardiogram be useful for predicting death in children with idiopathic dilated cardiomyopathy? Arq Bras Cardiol. 2004;82(6):505–9.
11. McMahon CJ, Nagueh SF, Eapen RS, Dreyer WJ, Finkelshtyn I, Cao X, et al. Echocardiographic

predictors of adverse clinical events in children with dilated cardiomyopathy: a prospective clinical study. Heart. 2004;90(8):908–15.

12. Hahn RT, Abraham T, Adams MS, Bruce CJ, Glas KE, Lang RM, et al. Guidelines for performing a comprehensivetransesophagealechocardiographic examination: recommendations from the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. J Am Soc Echocardiogr. 2013;26(9):921–64.
13. Levin R, Dolgin M, Fox C, Gorlin R. The Criteria Committee of the New York Heart Association: Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. LWW Handbooks. 1994;9:344.
14. Overbeek LIH, Kapusta L, Peer PGM, De Korte CL, Thijssen JM, Daniels O. New reference values for echocardiographic dimensions of healthy Dutch children. Eur J Echocardiogr. 2006;7(2):113–21.
15. Puggia I, Merlo M, Barbati G, Rowland TJ, Stolfo D, Gigli M, et al. Natural history of dilated cardiomyopathy in children. J Am Heart Assoc. 2016;5(7):e003450.
16. Dimas VV, Denfield SW, Friedman RA, Cannon BC, Kim JJ, Smith E, et al. Frequency of cardiac death in children with idiopathic dilated cardiomyopathy. Am J Cardiol. 2009;104(11):1574–7.
17. Wettrell G. Dilated cardiomyopathy of unknown cause in young patients: risk evaluation, possible etiologies, and treatment. Libyan J Med. 2007;2(4):157.
18. Kindel SJ, Miller EM, Gupta R, Cripe LH, Hinton RB, Spicer RL, et al. Pediatric cardiomyopathy: importance of genetic and metabolic evaluation. J Card Fail. 2012;18(5):396–403.
19. Weintraub RG, Nugent AW, Davis A, King I, Bharucha T, Daubeney PEF. Presentation, echocardiographic findings and long-term outcomes in children with familial dilated cardiomyopathy. Prog Pediatr Cardiol. 2011;31(2):119–22.

Effect of Exercise and Body Mass Index (B.M.I.) on Fitness

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ABSTRACT

Background: Both Body Mass Index (B.M.I.) and fitness level are very important factors affecting risk of many disease or infections such as hypertension especially in obese men(overweight) without any exercise, therefore aim of current study were study the role of both exercise and Body Mass Index (B.M.I.) on the Fitness.

Material and Method: This study has been done upon (180) students in Nursing department (70) males, (110) females, their age ranged between (18-24) years.

Findings: Current study found 55(25 males,30 females) have high level of fitness with B.M.I. ranges between (18 – 30Kg/m^2) and all them always do physical exercise daily. The study showed 80(35 males, 45 females) with less fitness depending on time required to return to rest values of vital signs (25) of them do exercise every day,but (55) don't do any physical activity. Also the study indicates that (45) of sample (10 males, 35 females) have low fitness with B.M.I. ranges between (22-30 Kg/m^2) without any physical activity.

Conclusion: (50%) of the sample of both sex were practise proper sports and average body mass is (19-26 k.g/s.m) is the best concerning physical activity, the level of physical fitness decreases if body mass exceeds (26 k.g/m^2)and proper sports exercises can lessen the negative impact of overweight on physical fitness.

Keyword: *Exercise; Body Mass Index: (B.M.I.) and Fitness*

Introduction

Gymnastic or sports exercises make a series of body self-responses which improve the vascular cardiac system, and play an important role in treating many morbid cases without the use of drugs such as pulse rates, breathing, blood pressure, muscle strength, and sustaining physical fitness.[1] The impact of gymnastic exercises by (10) minutes a day for three successive days is the same as that of the physical fitness when practiced by two minutes a day for (15) days or one minute for (30) days and there was a considerable decrease in weight and increase in vital capacity.[2] Hypertension is of the health challenges all over the world, different epidemic studies indicate that that leads to diseases of blood vessels and kidneys and others. Treating hypertension lessens the risk of the results incurred on being infected with these diseases and the organized gymnastic exercises have played an important role to treat high blood pressure by the use of drugs and clinical results confirm the usefulness of practicing sports on the long run.[3] When comparing physical fitness levels between two groups, the first consists of ordinary people and the second of people suffering from over-weight, when they run for one mile and then taking measure criteria (age, length, weight, and body mass) there was an abstract sharp difference between the two groups as pulse average and blood pressure of each group.[4]

Weak physical fitness among children and adolescents is an important factor that cause health problems in blood vessels later on among middle aged people and develop to other diseases and there is a relation with body mass among normal adolescents and their physical fitness.[5]

Proper sport practice depending on body building and enduring exercises has positive results in that part of the extra energy leaks the thing that improves muscle functions and body systems, practicing bodily exercises for (30) minutes everyday leads to burning sugar molecules as hard labour is sufficient to burn the same amount of sugars.[6]

Sport exercises practicing in fresh air increases the vital capacity which leads to a lot of health benefits, and when using three kinds of labour methods to

distinguish benefits, there was an absolute coincidence with laboratory examinations of blood vessels safety and respiratory system due to the amount of oxygen and comparing it against the standard volume at rest.[7] The impact of these exercises on lessening blood pressure varies in general, when asking normal women and others with high blood pressure to practice trunk, legs, knee and dual muscles exercises during three various periods, the fall in the systolic pressure was obvious in some of these exercises whereas no such thing happened in both groups while practicing other exercises. [8]

The mass of the body has a negative impact when exceeding (30k.g/s.m). When comparing the nutritional state with body mass of a number of university students in Nigeria for a complete year, the laboratory analyses indicate negative effects as to the various body systems.[9] Obesity is one of the increasing health problems in Canada and decreasing it is of the important factors to specify the relation between physical fitness and the working of both the vascular and respiratory systems in the proper manner, and keeping body mass does not lead to obesity in the future. [10] When testing the impact of body weight on the level of physical fitness of many personnel of the marines in Croatia aged (27) with body mass (86.2k.g/m^2), there was an adverse relation between fat rate and three tests connected with physical fitness. In the light of that the weight administration programme was allocated to decrease the appropriate amount on the long run to enable those people to live in the environment and the kind of work they practice.[11] Dancing in fresh air has a positive impact on the blood vessels, when a three-month- dancing programme was conducted on many women ranging from twenty years to twenty-five, there was a positive effect on the systolic and diastolic blood pressure and the average number of inhaling and exhaling per minute which allows entering a larger amount of oxygen. [12]

The aim of study is encouragement people to do continuously exercise to keep normal B.M.I to get highest fitness.

Material and Method

The weight and the length of (180) students were measured, (70) of them are males and (110) females, their age ranged from (18-24) years. Then the body mass was calculated by dividing weight (k.g) by length (cm) then measuring the vital signs for each one of them which are pulse, breathing and blood pressure at complete rest by using (sphygmomanometer and stethoscope).

After that each individual was exposed to physical stress by using the (treadmill) at 7 k.m/h for ten minutes, then directly after the exercise all the vital signs were measured and the time was also measured for the rates to move from a state to state, the criterion used to measure physical fitness was the least time required for the rates to return to their initial state.

Findings

When the experiment was conducted on (180) students at the Nursing Department (70/38%) males whose body masses ranged from (17-30 k.g/m^2), and (110/62%) females whose body masses ranged from (17-33 k.g/m^2).

Table 1: Sample as Gender and Body Mass Index (B.M.I)

Gender	No.	%	B.M.I kg/m^2
Male	70	38%	(17-30)
Female	110	62%	(17-33)
Total	180	100%	

Table (1) showed that people who were in rest their vital signs was within normal range for males (pulse 78/ min, respiration rate 19/min, blood pressure 120/80) and for females (pulse 78/min, respiration rate 16/min, blood pressure120/80) and after exercise there was clear increase in all signs for both sex, for males (pulse 120/ min, respiration rate 40/min, blood pressure 140/80) and for females (pulse 111/min, respiration rate 36/min, blood pressure 130/80)

Table 2: Average of vital signs before and after exercise

Gender	Vital signs during rest			Vital signs after exercise		
	Pulse Beats/ minute	Respiratory rate Once/minute	Blood pressure mm./Hg.	Pulse Beats/ minute	Respiratory rate Once/minute	Blood pressure mm./Hg.
Male	78	16	120/80	120	40	140/80
Female	78	19	120/80	111	36	130/80

In this table (2) illustrate the increased the vital signs (Pulse; Respiratory rate, and Blood pressure) after exercise compared to during rest

Table 3: Sample who having long practise and haven't

Gender	Have practise		Don't have practise		Total
	No.	%	No.	%	
Male	45	50%	25	27.8%	70
Female	45	50%	65	72.2%	110
Total	90	100%	90	100%	180

Results in table -3 showed that both males and females (No.= 45, 50%) were get good practise for suitable period, so females who do not have practise (No.= 65, 72.2%) more than male (No.= 25, 27.8%).

Table 4: Person who have highest physical fitness with good practise

Gender	No.	B.M.I kg/m^2								
		18	19	21	22	24.8	25	26	29.5	30
Male	25	—	6	4	—	7	3	5	—	—
Female	30	8	—	8	5	—	2	—	5	2
Total	55	8	6	12	5	7	5	5	5	2

From the above results, it was seen that the students with the highest physical fitness were those who lasted five minutes to return to the rest rates and their number was (55)-25males and 30females, with body mass (19-26k.g/m^2) for males, and (18-30) for females and all practise proper sports as is illustrated in table (4).

Table 5: Person who have medial physical fitness

Gender	No.	B.M.I kg/m^2										
		17	18	20	22.6	23	24.8	25	25.5	26	27	28
Males have practise	10	—	—	—	6	—	—	—	—	—	—	4
Males haven't practise	25	3	—	7	—	—	4	6	5	—	—	—
Females have practise	15	—	—	3	—	7	—	5	—	—	—	—
Females haven't practise	30	4	6	10	—	—	—	—	—	5	5	—
Total	80	7	6	20	6	7	4	11	5	5	5	4

Table (5) showed that (80) of the sample were have medial physical fitness and they needed (6-7) minutes. Of them (25) practise regular sports and (55) do not and the body mass of this group were (17-28 k.g/m^2).

Table 6: Person who have least physical fitness

Gender	No.	B.M.I kg/m^2					
		22	23	26.9	27	28	30
Males have practise	10	3	—	—	—	—	7
Males haven't practise	—	—	—	—	—	—	—
Females have practise	—	—	—	—	—	—	—
Females haven't practise	35	5	5	3	7	5	10
Total	45	8	5	3	7	5	17

As for the group with the least physical fitness as in table No.(6), of them were (45) as (10 Males and 35 Females) where it took them (8-12) minutes to return to the initial state, most of them were of those who do not practise proper sports and their body mass were (22-30 k.g/m^2).

Discussion

Physical activity is considered one of the important factors that lead to the loss calories that are not needed by the body –the surplus- and preventing fat from concentrating in various body tissues which leads to increase of endurance and physical fitness. The study has revealed that the individuals with the highest fitness are those who practise proper sports exercises everyday, Of the dependable criteria to measure fitness as in our study are pulse rates, breathing, blood pressure, and the time required to return to the rest state and here there is one of the most important indicators to specify the level of the physical fitness besides other criteria as oxygen consumption.[13]

Using up to date devices such as the (treadmill) to gauge the labour has an important effect in getting the results of the students at the preparatory and university stages. It is of benefit in increasing the capacity to endure and strengthening muscles especially legs and trunk muscles and this was emphasised by similar studies in this regard. [14]

Body mass has a noticeable effect on some of the elements of physical fitness. In our research it is noticed that those with a certain body mass can continue doing the exercise using the (treadmill) device longer than the time determined in the research and did not get tired on the contrary to those with larger body mass and this coincides with other studies. [10,15]

The study shows that the individuals with the least fitness do not practise proper sports and their body masses are larger than normal. Those people with medial fitness according to the criteria of the research were practising some physical activities yet improperly. We believe that physical activity lessens the negative impact of body mass which is larger than usual and this is confirmed by other studies. [6]

Conclusions

(50%) of the sample of both sex were practise proper sports and average body mass is (19-26 k.g/m^2) is the best concerning physical activity, the level of physical fitness decreases if body mass exceeds (26 k.g/m^2)and proper sports exercises can lessen the negative impact of overweight on physical fitness.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

REFERENCES

1. Monteiro MF, Filho DC. Physical exercise and blood pressure control. Rev Bras Med. 2014; 10: 517-519.
2. Schmidt WD, Craig JB, Kalscheuer LK. Effects of long versus short bout exercise on fitness and weight loss in overweight females. Journal of American College of Nutrition. 2001; 20: 494-501.
3. Ferdinando I, Maurizio V. Effect of exercise training in essential arterial hypertension. Rev. Bras Hipertens. 2010;17: 68-71.
4. Masomeh K, Morteza J, Bita M K. Comparison of physical fitness level among normal weight and obese female university students. Annals of Biological Research. 2011; 2:126-133.
5. Laxmi CC., MB BS. A study of effect of body mass index on cardiorespiratory fitness in young males. Rajiv Gandhi University of Health Sciences. Bangalore, Karnataka. 2008.
6. Michael RS, Tom HMD. Selecting and effectively using hydration for fitness. American College of Sport Medicine. 2011.
7. Luc V, Johan LP. How to assess physical activity ? How to assess physical fitness ?. European Journal of Cardiovascular Prevention and Rehabilitation. 2005; 12: 102-114.
8. Michele MF. The effect of resistance exercise on recovery blood pressure in normotensive and borderline hypertensive women. Journal of Strength and Conditioning Research.2001; 5: 210-216.
9. Raphael AA, Ephriam PI. The effect of body weight, percentage body fat and body mass. Index on adolescent Academic performance Nature and Science.2010; 8: 36-42.

10. Brien SE, Cora LC. Cardiorespiratory fitness and body mass index as predictors of substantial weight gain and obesity. Canadian Journal of Public Health. 2007; 98: 121-124.

11. Goran S, Igor J, Daniel B, Dinko V J, Dra H. Impact of body composition on performance in fitness tests among personnel of the Croatian navy. Coll Antropol Original.2011; 35: 335-339.

12. Radmila K, Ratomir D. Changes in the cardiovascular fitness and body composition of women under the influence of the aerobic dance. Physical Education and Sp.2006; 1: 59-71.

13. Al-Hazzaa H. Measurement of physical activity and energy expenditure in human. Arab Journal of Food & Nutrition.2005;6(13):26-50

14. Ziad Z. Relationship of body mass index with some elements of physical fitness and maximum oxygen consumption. An-Najah University Journal for Research Humanities.2011;24(9).

15. Jamal S, Alatrash M. Body composition and resting metabolic rate among team and individual games players at An- Najah National University. An-Najah University Journal for Research Humanities.2011; 25(6).

Analysis of Related Factors with Anxiety Occurrence in Population with the Risk of Coronary Heart Disease in Indonesia

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ABSTRACT

Background: Anxiety is one of the psychological factors as an independent factor of predictors coronary heart disease (CHD) and proven to play a strong role in increasing the risk of CHD doubling.

Aim: Objective of the study is to identify the relationship of socioeconomic status, type of personality and coping mechanism with anxiety occurrence in population with the risk of CHD.

Method: The study used analytical observation with cross sectional approach. The respondents were 111 individuals with the risk of coronary heart disease. The sampling method was purposive sampling. The study was conducted in Malang, Indonesia on April 2018.

Result: Spearman rank correlation test showed a significant relationship between socioeconomic status (p=0.009), type of personality (p=0.038) and coping mechanism (p=0.000) with anxiety occurrence in population with the risk of CHD. Logistic regression test showed that coping mechanism is the most correlation factor with anxiety occurrence in population with CHD risk (OR=5.343) compared with other factor. It is important to provide skills of coping mechanism for population with the risk of coronary heart disease.

Keywords: *socioeconomic status, personality, coping mechanism, anxiety, coronary heart disease, risk*

Introduction

The high prevalence of morbidity and mortality due to coronary heart disease (CHD) became a major health problem in various countries of the world including Indonesia. World Health Organization (WHO) data from 2012 shows that of 56.5 million deaths worldwide, 31% are due to cardiovascular disease where 42.3% is caused by CHD[1]. CHD became the highest cause of death at all ages in Indonesia of 12.9% with a prevalence of 1.5% and the number continues to increase with age (highest group at age 65-74 years). The highest incidence of the majority in women, the population not in school, not working, urban domicile, and low economic status[2].

Epidemiological studies have a clear influence on the risk of CHD, ie irreversible risk factors such as age, sex, ethnicity, genetics, geography and change of life, as well as changeable risk factors such as hypertension, hypercholesterolemia, diabetes, obesity, diet, smoking, exercise, lifestyle, social circumstances and psychological factors[3]. Psychological factors such as stress anxiety and depression are predictor independent factorsand are twice as likely to increase the risk of developing CHD[4]. Acute anxiety leads to hyperventilation resulting in seizures in the heart muscle, increased sympathetic nervous system work and triggering episodes of ventricular arrhythmias that affect cardiovascular health and trigger CHD. Anxiety increased neuroendocrine and platelet activation[5,6].

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Factors that affect anxiety consisting of intrinsic factors such as age, experience undergoing treatment and personality type[7]. While extrinsic factors are medical condition or disease diagnosis, and access of information, adaptation process or coping mechanism, socioeconomic status and family disease history. Factors of experience undergoing treatment and diagnosis of disease occur in someone who has suffered from CHD. While the study of this study is a factor that affects the incidence of anxiety in healthy populations that have risk factors for CHD such as age, sex, family heart disease history, knowledge, socioeconomic status, type of personality and coping mechanism.

Methodology

The study used analytical observational design with cross sectional approach. The respondents were 111 individuals with coronary heart disease risk selected using the purposive sampling method. The study was conducted in Kota Lama, a sub-region in Kedungkanandg, Malang City, Indonesia on April 2018. The instrument was questionnaire. Bivariate analysis and spearman rank correlation were used to identify relationship between socioeconomic status, type of personality and coping mechanism with anxiety in population with coronary heart disease risk, while multivariate analysis and logistic regression test were used to identify the most significant factor.

Findings

Table 1: General Characteristics of Respondents by Age

	N	Mean	Minimum	Maximum	Standard Deviation (SD)
Age (year)	111	52.36	27	78	11.722

Source: Primary Data (2018)

Table 1 showed that the average age of respondents is 52.36 years with a standard deviation of 11,722. The youngest age of 27 years and the oldest age of 78 years.

Table 2: Distribution of Respondent Characteristics and Variable

Characteristics	%
Socioeconomic status	
Low	28.8
Medium	36.9
High	34.2
Total	100
Type of Personality	
Type A	18.0
Type B	35.1
Type C	27.9
Type D	18.9
Total	100
Coping Mechanism	
Poor	38.7
Good	61.3
Total	100
Anxiety	
Anxious	61.3
Not Anxious	38.7
Total	100

Source: Primary Data (2018)

Table 2 showed that from 111 respondents, most with moderate socioeconomic status (41.9%), most with type B personality (39.1%), almost half with less coping mechanism (43.7%), and most experienced anxiety is 68 people (61.3%).

Table 3: Spearman Rank Correlation Test Results Between Socioeconomic Status, Type of Personality and Coping Mechanism with Anxiety Occurrence in Population with The Risk of CHD

Variable	Anxiety	
	r	p
Socioeconomic Status	0.247	0.009
Type of Personality	-0.197	0.038
Coping Mechanism	0.367	0.000

Source: Primary Data (2018)

Table 3 shows the p value < α (0.05) meaning that there is a significant relationship between socioeconomic status, type of personality and coping mechanisms with

anxiety occurrence in population with the risk of CHD in Malang.

Table 4: Logistic Regression Test Results Factors Most Associated with Anxiety Occurrences in Populations with The Risk of CHD

Variabel	P Value	Exp (B)	R Square
Type of Personality	0.032	0.560	0.430
Coping Mechanism	0.006	5.343	
Socioeconomic Status	0.966	0.983	

Source: Primary Data (2018)

Based on table 4 it is known that R Square 0.430, meaning 43% of anxiety occurrence in population with high risk of CHD can be explained by factors socioeconomic status, personality type and coping mechanism.

Discussion

1. **Relationship between Socioeconomic Status and Anxiety Occurrence in Population with The Risk of Coronary Heart Disease:** The bivariate analysis showed that socioeconomic status correlated significantly with the occurrence of anxiety in population with risk of CHD, since the *p* value < α (0.05) and the correlation score was positive. This indicates that the lower the socio-economic status of a person, the more likely to experience anxiety. The results of this study are consistent with several research results which show that low socioeconomic status and financial pressures felt to be significantly related to anxiety. Individuals with good socioeconomic status can protect emotional stress and anxiety[8,9,10].Low socio-economic status will cause individuals to experience anxiety more easily, this is evidenced by the results of studies that show the prevalence of anxiety decreases with higher socioeconomic status[7,11]. The prevalence of disease is more prevalent in people with low socioeconomic class.

   In this study also found most respondents who experience anxiety in those who do not work, as housewives, do not have a permanent job and with types of jobs such as car drivers, sellers, factory workers and traders. Anxiety is more common in societies with lower socioeconomic status and then results in acute or chronic physiologic changes in cardiovascular function, increase the risk of CHD. A person with a job status and a fixed income will feel more peaceful life because the problems of daily living and economic needs can be met so as to reduce the burden of thoughts and psychological pressure that can cause anxiety[12,13].

2. **Relationship between Type of personality and Anxiety Occurrence in Population with The Risk of Coronary Heart Disease:** The bivariate analysis showed that there was significant relationship between type of personality and anxiety in population with the risk of coronary heart disease, since the *p* value < α (0.05) and the correlation score was negative. It indicated that type of personality was inversely proportional to anxiety incidents, in which an individual with type A personality was more prone to anxiety compared to individuals who have other types of personality.

   Type A personality is associated with anxiety and increases the risk of CHD[14]. This type of personality feels more anxious and has a negative coping style that increases the risk of CHD[15,16.] This is reinforced by the results of studies that show that the hostile component of Type A personality is the most significant risk factor for stress and anxiety[17].

   The development of the concept of stress, psychodynamics and psychosomatic disorders, personality type is used to be an important idea in which personality type A is associated with stress and anxiety and promotes the development of coronary heart disease[18]. In addition, personality type D is also described as a personality that connects with negative affective and emotional, avoidive coping styles and social inhibitions associated with cardiovascular disease and the development of CHD risk[19].

3. **Relationship between Coping Mechanism and Anxiety Occurrence in Population with The Risk of Coronary Heart Disease:** The bivariate analysis showed that coping mechanism correlated significantly with the occurrence of anxiety in population with risk of CHD, since the *p* value < α (0.05) and the correlation score was positive. This means that the less the ability of coping mechanism, the tendency to experience anxiety is higher. The results of this

study are in line with research that shows that low coping mechanism during adolescence are associated with an increased risk of heart disease during adulthood[20]. Individuals with low coping mechanism ability when faced with difficulties, will be more susceptible to stress that can cause anxiety, depression, anger, impulsiveness and low self esteem.

Coping mechanisms can regulate negative and positive emotions as well as improve self-efficacy in stress relief so that individuals can reduce or eliminate anxiety. Whenever there is a stressor, the individual automatically appears to attempt to cope with various coping mechanisms[21]. The use of coping mechanisms will be effective when supported by individual beliefs against the coping used can reduce or eliminate anxiety. Anxiety should be addressed to reach homeostasis in the individual, both physiologically and psychologically[22].

4. **The Most Significant Factor in Anxiety Occurrence in Population with The Risk of Coronary Heart Disease:** The result of multivariate analysis showed that coping mechanism was the most correlated factor with anxiety occurrence in population with CHD risk since the OR was 5.343. Coping strategies and coping mechanisms are factors that greatly affect the individual's ability to deal with problems, psychological stress and anxiety compared to other factors[23]. Further explained that, the coping mechanism becomes the determinant in problem solving. Coping mechanisms are the most important factor in the individual's ability to control and adapt to psychological problems such as stress, anxiety and depression in addition to biological factors, exercise, and appropriate psychotherapy[24].

   Coping mechanism influenced by motivation, self-efficacy and self-resilience. Identifying coping source and strategy was an effective and efficient method to develop coping mechanism preparing an individual to overcome his or her issues accurately[25]. Coping mechanism is a prominent element in negotiation, management and adaptation towards source of stress and anxiety allowing an individual to adapt and maintain positive, well-balanced life.

Conclusion

There is a significant correlation between asocioeconomic status, personality type and coping mechanism with anxiety occurrence in population with risk of CHD. Coping mechanism is the factor most associated with anxiety events in the population with CHD risk compared with other factors. It is important to provide skills of coping mechanism for population with the risk of coronary heart disease.

Ethical Clearance: Ethical, Health, and Research Commission of the Medical Faculty, Brawijaya University (number: 216/EC/KEPK/06/2017).

Source o Funding: Self

Conflict of Interest: Nil

REFERENCES

1. World Health Organization. World health statistics 2014 a wealth of information on global public health. Switzerland: WHO Press; 2014.
2. Kemenkes RI. Basic health research 2013. Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementrian Kesehatan RI; 2013.
3. Larifla L, Beaney KE, Foucan L, Bangou J, Michel CT, Martino J, et al. Influence of genetic risk factors on coronary heart disease occurrence in Afro-Caribbeans. Can J Cardiol. 2016;32:978–85.
4. Khayyam-nekouei Z, Neshatdoost H, Yousefy A, Sadeghi M, Manshaee G. Psychological factors and coronary heart disease. ARYA Atheroscler. 2013;9(1):102–11.
5. Hocaoglu AB, Karaman O, Erge DO, Erbil G, Yilmaz O, Bagriyanik A, et al. Glycyrrhizin and long-term histopathologic changes in a murine model of asthma. Curr Ther Res. 2011;72(6):250–61.
6. Roffi M, Valgimigli M, Bax JJ, Borger MA, Gencer B, Germany UL, et al. 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. European Heart Journal. 2015. 2999-3054 p.
7. Sadock BJ, Sadock VA, Ruiz P. Kaplan & sadock's: Synopsis of psychiatry. 11th ed. Goolsby J, editor. Philadelphia: Wolters Kluwer; 2015. 3237 p.

8. Eslami B, Sundin Ö, Macassa G, Khankeh HR, Soares JJF. Anxiety, depressive and somatic symptoms in adults with congenital heart disease. J Psychosom Res. 2013;74:49–56.

9. Bjelland I, Krokstad S, Mykletun A, Dahl AA, Tell GS, Tambs K. Does a higher educational level protect against anxiety and depression ? The HUNT study *. Soc Sci Med. 2008;66:1334–45.

10. Curtis K, Lewis MJ, Curtis K, Murphy M, Ed M, Hoy S, et al. The emergency nursing assessment process — A structured framework for a systematic approach The emergency nursing assessment process —— A. 2009;(November).

11. Harianto. Analysis of the social status of the community and its impact on political participation in the Karangrejo subdistrict, Karangrejo subdistrict, Magetan district. J Sos UNMER. 2008;9(2):18–23.

12. Rosengren A, Hawken S, Ôunpuu S, Sliwa K, Zubaid M, Almahmeed WA, et al. Association of psychosocial risk factors with risk of acute myocardial infarction in 11 119 cases and 13 648 controls from 52 countries (the interheart study): case-control study. wwwThelancet.com. 2004;364:953–62.

13. Lorant V, Deliège D, Eaton W, Robert A, Philippot P, Ansseau M. Socioeconomic inequalities in depression : A meta-analysis. Am J Epidemiol. 2003;157(2):98–112.

14. Gallacher JEJ, Sweetnam PM, Yarnell JWG, Elwood PC, Stansfeld SA. Is type a behavior really a trigger for coronary heart disease events ? Psychosom Med. 2003;65:339–46.

15. Du J, Zhang D, Yin Y, Zhang X, Li J. The Personality and Psychological Stress Predict Major Adverse Cardiovascular Events in Patients With Coronary Heart Disease After Percutaneous Coronary. 2016;95(15):1–6.

16. Vukovic O, Tosevski DL, Jasovic-gasic M, Damjanovic A, Zebic M, Britvic D, et al. Type D personality in patients with coronary artery disease. Psychiatr Danub. 2014;26(1):46–51.

17. Smith PJ, Blumenthal JA. Psychiatric and behavioral aspects of cardiovascular disease: Epidemiology, mechanisms, and treatment. Rev Española Cardiol (English Ed. 2011;64(10):924–33.

18. Chauvet-Gelinier J-C, Bonin B. Stress, anxiety and depression in heart disease patients: A major challenge for cardiac rehabilitation. Ann Phys Rehabil Med. 2017;60:6–12.

19. Svansdottir E, Denollet J, Thorsson B, Gudnason T, Halldorsdottir S, Gudnason V, et al. Association of Type D personality with unhealthy lifestyle, and estimated risk of coronary events in the general Icelandic population. Eur J Prev Cardiol. 2012;20(2):322–30.

20. Bergh C, Udumyan R, Fall K, Almroth H, Montgomery S. Stress resilience and physical fi tness in adolescence and risk of coronary heart disease in middle age. Heart. 2015;0:1–7.

21. Wang M, Saudino KJ. Emotion regulation and stress. J Adult Dev. 2011;18(2):95–103.

22. Gross JJ, Thompson RA. Emotion regulation: Conceptual foundations. In: Gross JJ, editor. Handbook of Emotion Regulation. New York: Guilford; 2007. p. 3–24.

23. Jackson JL, Emery CF. Emotional distress, alexithymia, and coping as predictors of cardiac rehabilitation outcomes and attendance. J Cardiopulm Rehabil Prev. 2013;33:26–32.

24. Miclea M. Stres si aparare psihica. Cluj-Na-Poca: Presa Universitara Clujeana; 1997.

25. Leppin AL, Gionfriddo MR, Sood A, Montori VM, Erwin PJ, Zeballos-palacios C, et al. The efficacy of resilience training programs: A systematic review protocol. Syst Rev. 2014;3(20):1–5.

26. Windle G, Bennett KM, Noyes J. A methodological review of resilience measurement scales. Health Qual Life Outcomes. 2011;9(8):1–18.

What are the Staffing Levels and Maternal Outcomes? A Descriptive Study in Referral Hospitals in Java, Indonesia

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ABSTRACT

Adequate maternity staffs (obstetric/gynecologists, midwives, and nurses) at referral hospitals are crucial to manage obstetric complications and to improve maternal outcomes. This study aims to describe the staffing levels and maternal outcomes in selected referral public hospitals in Java region of Indonesia. The data of 8,396 deliveries with live birth and 522 maternity staffs were collected from six referral hospitals in Java, Indonesia. Descriptive statistics were employed to summarize the study subjects. The maternity staffing levels of the study hospitals were relatively sufficient, however, the maternal mortality ratio and the severe maternal outcome ratio are moderately high. Further studies are recommended to understand the effect of staffing and other possible factors on maternal outcome.

Keywords: *maternal, midwife, nurse, referral hospital*

Introduction

Maternal mortality is the second highest cause of death among women of reproductive age with nearly eight hundreds women died every day from maternal causes.[1] In addition maternal morbidity is experienced by approximately twenty million women around the world that leads to death and disability without prevention or appropriate treatment.[2] Considering the magnitude of this issue, improving maternal health continuously receive a major concern from the global stakeholder. The Sustainable Development Goals set a target to reduce the maternal mortality ratio by 70 deaths per 100,000 live births by 2030.[3]

Despite the declining trend of maternal mortality ratio (MMR), Indonesia is among other developing countries with a high number of maternal deaths. Based on the national population census reports, the MMR has been reduced from 390 per 100,000 live births in 1991 to 305 per 100,000 live births in 2015.[4] This achievement is in line with the increase proportion of skilled birth attendance. By 2015, the percentage of skilled birth attendance has exceeded the national target at 93.1%.[5] However, approximately 20.5% of births are delivered at home.[5]

Skilled birth attendance at health care facilities is a key strategy in Indonesia to prevent delays in managing obstetric emergencies. Based on the 2012 Indonesian Demographic and Health Survey, more than 80% of maternal deaths occur in hospitals.[6] It indicates that women with obstetric complications may not arrive timely at the hospital or may receive inadequate treatment while in the hospitals. The Government of Indonesia stated that delays in making decision to seek care, making referral to health facilities, and managing obstetric emergency care due to constraints in infrastructure and human resources are among contributing factors to maternal mortality.[7]

Health workforce is a central component within the health system. To improve maternal health, appropriate staffing has been strongly recommended by policy makers from international and national institutions. This policy is partly supported by evidence, as various studies have reported the significant relationship between higher staffing

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and positive health outcome.[8] A previous review study reported that shortage of health workers and imbalance distribution occur in various public health facilities in Indonesia.[9] This study, therefore, aims to describe the staffing levels and maternal outcomes in several referral public hospitals in Java region of Indonesia.

Method

Study Design, Setting, and Sampling: This study employed an observational study design using the retrospective data from the hospital administrative electronic database. The hospital study location was purposively selected based on the similarity of structural characteristics of the hospitals. Data of obstetric patients and maternity staffs were collected from six referral hospitals with eleven maternity wards within Java region, Indonesia from September to December 2017. The study employed the total sampling technique to capture data of all study subjects. We included all deliveries with live birth (single and multiple births). Stillbirth and incomplete data of deliveries were excluded from the data analysis.

Study Variables: Nursing staffs included registered nurses and diploma nurses, while midwifery staffs consisted of professional midwives and diploma midwives. Variables of staffing levels will be presented as an aggregate at the maternity unit level, including:

1. Nurse to patient: number of nursing staffs per 1000 patient/year.
2. Midwife to patient: number of midwifery staffs per 1000 patient/year.
3. Maternity staffs to patient: number of nursing and midwifery staffs per 1000 patient/year.
4. Proportion of nurses and midwives with bachelor degree.
5. Average years of nursing experience.
6. Average years of midwifery experience.
7. Proportion of permanent staffs.

One variable of the staffing level of obstetrician/ gynecologist (ob/gyn) is presented in ratio per 1000 patient/year at the hospital level.

Variables of maternal outcomes represented the outcome of obstetric patients that are categorized as follows:

1. **Death:** women who died in the hospital from maternal causes
2. **Near-miss:** women who almost died from maternal conditions within 42 days after the pregnancy terminated
3. **Survive:** women who are alive at the time of discharge from hospital.

Other variables represented the characteristics of obstetric patients include:

1. Age
2. Place of residence:
   - Same city : the patients were residents of the city where the hospital located.
   - Other city: the patients were residents of other cities.
3. Admission procedure: referral and non referral.
4. Payment scheme: insurance and out of pocket.
5. Types of delivery: vaginal spontaneous delivery, instrumental delivery, caesarean section, and other assisted delivery.
6. Types of live birth: single and multiple
7. Length of stay: days of hospitalization calculated from the day of admission to the day of discharge.
8. Type of maternal complications underlying causes of morbidity and mortality.

Data Analysis

Descriptive statistics method was employed to analyze the data to generate the study results in forms of frequencies, percentages, mean, ranges, and standard deviation. This method allowed to summarize the characteristics of the study subjects based on the variables selected.

Results

The data of 8,396 patients with live birth deliveries and 522 maternity staffs (medicine, nursing, and midwifery staffs) were obtained from six hospitals. Table 1 displays the statistics summary of variables of staffing levels. The mean nursing staffing level at maternity unit was 26.1 nurses per 1000 patient in a year. The average

midwifery staffing level at maternity unit was 21.8 midwives per 1000 patient per year. The maternity staffs showed an average ratio of 47.9 staffs to 1000 patient per year. The proportion of nurses and midwives holding bachelor degree in maternity units was ranging from 2.0% to 57.4%, with 25.0% at the average. The average years of experience between nursing staffs and midwifery staffs per maternity unit were quite similar at 11.1 years and 11.3 years respectively. The mean of the proportion of permanent staffs at the maternity unit was 74.3%. At the hospital level, the mean of the staffing level of ob/gyn was 13.6 ob/gyn per 1000 patient in a year.

Table 1: Descriptive statistics of staffing levels by maternity unit

n = 11

Staffing levels	Minimum	Maximum	Mean	SD
Nurses to patient	5.0	45.4	26.1	15.09
Midwives to patient	7.1	50.7	21.8	12.24
Maternity staffs to patient	27.8	66.2	47.9	15.32
Proportion of nurses and midwives with bachelor degree	2.0	57.4	25.0	18.74
Average years of nursing experience	2.7	21.6	11.1	5.74
Average years of midwifery experience	6.7	26.0	11.3	5.23
Proportion of permanent staffs	34.9	100.0	74.3	22.42
Ob/gyn to patient*)	6.1	29.9	13.6	8.86

*) calculated at hospital level

Table 2 presents the characteristics of obstetric patients included in this study. The mean age of the study subjects was 29.8 years old. Most of patients (67.1%) were residents of the city where the hospital located. Admission to the hospital were mostly through medical referrals (74.5%). Insurance was the most payment scheme utilized by the patients (84.7%). Surprisingly, although most deliveries were single live birth (98.5%), more than half deliveries were conducted through Caesarean section. Majority of patients (83.9%) were reported to have maternal complications. The mean length of stay in the hospital was 4.2 days. While most maternal outcomes (97.2) were positive, 15 patients died and 221 patients experienced near-miss events.

Table 2: Characteristics of obstetric patients

N = 8,396

Variables	Number (%)	Mean ± SD
Age	-	29.8 ± 6.52
Place of residence		
Same city	5,632 (67.1)	
Other city	2,764 (32.9)	
Admission procedure		
Self-referral	2,138 (25.5)	
Medical referral	6,258 (74.5)	
Payment scheme		
Out of pocket	1,288 (15.3)	
Insurance	7,108 (84.7)	
Types of delivery		
Vaginal spontaneus	3,088 (36.8)	
Instrumental	471 (5.6)	
Caesarean section	4,837 (57.6)	
Type of live birth		
Single	8,266 (98.5)	
Multiple	130 (1.5)	
Complications		
No	1,354 (16.1)	
Yes	7,042 (83.9)	
Length of stay	-	4.2 ± 2.93
Patient outcome		
Death	15 (0.2)	
Near-miss	221 (2.6)	
Survive	8,160 (97.2)	

Table 3 shows the outcome of patients who experienced maternal complications (n=7,051). Most of the underlying causes of maternal mortality and near-misses were complications predominantly related to puerperium and other conditions at 40% and 24.4% respectively. Overall, maternal complications were dominated by conditions specified in the group of other maternal care related to fetus and amniotic cavity and delivery problems (36.4%).

Table 3: Types of maternal complications by patient outcome n = 7,051

Maternal complications	Patient outcome, N (%)			
	Death	Near-misses	live	Total
Oedema, proteinuria, and hypertensive disorder	1 (6.7)	44 (19.9)	1,454 (21.3)	1,499 (21.3)
Placenta praevia, premature separation of placenta and antepartum haemorrhage	1 (6.7)	26 (11.8)	231 (3.4)	258 (3.7)
Other maternal care related to fetus and amniotic cavity and possible delivery problems	2 (13.3)	53 (24.0)	2515 (36.9)	2570 (36.4)
Obstructed Labour	0 (0.0)	4 (1.8)	188 (2.8)	192 (2.7)
Postpartum haemorrhage	0 (0.0)	3 (1.4)	30 (0.4)	33 (0.5)
Other complications of pregnancy and delivery	5 (33.3)	29 (13.1)	1582 (23.2)	1616 (22.9)
Complication predominantly related to puerperium and other conditions	6 (40.0)	54 (24.4)	666 (9.8)	726 (10.3)
Other not specified complications but may affect the maternal outcome.	0 (0.0)	8 (3.6)	149 (2.2)	157 (2.2)
TOTAL	15	221	6,815	7,051

Discussion

Our study showed that the mean of staffing levels of nurses is slightly higher than the staffing levels of midwives. The minimum ratio and the maximum ratio have a wide range in both nursing and midwifery staffing levels, but narrower range in the maternity staffing level at 47.9 staffs per 1000 patients a year. This finding implies that nursing and midwifery staffs in maternity units may have substitution roles. The availability of ob/gyn in referral hospitals is crucial. In our study, there was a wide range of ob/gyn staffing level among the study hospitals from 6.1 to 29.9 ob/gyn per 1000 patients per year, with an average of 13.6 ob/gyn per 1000 patients a year. A previous study in England, reported that the mean for each maternity staffing levels was 29.6 midwives, 1.4 consultant ob/gyns, and 4.3 junior ob/gyns per 1000 deliveries a year.[10]

In Indonesia, the staffing in the maternity unit is determined based on the hospital classification. Referral hospitals of type A and type B are recommended to have the staffing ratio of one nurse or midwife per patient.[11] This regulation implies that at the secondary or tertiary referral level of care every patient should be attended by either a nurse or a midwife at all shifts. Other countries such as the United Kingdom and Australia also had different recommendation related to the optimum maternity staffing. The UK suggested 36 midwives per 1000 births to manage one to one care throughout the childbirth process and other period of care.[12] In Australia, the suggested staffing levels in maternity inpatient units were one midwife or nurse for every five patients on a day shift and for every eight patients on the evening shift.[13]

In this study, the mean of the proportion of staffs with bachelor degree in maternity units was 25%, while both the mean years of nursing experience and midwifery experience were quite similar at approximately eleven years. Previous studies reported the significant factors of staffs educational background and the duration of staff experience to the improved patient outcome.[14] A previous study reported that the likelihood of patients dying was 30% lower in the hospitals with 60% of staffs with bachelor degree in nursing than in hospitals with only 30% of nursing staffs with bachelor degree.[15]

The average age of obstetric patients in this study was 29.8 years old, insurance users, and mostly admitted through the referral procedure. Most of patients were having maternal complications which may indicate the reason for accessing the referral level of care. This finding is not surprising, considering the data of this study was taken from the 2016 hospital database which was the second year of the implementation of the National Health Insurance system. The system may have contributed to the increasing access of women with maternal complications to referral health facility.

Our study showed that the maternal mortality ratio was 178.8 per 100,000 live births. According the World Health Organization (WHO), the MMR is categorized as moderately high if the range falls between 100 to 299

maternal deaths per 100 000 live births. The MMR in this study is found to be lower than the present MMR at the national level which is probably due to the small sample size and only conducted in one region. The severe maternal outcome (deaths and near-misses) ratio was 28.2 per 1000 live births. This finding is higher than the ratio reported in a previous study in Brazil at 11.08 per 1000 live births.[16]

Most of underlying causes of maternal deaths and near-miss events in this study included puerperal complications, other complications of pregnancy and delivery (including intrapartum haemorrhage and preterm labour), other maternal care related to fetus and amniotic cavity and possible delivery problems, and hypertensive disorder. According to WHO, most of the causes of maternal deaths can be prevented through effective interventions including antenatal care, intranatal care, and postnatal care.[1] These interventions aim to ensure that every pregnant woman is physically and mentally healthy throughout pregnancy and deliver a healthy baby. Effective maternal health care services require adequate and competent health providers.

Conclusion

The staffing level is an essential component to deliver quality of care. The mean of staffing levels of nursing, midwifery and obstetric/gynecology in this study indicated sufficient staffs available at the referral facilities. However, the maternal mortality ratio and the severe maternal outcome ratio are still moderately high indicating that other factors may have influential contribution. Further studies are strongly recommended to explore the relationship between staffing and maternal outcomes by incorporating other possible factors that may affect the association.

Ethical Clearance: The ethical approval for this study was granted by the IRB committee of the Faculty of Nursing at the Airlangga University in 2017.

Source of Funding: This study received funding support from the Ministry of Research, Technology and Higher Education of Indonesia number 004/ADD/SP2H/LT/DRPM/VIII/2017. The funding source was not involved in study design, data collection, analysis or interpretation; in the writing of this report; or in the decision to submit the article for publication.

Conflict of Interest: None

REFERENCES

1. World Health Organization. Trends in maternal mortality: 1990 to 2015: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2015.
2. Koblinsky M, Chowdhury ME, Moran A, Ronsmans C. Maternal morbidity and disability and their consequences: neglected agenda in maternal health. Journal of health, population, and nutrition. 2012;30(2):124.
3. World Health Organization. Health in 2015: from MDGs, Millennium Development Goals to SDGs, Sustainable Development Goals. Geneva: World Health Organization; 2015.
4. MoH. Indonesia Health Profile Year 2016. Jakarta: Kemenkes RI; 2017.
5. Balitbangkes. Evaluation of Health Development Performance. In: Badan Litbangkes KR, editor. Jakarta: Balitbangkes Kemenkes RI; 2019.
6. BPS, BKKBN, MoH, ICF International. Indonesia Demographic and Health Survey 2012. Jakarta, Indonesia: BPS, BKKBN, Kemenkes, and ICF International; 2013.
7. MoH, WHO, POGI, IBI. Handbook of Maternal Health Service in Primary and Referral Facilities. Jakarta: Kemenkes RI; 2013.
8. Speybroeck N, Kinfu Y, Dal Poz MR, Evans DB. Reassessing the relationship between human resources for health, intervention coverage and health outcomes. Geneva: World Health Organization; 2006.
9. Kurniati A, Rosskam E, Afzal M, Suryowinoto T, Mukti A. Strengthening Indonesia's health workforce through partnerships. public health. 2015;129(9):1138-49.
10. Joyce R, Webb R, Peacock J. Predictors of obstetric intervention rates: case-mix, staffing levels and organisational factors of hospital of birth. Journal of Obstetrics and Gynaecology. 2002;22(6):618-25.
11. MoH. The Health Minister regulation numberr 56 year 2014 concerning the classification and licensing hospital. Jakarta: Kementerian Kesehatan; 2014.

12. Yelland A, Winter C, Draycott T, Fox R. Midwifery staffing: Variation and mismatch in demand and capacity. British Journal of Midwifery. 2013;21(8).

13. Forster DA, McLachlan HL, Yelland J, Rayner J, Lumley J, Davey M-A. Staffing in postnatal units: is it adequate for the provision of quality care? Staff perspectives from a state-wide review of postnatal care in Victoria, Australia. BMC health services research. 2006;6(1):83.

14. McGahan M, Kucharski G, Coyer F. Nurse staffing levels and the incidence of mortality and morbidity in the adult intensive care unit: A literature review. Australian Critical Care. 2012;25(2):64-77.

15. Aiken, Sloane DM, Bruyneel L, Van den Heede K, Griffiths P, Busse R, et al. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. The Lancet. 2014;383(9931):1824-30.

16. Oliveira FC, Surita FG, Pinto e Silva JL, Cecatti JG, Parpinelli MA, Haddad SM, et al. Severe maternal morbidity and maternal near miss in the extremes of reproductive age: results from a national cross- sectional multicenter study. BMC Pregnancy and Childbirth. 2014;14(1):77.

Estimation of Procollagen Type III Peptide (PIIIP) Level in β Thalassemia Patients

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ABSTRACT

Procollagen type III peptide (PIIIP) is established as biochemical markers of liver fibrosis. So that, type III (Pro-C3) can be used as diagnostic tools for liver fibrosis. Collagen type III amino-terminal pro-peptide (PIIINP) is a degradation product of collagen type III, the increase of which may reflect an ongoing fibrotic process. Procollagen type III is found abundantly in skeletal muscle and other soft tissues such as skin, and in negligible amounts in bone. During the late phases of collagen synthesis, the N-terminal end of procollagen type III is cleaved releasing P3NP into the circulation.According to case-control study. This study was conducted with eighty-eight of males that age ranges from 2-29 years, which divided in 60 of males with β-thalassemia whom have visited the Thalassemia Center at Al-Zahraa Teaching Hospital in Al–Najaf province, Iraq, for managed of the disease, and 28 voluntary healthy as a control groups of. The study was carried out from January 2018 to July 2018., Procollagen type III in β-thalassemic patients and healthy groups of males. It also investigates the relationship between these biomarkers levels was measurement by using a solid phase enzyme-linked immunosorbent assay (ELISA) and also, determined Hb, Body Mass Index, splenic status liver function test (ALT, ASTand ALP).

Keywords: *Procollagen type III, ALT, ASTand ALP, β-thalassemia.*

Introduction

Type III collagen contains multiple charged residues in the Xaa and Yaa positions of its chain. Type III collagen is the second most abundant collagen in human tissues after type I and is primarily found in tissues exhibiting elastic properties, such as skin, blood vessels, and internal organs. Type III collagen is common in fast growing tissue, particularly at the early stages of wound repair ([1,2,3,4])

The amino-terminal propeptide of type III procollagen (PIIINP) is an extension peptide of procollagen type III, which is cleaved off during conversion from type III procollagen to type III collagen. PIIINP reflects myocardial fibrosis, which is higher in the tissue of dilated and dysfunctional left ventricles ([6, 7]). Recently, a new ELISA kit was developed by applying monoclonal antibody targeting the N-protease cleavage site of collagen type III pro peptide, which could assess the true synthesis of collagen type III ([8,9,10]).

In the liver type III collagen mainly occurs during the synthesis of type III collagen, the N-terminal pro peptide of procollagen type III (PIIINP) is detached from procollagen type III, so the fibrogenesis results in release of ECM fragments into the blood. Hence the quantity of propeptide of procollagen type III can be a direct indicator of collagen synthesis and its deposition in the extracellular space ([11.12,13]). The increased amount of propeptide of type III procollagen may indicate the transformation of normal liver tissue into connective tissue. N-terminal propeptide of procollagen type III (PIIINP) is generated during the synthesis of type III collagen. PIIINP can be measured in the serum as an indicator of liver fibrosis and cirrhosis ([14,15,16]).

Material and Method

This study was conducted with eighty-eight of males that age ranges from 2-29 years, which divided in 60 of males with β-thalassemia whom have visited the Thalassemia Center at Al-Zahraa Teaching Hospital in Al–Najaf province, Iraq, for managed of the disease, and 28 voluntary healthy as a control groups of. The study was carried out from January 2018 to July 2018.

Collection of Blood Sample: The Blood samples were drawn from vein by sterilized synergies with 5 milliliters. The sample put in the two labeled tubes, first group of tubes contain EDTA as anti-coagulants to prevent clotting of blood to be used for physiological studies. The second group of tubes was without anti-coagulant as gel tubes, for blood to be used for preparing serum for following biochemical and biomarkers.

Hemoglobin Estimation: The hematological parameters were performed on EDTA blood using Mythic 18 (RINGELSAN CO., Turkey) in Hematology Laboratory of Al- Zahraa Teaching Hospital. This device is a completely automated hematology analyzer.

Biochemical Parameters

Measurements of ALP concentration: This was done by a method based on enzymatic colorimetric test, executed with specific kit for test, supplied by BIOLABO**.**

Measurements of AST, ALT, ALP concentration: This was done by a method based on enzymatic colorimetric test, executed with specific kit for test, supplied by BIOLABO.

Biomarker Parameters

Estimation Human Procollagen type III ELSA kit: Specific kit for measuring human IL-1β concentrations in serum was supplied by Elabscience Biotechnology

Statistical Analysis

The data was statistically analyzed through SPSS package (SPSS, Version 23). The descriptive analyses between the patients and control groups of Means and Standard Error. All of these statistically analyzed at significant($P<0.05$).

Results

Procollagen type III level in male β-thalassemia patient and healthy groups are plotted in figure (1)**.** The results are finding a significant ($P<0.05$) increase in Procollagen type III level in β-thalassemia patient group (9.39 ± 0.59) ng/ml than healthy group (4.49 ± 0.22) ng/ml.

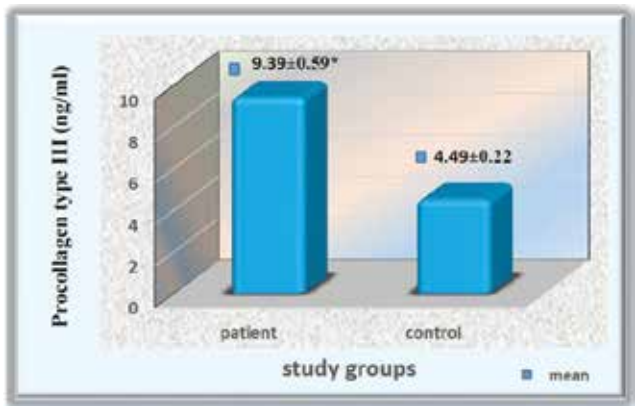


Figure 1: Procollagen type III (ng/ml) level in male patients with β-Thalassemia and control groups

Procollagen type III level in both patient groups as shown in figure (2). The results indicate the presence of a significant ($P<0.05$) increase in mean Procollagen type III level in serum of β-thalassemia intermedia (11.09 ± 0.94) ng/ml, in comparison with that of β-thalassemia major (8.40 ± 0.72) ng/ml.

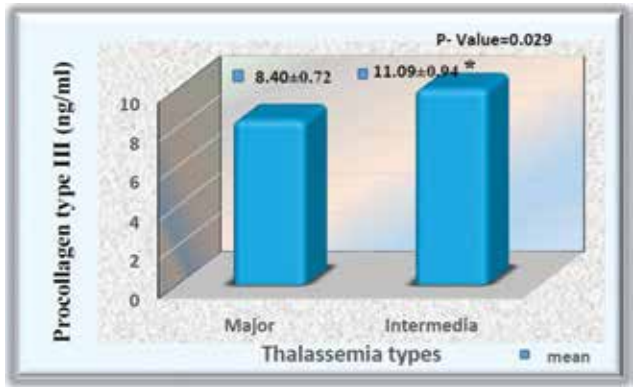


Figure 2: Procollagen type III level (ng/ml) in male patients with major and intermedia β-thalassemia

Mean serum Procollagen type III level values in the studied of the age groups as shown in figure (3). The results demonstrated the presence of a significant ($P<0.05$) increase in serum Procollagen type III level of male patients with β-thalassemia of the age group (2-10) year about (10.40 ± 0.84) ng/ml in comparison with the age group (11-19) about (7.63 ± 1.01) ng/ml.

Moreover, it presented the same significant increase when it was compared of the age group (20-29) about (10.74 ± 1.12) ng/ml, with the (11-19) age group about (7.63 ± 1.01) ng/ml.

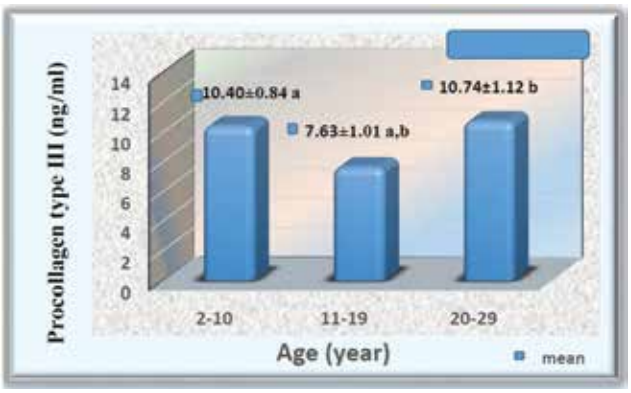


Figure 3: Procollagen type III level (ng/ml) in male patients of β-thalassemia according to age

The statistical analysis showed in figure revealed to no significant differences in serum procollagen type III level between both groups splenectomized (7.86 ± 0.91) ng/ml and unsplenectomized group (10.33 ± 0.75) ng/ml, of male patients with β-thalassemia.

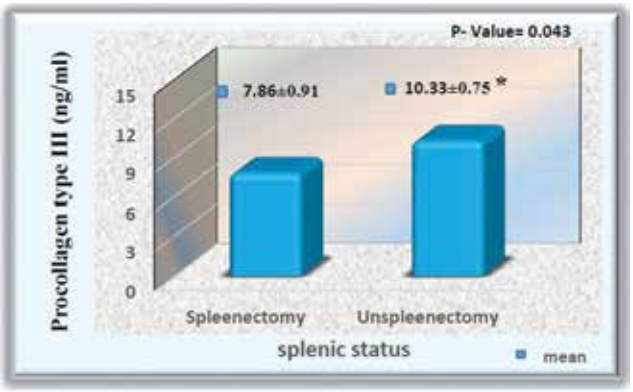


Figure 4: Procollagen type III level (ng/ml) in splenectomized and unsplenectomized of male patients with β-thalassemia

Discussion

In the present study, the liver function test table revealed a significant increase in the levels of ($p<0.05$) in serum levels of ALP, AST and ALT. Current results agree with Zayed, (2018) who suggested that thalassaemia may be causes lesions in liver tissues indicated by elevation of serum liver function criteria levels ([17,18,19]).

ALP value increases in bone turnover and has been reported to be regarded as a marker of bone formation ([20]). Previous study found that serum ALP is a sensitive screening tool for the diagnosis of osteomalacia ([21]).

The same table showed highly significance in AST and ALT levels in male patients with β-thalassemia compared with healthy control group this acceptable with the results of Salama *et al.,* (2015) and Abdulla, (2018). ([22,23])

Many Study of observed that increased levels of AST and ALT in β-thalassemia are due to iron overload, a very low hemoglobin level with very high (AST, ALT) level along with spleenomegaly is suggestive of poor prognosis in these patients. ([24,25,26]).

Data in the present study revealed marked significant elevation in ALT and AST activities as well as total and direct bilirubin levels in thalassemia patients compared to controls. Similar results were obtained by Mansi and Aburjai, (2008) and Attia *et al.,* (2012). ([27,28])

Elevated transaminasaemia in â-thalassemic children is indicative of liver dysfunction and leakage of liver metabolites into the plasma ([29]). Previous study suggested that The iron deposition may cause damage of hepatocyte (ALT & AST elevation) and cholestasis (bilirubin & ALP elevation), liver Injury may be as necrosis of heaptocellular, cholestatic disease or mixed between these two diseases like granulomatous hepatitis ([30,31]).

Rahim, (2017) revealed that the increased serum liver parameters may be caused by iron storage in the liver which is regarded as a notable victim of iron deposition.([32])

The results of this study have revealed a increase in serum PCIII level in male patients with β-thalassemia that compared to the healthy male groups.These results agree with Wang *et al*., (2017), which proved that the elevated of serum PIIINP levels is a potentially sensitive method to predict the risks for iron overload-related liver fibrosis in Chinese thalassemia patients.([32])

Iron overload, that take place in a significant proportion of thalassemia patients because of elevate in gastrointestinal iron absorption ([33]) and/or repeated transfusions, ([34]) reflects iron deposition in the liver, heart and endocrine glands, and cases cardiac failure, endocrine disorder and liver fibrosis ([35]). Transfused iron is accumulated first in the reticuloendothelial cell prior to parenchymal iron loading in the liver and heart ([36]).

Study of Knovich *et al.,* (2009) proposed that liver cirrhosis related to high serum ferritin levels. Although ferritin best reflects bodyiron store, it is an acute phase reactant that readily fluctuates with active infection or inflammation.([37])

Recent study has been showed liver iron deposition can cause lipid peroxidation, that compromises the organelle integrity, thereby partispating to hepatocyte necrosis and apoptosis, and finally causes liver fibrogenesis. Iron can also have assisted the hepatic stellate cells differentiation into collagen producing myofibroblasts([38])

In several studies, it has been shown that PIIINP can be diagnosed in the serum as an indicator of liver cirrhosis and fibrosis ([39]). So that, studies based on PIIINP as a liver damage indicator suggest that tissues with high fibro genic activity or non-mature fibrotic tissue composed communally from type III collagen. These findings raise an intriguing possibility that liver iron overload and liver function are likely correlated with serum markers of liver fibrosis. Eventually, ferritin concentration and liver iron level were significantly correlated with liver dysfunction meatured by AST and ALT ([33]).

Conflict of Interest: There was no any conflict of interest in this study

Source of Funding: There was no fund in this study

Ethical Clearance: Ethical was According to the *Declaration of Helsinki* issued by the World Medical Association, formulated in experimental protocols and independent (ethics committees approval university of kufa/college of Medicine

REFERENCE

1. Ulrich D, Noah EM., & Pallua N. TIMP-1, MMP-2, MMP-9, and PIIINP as serum markers for skin fibrosis in patients following severe burn trauma. Plastic and reconstructive. 2003; 111(4), 1423-1431.
2. Myllyharju, J. Matrix Biol. 2003; 22, 15–24
3. Myllyharju J, & Kivirikko KI. Collagens, modifying enzymes and their mutations in humans, flies and worms. TRENDS in Genetics. 2004; 20(1), 33-43.
4. Okuyama K., Xu X, Iguchi M, & Noguchi K. Revision of collagen molecular structure. Peptide Science: Original Research on Biomolecules. 2006; 84(2), 181-191.
5. Boudko S P, Engel J, Okuyama, K., Mizuno, K., Bächinger, H. P., & Schumacher, M. A. Crystal structure of human type III collagen Gly991–Gly1032 cystine knot-containing peptide shows both 7/2 and 10/3 triple helical symmetries. Journal of Biological Chemistry. 2008; 283(47), 32580-32589.
6. Zannad, F., Alla, F., Dousset, B., Perez, A., & Pitt, B. Limitation of excessive extracellular matrix turnover may contribute to survival benefit of spironolactone therapy in patients with congestive heart failure: insights from the Randomized Aldactone Evaluation Study (RALES). Circulation. 2000; 102(22), 2700-2706.
7. Poulsen, S. H., Høst, N. B., Jensen, S. E., & Egstrup, K. Relationship between serum amino-terminal propeptide of type III procollagen and changes of left ventricular function after acute myocardial infarction. Circulation. 2000; 101(13), 1527-1532.
8. Nielsen, M. J., Nedergaard, A. F., Sun, S., Veidal, S. S., Larsen, L., Zheng, Q., ... & Leeming, D. J. The neo-epitope specific PRO-C3 ELISA measures true formation of type III collagen associated with liver and muscle parameters. American journal of translational research. 2013; 5(3), 303.
9. Bode, MK, Soini Y, Melkko J, Satta J, Risteli L, & Risteli J. Increased amount of type III pN-collagen in human abdominal aortic aneurysms: evidence for impaired type III collagen fibrillogenesis. Journal of vascular surgery. 2000; 32(6), 1201-1207.
10. Rossi E, Adams, L A, Bulsara M, & Jeffrey GP. Assessing liver fibrosis with serum marker models. Clinical Biochemist Reviews. 2007; 28(1), 3.
11. Gressner OA, Weiskirchen R., & Gressner AM. Biomarkers of liver fibrosis: clinical translation of molecular pathogenesis or based on liver-dependent malfunction tests. Clinica Chimica Acta, 2007; 381(2), 107-113.
12. Colli A, Colucci A, Paggi S, Fraquelli M, Massironi S, Andreoletti M, & Conte D. Accuracy of a predictive model for severe hepatic fibrosis or cirrhosis in chronic hepatitis C. World journal of gastroenterology. 2005; 11(46), 7318.

13. Baranova A, Lal P, Birerdinc A, et al. Non-Invasive markers for hepatic fibrosis. BMC Gastroenterol 2011; 11: 91-6.

14. Cross T J S, Calvaruso V, Maimone S, Carey I, Chang T., Pleguezuelo M, & Dusheiko G. M. Prospective comparison of Fibroscan, King's score and liver biopsy for the assessment of cirrhosis in chronic hepatitis C infection. Journal of viral hepatitis. 2010; 17(8), 546-554.

15. Sarah, D., Berry, S. D., Ramachandran, V. S., Cawthon, P. M., Gona, P., McLean, R. R., Cupples, L. A., & Kiel, D. P. Procollagen type III N-terminal peptide (P3NP) and lean mass: a cross-sectional study. The Journal of frailty & aging/[editor in chief M. Cesari. 2013; 2(3), 129-34.

16. Gudowska M, Gruszewska E, Panasiuk A, Cylwik B, Swiderska M, Flisiak R & Chrostek L. High serum N-terminal propeptide of procollagen type III concentration is associated with liver diseases. Przeglad gastroenterologiczny. 2017; 12(3), 203.

17. Zayed K S. Study Of Some Liver Functions Parameters In Thalassaemic Patients In Al-Najaf Province Pak. J. Biotechnol. 2018; 15 (1) 181-184.

18. Saboor M, Qudsia F, Qamar K and Moinuddin M. Levels of Calcium, Corrected Calcium, Alkaline Phosphatase and Inorganic Phosphorus in Patients' Serum with β-Thalassemia Major on Subcutaneous Deferoxamine. J Hematol Thromb Dis. 2014. 2:130.

19. El-Nashar M, Mortgage AK, El-Beblawy N M S, El-Gohary E, Kamel I M and Rashid M. Parathyroid hormone in pediatric patients with -thalassemia major and its relation to bone mineral density; a case control study. Egypt J Med Hum Genet. 2017; 18(1):75-8.

20. Lumachi F, Orlando R., Fallo F and Stefano M M. Relationship between Bone Formation Markers Bone Alkaline Phosphatase, Osteocalcin and Amino-terminal Propeptide of Type I Collagen and Bone Mineral Density in Elderly Men. Preliminary Results. 2012; 26 (6): 1041-1044.

21. Chino M A, Javed M I, Khan A and Sadruddin N. (2011). Alkaline phosphatase as a screening test for osteomalacia. J Ayub Med Coll Abbottabad. 23: 23-25.

22. Salama K M, Ibrahim O M, Kaddah A, Boseila M, Abu Ismail S L, Abdel Hamid M M. and Maced O. A. Liver Enzymes in Children with Beta-Thalassemia Major: Correlation with Iron Overload and Viral Hepatitis J Med Sci. 2015 Jun 15; 3(2):287-292.

23. Abdulla A A. Evaluation of serum antioxidant enzymes in β- thalassemia major patients. International Journal of ChemTech Research. 2018; 11 (7): 323-328.

24. Gira PM, Mankad VB, Singh S B. A study of serological and hematological parameters in thalassaemic patients of Rajkot, Gujarat. International Journal of Scientific and Research Publications. 2013; 3: 2250-3153.

25. Kountouras D, Tsagarakis NJ, Fatourou E. Liver disease in adult transfusion-dependent beta-thalassaemic patients: Investigating the role of iron overload and chronic HCV infection. Liver Int 2013; 33: 420–427.

26. Soliman A, Yassin M, Al Yafei F, et al. Longitudinal study on liver functions in patients with thalassemia major before and after deferasirox (DFX) therapy. Mediterr J Hematology Infect Dis 2014; 6: e2014025.

27. Mansi K M and Aburjai T A. Lipid Profile in Jordanian Children with β-thalassemia Major. International Journal of Hematology and Oncology. 2008; 2 (18):93-98.

28. Atta M, Cabral M, Santos G, Paraná R and Atta A. (2012). Inflammation biomarkers in chronic hepatitis C: association with liver histopathology, HCV genotype, and cryoglobulinemia. Inflamm Res. 2012; 61(10):1101-1106.

29. Waseem F, Khemomal K A and Sajid R. Antioxidant status in beta thalassemia major: A single-center study. Indian Journal of Pathology and Microbiology, 2011; 54 (4): 761-763

30. Fargion S, Valenti L and Fracanzani A L. Beyond hereditary hemochromatosis: new in-sights into the relationship between iron over-load and chronic liver diseases. Dig. Liver Dis. 2011; 43: 89–95

31. Zayed K S. Determination of I/D genetic variation of the Angiotensin Converting Enzyme (ACE) gene in Iraqi patients with Renal Failure. Al-Kufa University J. for Biol.2017; 9(3): 1-8

32. Rahim, S. A. Effect of injection of human menopausal gonadotrophin and human chorionic gonadotrophin hormone on spermatogenesis of adult male mice. Pak. J. Biotechnol.. 2017; 14(1): 1 – 8

33. Wang M, Liu R, Liang Y, Yang G, Huang Y, Yu C, Sun K, Lai Y and Xiao Y. Iron overload correlates with serum liver fibrosis markers and liver dysfunction: Potential new methods to predict iron overload-related liver fibrosis in thalassemia patients. Gastroenterology Journal. 2017; 5(1):94–103

34. Gudowska M, Gruszewska E, Panasiuk A, Cylwik B, Swiderska, M, Flisiak R & Chrostek L. High serum N-terminal propeptide of procollagen type III concentration is associated with liver diseases. Przeglad gastroenterologiczny. 2017; 12(3), 203.

35. Al-Khafaji K H, Abod, Al-Dujaili M N & Al-Dujaili A N. Estimation of Endostatin level in pulmonary arterial hypertension patients and its relation with some parameters, Current Issues in Pharmacy and Medical Sciences. 2019; .31(4).

36. 43. Al-Khafaji K H Abod, Al-Dujaili , Arshad N. Mohammed N & Al- DujailiAssessment of Noggin level in pulmonary arterial hypertension patients. Current Issues in Pharmacy and Medical Sciences. 2018; 31(3).122-130

37. Al-Khafaji, K H A, Al-Dujaili A N & Al- Dujaili M N. Endoglin level in pulmonary arterial hypertension patients and its association with some criteria.Journal of Pharmaceutical Sciences and Research .2018; 10(3):644-651

38. Al- Dujaili M N, Al-Khafaji, K. H A &Dujaili A N. Relationship Between Chordin Like-1 Protein Level and Patients with Pulmonary Arterial Hypertension Disease.International Journal of Pharmaceutical Quality Assurance. 2018; 9(3) :308-316.

39. Al- Kraity W, Rajh H & Al-Dujaili, A N G. Assessment of Gelsolin Level in women with heart disease after menopause. Research J. Pharm. and Tech. 2017; 10(6).

Study Prevalence of Breast Cancer and the Relation it's with Some Risk Factors and Blood Group in Al-Najaf Governorate, Iraq

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ABSTRACT

The current study was designed to determine the prevalence of breast cancer compared to other types of cancer patients who are admitted to the cancer tumors Center/Al Sadr Teaching Hospital in Najaf, For the period from February to Jun2017. The rate of breast cancer was 21.2 % (215) of the total number of infected people cancer (1015). this study showed the relation between the type of blood and the prevalence of infection, where the results were (36.3, 32.1, 22.3, 9.3%) by dependent the factions of blood (A, O, B,AB) respectively. The incidence of infection in women who use oral contraceptives was (52.7) compared to those who did not use the pills (5.4). Obesity is also an important factor In the prevalence of infection, where the proportion of women in obese women (64.5) compared to non-obese (16.1). The study also showed that there was a relationship between the level of education and the prevalence of breast cancer, which was the highest rate of infection in uneducated women followed by the holders of primary, preparatory, diploma and the lowest percentage of the bachelor's degree, where the percentages were (36.3,28.8,15.8,11.6,7.4) % respectively.

Keywords: *cancer, contraceptives, blood group, Obesity*

Introduction

The growth of normal cell usually results from a tight balance between growth stop signals and growth stimulation signals. Reproduction happens only when the cells number is increased. The balance is shifted to stimulate growth. This occurs during normal tissue change and during wound healing. Cells differentiate during this process and the reproduction stops. When needed. While in tumor cells there is a defect in this balance, which leads to the continued proliferation of cells and loss of differentiation.

Cancer result from a genetic defect in the body cells that transforms it into cancerous cells that are out of control. They divide and grow at the wrong place and time, leading to the formation of tumors. In initiation phase of cancer occur mutation in DNA copy during the division of the cell. This mutation happens with effect many factors such as viruses infection, radiation, environmental factors, and smoking. when the mutation causes many mutations, the cell becomes more able to life and resistance of immune factors. after that, cancer speared to other tissues.

Type of breast cancer is a solid carcinoma and diagnosed by clinical and postoperative classification It was very important to detect early breast cancer because the patient's survival rate for at least five years from the diagnosis of the disease decreases with the development of the disease

Most disease injured of human-associated with blood group, ABO blood groups are antigenic, polymorphic, found on the erythrocyte surface and some tissue or other cells.ABO discovered by Landsteiner in "1900". In 2015 find the blood types system are important in transfusion medicine. the blood groups are allied with many of diseases including vascular disease, diabetes type 2. so that the study objective to know the relationship between cancer and blood group also study effect some risk factors on the prevalence of disease.

Materials and Procedure

Samples: Blood samples collection from women infected by breast cancer by finger prick method for diagnosis type of blood.

Diagnosis Type of Blood: Diagnosis of blood group directly by used blood group kit.

Result and Discussion

Shows the percentage of breast cancer relative to the total number of the sample studied

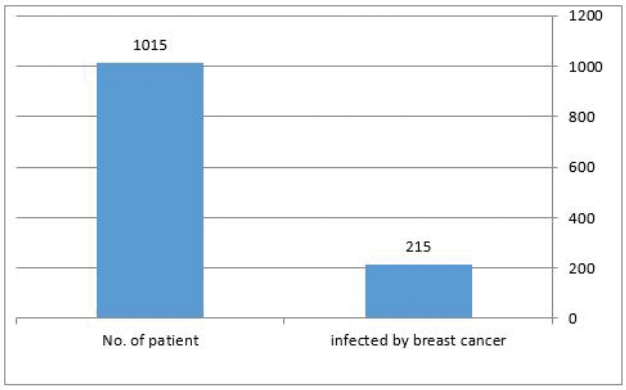


Figure 1: Explain the number patient of infection by breast cancer for a total number of cancer patients

The results showed that the rate of breast cancer reached about 21.2% (215) of the total number of cancer patients(1015) and this indicates the high incidence of breast cancer. A blood sample was drawn for each group of patients with cancer for the purpose of determining the blood type, the result explained the women with blood type (A) have the highest incidence of breast cancer, followed by the type of blood (O, B) and the lowest type of blood (AB) (36.3, 32.1, 22.3, 9.3) % respectively. These results are agree with the results of a number of studies that attempted to prove the relationship of cancer with blood type, although there was a disparity in the outcome, including the study of which found a relationship between blood type and breast cancer. (figure 2)

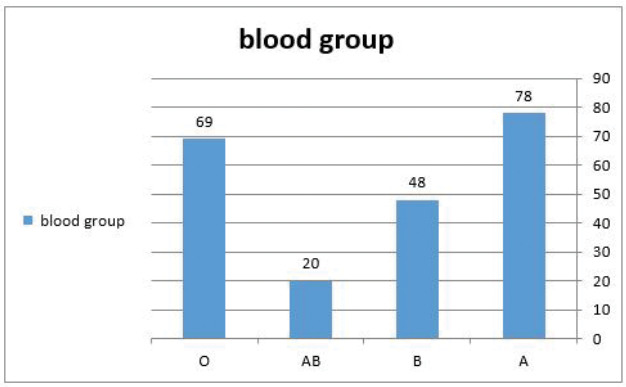


Figure 2: Explain the relation between Blood group and breast cancer

Also the results showed that women taking oral contraceptives are more likely to be infected(figure 3), and this is agree with Nygren et al. This explains that the treatment of (estrogen, progesterone) of the risk of breast cancer by 55-100%, Estrogen plays an important role through its receptors in a process Growth and proliferation of cells in the natural breast tissue, thus increasing the levels of estrogen with a view to pharmacological treatment May lead to the emergence of growth and proliferation of cells from control and the development of cancer

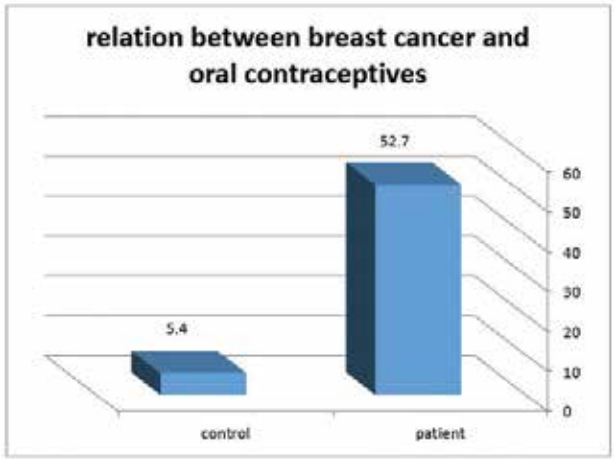


Figure 3: Explain the relation between oral contraceptive and breast cancer

We see a rise in the obesity factor in women with breast cancer compared to healthy women (figure 4) Consequently, obese females are more likely to develop breast cancer, and this is agree with This is because lipid tissue is an important source of estrogen in obese, as fat cells increase the of fat number Sex hormones in the body play a role in the production of estrogens and act to increase the conversion of androgens induced The enzyme aromatase to estrogen, thus increasing levels of estrogen and its effect on the path of growth and proliferation of other cells Thus natural development of estrogen-positive future cancers

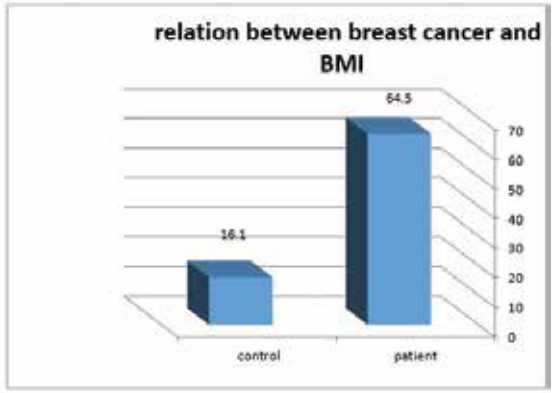


Figure 4: Explain the relation between BMI and breast cancer

The study showed that the level of education for women plays a large role in the prevalence of breast cancer, with 36.3% of the illiterate women, 28.8% of the women with primary education, 15.8% secondary education, 11.6% of the diploma and 7.4% of the Bachelor's degree (figure 5)

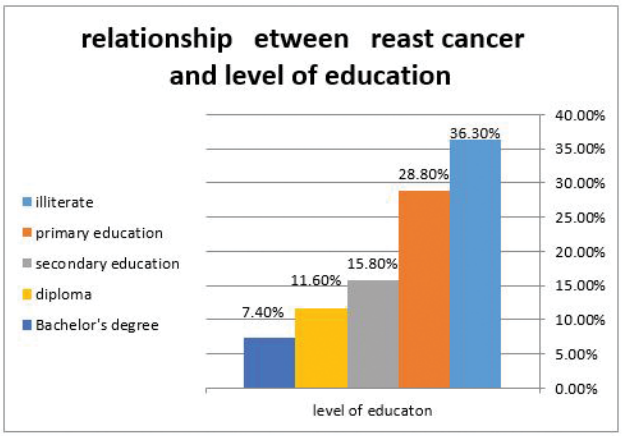


Figure 5: Explain the relationship between level of education and breast cancer

Conclusions and Recommendations

Conclusions

- The rate of breast cancer was higher for other cancers
- The study showed that oral contraceptives were a risk factor for cancer Breast.
- The study showed that obesity is a risk factor for breast cancer.
- The study showed is a relationship between blood groups and breast cancer.

Recommendations

- We recommend that women use oral contraceptives to reduce the risk of breast cancer.
- As obesity is one of the most important factors for breast cancer, women are advised to lose weight and exercise.
- It is necessary to follow a regular breast examination which helps in early detection of the disease.

Conflict of Interest: Nil

Source of Funding: Self.

Ethical Clearance: Not required.

REFERENCES

1. Macdonald, F, Ford, C.H.J and Gasson A.G. Molecular Biology of Cancer, 2ed,Edition, Garland Science/BIOS Scientific Publishers 2004.
2. Perou CM, Sorlie T, Eisen MB, van de Rijn M, Jeffrey SS, Rees CA, et al. Molecular portraits of human breast tumours. Nature. 2000;406:747–752
3. Homo-Delarche F, Fitzpatrick F, Christeff N, Nunez E, Bach J, Dardenne M: Sexsteroids, glucocorticoids, stress and autoimmunity. J Steroid Biochem MolBiol 1991, 40:619-637.
4. VanItallie T: Stress: a risk factor for serious illness. Metabolism 2002, 51:40-45
5. American Cancer Society.. How is breast cancer staged? (2013, October 24).
6. American Cancer Society. Breast cancer survival rates by stage.(2013, October 24).
7. S. Eva Singletary, Rating the Risk Factors for Breast Cancer, Annals of surgery, 2003;No. 4, 474–482.
8. Siransy L.K., Nanga Z.Y., Zaba F.S., Tufa N.Y., Dasse S.R. ABO/Rh blood groups and risk of HIV infection and Hepatitis B among blood donors of Abidjan, Côte D'ivoire. Eur. J. Microbiol. Immunol. 2015;18:205–209
9. Zakai Nai, Judd S.E., Alexander K., Mcclure L.A., Kissela B.M., Howard G., Cushman M. ABO blood type and stroke risk: the reasons for geographic and racial differences in stroke study. J. Thromb. Haemost. 2014;12:564–570.
10. Meo S.A., Rouq F.A., Suraya F., Zaidi S.Z. Association of ABO and Rh blood groups with type 2 diabetes mellitus. Eur. Rev. Med. Pharmacol. Sci. 2016;20:237–242
11. Yu J., Gao F., Klimberg V.S., Margenthaler J.A. ABO blood type/Rh factor and the incidence and outcomes for patients with triple-negative breast cancer. Ann. Surg. Oncol. 2012;19:3159–3164.
12. Aly R., Yousef A., Elbably O. Association of ABO blood group and risk of breast cancer. J. Blood Disord. Transfus. 2014;5:241.
13. Stamatakos M., Kontzoglou K., Safioleas P., Safioleas C., Manti C., Safioleas M. Breast cancer

incidence in Greek women in relation to ABO blood groups and Rh factor. Int. Semin. Surg. Oncol. 2009;6:14.

14. Zhang B.L., He N., Huang Y.B., Song F.J., Chen K.X. ABO blood groups and risk of cancer: a systematic review and meta-analysis. Asian Pac. J. Cancer Prev. 2014;15:4643–4650.
15. Hunter DJ, Colditz GA, Hankinson SE, et al. Oral contraceptive use and breast cancer: a prospective study of young women. *Cancer Epidemiology Biomarkers and Prevention*2010; 19(10):2496–250242)
16. Pischon T, Nothligs U, Boeing H. Obesity and Cancer in the Symposium on Diet and Cancer. Proceedings of the Nutrition Society 2008 ; 67: 128-145.
17. Calle EE, Kaaks R. Overweight, obesity and cancer: epidemiological evidence and proposed mechanisms. Nat Rev Cancer 2004 ;4: 579-591.
18. Williams CM Lipid metabolism in women. Proc Nutr Soc, 2004 63(1):153–160.

Strengthen the Spiritual-Based Family Resilience to Overcome the Family Stigma of Leprosy

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ABSTRACT

The high burden of stigma received by the family as a result of leper family members requires resources, support, and resilience so that the family will be able to perform its role in caring for the leper family members and reducing the stigma. The Spiritual based family is an important component of the value system and trust for family life in strengthening family resilience. This spiritual factor will be very influential on coping, support, family acceptance of leprosy patients and the process of treatment and family stigma.

The purpose of this research was to analyze family spiritual factor with family resilience theory approach in overcoming family stigma.

This research used a cross-sectional design. The research population was 174 leprosy families in 21 endemic Leprosy public health centers or *Puskesmas* in Jombang regency of East Java. The samples were 120 families, taken using a Multi-Stage Random Sampling technique. The Hypothesis test used a chi-square test with a p-value <0.05.

The result of the research was that 73 (60.8%) had moderate and high family stigma, 46 (52.5%) moderate spiritual family and 60 (50%) of medium resilience. The family spiritual factor had an effect on family resilience (P = 0.000), and family resilience had an effect on family stigma (P = 0.000).

The conclusion was that family spiritual factors influence family resilience to overcome family stigma. Therefore, it is suggested that the intervention to overcome the family stigma must concern with family resilience and family spiritual factors.

Keywords: *Family, Spirituality, Resilience, Stigma*

Introduction

Based on the conceptual model of stigma, stigma is exists when the elements of labelling, stereotyping, separation, loss of status, and discrimination occur in a power situation that allows stigma components to unfold [(1)]. The cause of stigma in leprosy patients is complex, namely socio-cultural, fear of the causes, manifestations, effects and death from disease, economic, psychological, religious and spiritual [(2,3).] Public stigma effect on the family raises stigma problems for the family and also has an effect on the family's behavior of the leper family members. The results of the previous research conducted in 2017 showed that 39 families of leprosy patients in six endemic leprosy public health centers or *Puskesmas* in Jombang regency of East Java had 29 (74.4%) family stigma, individual factors involved individual stigma, self-concept, and level leprosy defect had an impact toward the family stigma (P = 0.000). Family factors involved family support, family coping mechanisms, knowledge and family perceptions of leprosy had an impact toward the family stigma (P = 0.000) [(4)].

Resilience, support, and strengthening of family resilience are needed by the family in carrying out the family function of caring for the leper family members and overcoming the stigma for the family, family internal stigma and stigma for the lepers. Strengthening of family resilience includes three major components

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are namely: strengthening the family belief systems, strengthening the structure and function of the family as a unit or system (organization patterns), strengthening communication patterns and family strength system in overcoming problems (communication/problem-solving) [4–10]. Family spirituality is the basis of family values and belief systems, the core of all coping and family adaptation, and families seek and rely on the spiritual support of family members as a family way to deal with stigma problems [11–13]. Spiritual is also a family domain, that being a source of family strength and family resilience, hence this research was aimed to analyses family spiritual factor with family resilience theory approach in overcoming family stigma.

Material and Method

This cross-sectional design research was conducted on 2018 – 2019. The study population was a leprosy family in 21 endemic leprosy community health services in Jombang regency of East Java, consisted of 174 families of leprosy patients and they had been diagnosed with leprosy and recorded in a public health center or *puskesmas* data registration. The sample was 120 families taken by using Multi-Stage Random Sampling. The hypothesis test was taken by using the chi - square test with <0.05 significance. Data collected by questionnaires. Respondent from each family was represented by a family member who cares directly for lepers in the family. Assessment topics included 1). The family spiritual factor, 2). The family resilience, and 3). The family stigma. The family spiritual factor data assessed using the family's answer to family religiosity coping, family interdependence in religious and spiritual, family support and togetherness in religious and spiritual, and family spiritual. The family resilience assessed using the family's answer to the family's ability to helping others, growing stronger, acceptance, adjustment, and survival. The questionnaire used to measure the spiritual family was a modified instrument which was created from the religion and problem-solving scale (RPS) instrument based on the concept of religion and the problem-solving process [14], the spiritual response questionnaire from Nursalam [15], and the American Family Strengths Inventory on the component Spiritual Well-Being (SWB) [16,17]. The family resilience measurement questionnaire used the Walsh Family Resilience Questionnaire (WRFQ) (18) and the concept of family resilience processes [19]. Measurements of family stigma were based on the concept of stigma [20], the concept of stigma and social stigma components [21,22], and the concept of family stigma (23) and modified with the Explanatory Model Interview catalog (EMIC) stigma scale for community [24–27]

The univariate analysis used frequency distribution while bivariate analysis applied test chi-square if statistically eligible, if it does not qualify, then it would use the test of Fisher's Exact Test of p value <0.05.

Findings

The Family Spiritual Factors toward the Leprosy Family Resilience Analysis

Table 1: The Influence of family spiritual factor toward the leprosy family resilience in Jombang district East Java Indonesia in 2018

Family spiritual	Lower Resilience		Moderate Resilience		High Resilience		Total		P
	(f)	(%)	(f)	(%)	(f)	(%)	(f)	(%)	
Family Religious Coping									
Low	22	18.3	28	23.3	2	1.7	120	100	0.000
Medium	7	5.8	22	18.3	19	15.8	120	100	
High	1	0.8	10	8.3	9	7.5	120	100	
Family Interdependence in religious and spiritual									
Low	20	16.7	22	18.3	0	0	120	100	0,000
Medium	9	7.5	28	23.3	22	18.3	120	100	
High	1	0.8	10	8.3	8	6.7	120	100	

Conted…

Family support and Togetherness in religious–spiritual									
Low	27	22.5	28	23.3	0	0	120	100	0,000
Medium	2	1.7	23	19.2	21	17.5	120	100	
High	1	0.8	9	7.5	9	7.5	120	100	
Family Spiritual									
Low	19	15.8	20	16.7	0	0	120	100	0,000
Medium	10	8.3	28	23.3	20	16.7	120	100	
High	1	0.8	12	10	10	8.3	120	100	

Based on table 1, it was shown that the spiritual family and its sub-variable influence the family resilience (P=0.000). It can be seen that the Family Religious Coping, the Family Interdependence in religious and spiritual, the Family Support and Togetherness in Religious and spiritual, and the Family Spiritual have a significant influence on family resilience.

The Resilience Factor toward the Stigma of Leprosy Family Analysis

Table 2: The Influence of resilience factor toward the stigma of leprosy family in Jombang district of Indonesia in 2018

Family resilience	Lower Stigma		Moderate Stigma		High Stigma		Total		P
	(f)	(%)	(f)	(%)	(f)	(%)	(f)	(%)	
Helping other									
Low	16	13.3	15	12.5	8	6.7	120	100	0.064
Medium	26	21.7	17	14.2	9	7.5	120	100	
High	5	4.2	14	11.7	10	8.3	120	100	
Growing stronger									
Low	28	23.3	6	5	1	0.8	120	100	0.000
Medium	19	15.8	25	20.8	12	10	120	100	
High	0		0	12.5	14	11.7	120	100	
Acceptance									
Low	26	21.7	13	10.8	4	3.3	120	100	0.000
Medium	19	15.8	32	26.7	14	11.7	120	100	
High	2	1.7	1	0.8	9	7.5	120	100	
Adjustment									
Low	25	20.8	9	7.5	2	1.7	120	100	0.000
Medium	21	17.5	25	20.8	12	10	120	100	
High	1	0.8	12	10	13	10.8	120	100	
Survival									
Low	41	34.2	13	10.8	2	1.7	120	100	0.000
Medium	6	5	25	20.8	15	12.5	120	100	
High	0	0	8	6.7	10	8.3	120	100	

Based on table 2, showed that the influence of spiritual family on family resilience after the statistical test, obtained value P = 0.000. It can be deduced that Family Interdependence in religious and spiritual factors. The family support and togetherness in religious and spiritual and the family Spiritual have a significant influence on family resilience.

The percentage of the family spiritual and the family resilience rates were almost half at moderate (> 45%) and only a small (<20%) rate was high. The results indicated that the spiritual family which was the family resources on the family's basic value system was still weak. Thus, these factors lead to family endurance to stress and resilience family.

After the statistical test, it was obtained that the effect of family resilience of family stigma in table 2 was P = 0.000, which means that family resilience has an effect on family stigma. The influence of sub-variable of resilience of the family was only sub-variable of other helping have a p-value = 0.064, while sub-variable Growing stronger (P = 0.000), Acceptance (P = 0.000), Adjustment (P = 0.000) and Survival (P = 0.000) it was concluded that there was influenced by the family stigma.

Discussion

The family spirituality greatly influences the family's ability to deal with their problems, strengthens family relationships and the resilience reflected in family dynamics as a system in carrying out family functions, the parenting styles, the family dynamics, the family development, and the spiritual relationships between generations. The spiritual component of the family includes 1) The Personal faith; 2). The Spiritual and religious praxes (contemplative practices, rituals, and ceremonies); 3). The Faith communities; (4) The Faith communities, connection with nature 5). The Ability to express creative activities (expression through the creative arts); 6). The Community service/ social activism; 7. The intimate relationship with transcendence; 8). The Relationship with God [6,28].

Spiritual strength would strengthen family health, including family commitments, improve emotional health, develop healthy living behaviors, improving healing process (13). The spiritual influence 4 dimensions of family care which were coping, support, acceptance, treatment and treatment process [29]. This condition cause a stressor of the situation for the family, the ability of the family to survive or the ability of family resilience is needed in the overcoming a stressful situation, the ability of the family to adapt, help each other, accept the condition of leprosy patients, change the family structure that support the process of treatment and care as well as the ability to survive together will help families to solve problems and adapt to stressors and will not appear in family stigma [7,28,30].

Family resilience is the ability to bounce back from adversity and then become stronger and able to take lessons from the difficulties encountered. There are three major components of family resilience, namely: family belief systems, family structure and function as an organizational pattern, communication pattern and family strengthening system (communication/problem-solving) [6,9,28,31].

Apparently, the reducing of leprocy occurences still gives bad stigma about the lepers and their family to the people and it is always attached to them. This effect of leprocy in term of physic, psychology and social consequently contribute to the rise of the problem of lepers and their family which represents in the form of stress and its effect on the health of the family. Thus, resources, support and strengthening the resilient of the family is necessary for the family of the lepers to care of their members who suffers of leprocy and also to maintain the health of the family. Furthermore, family should have spiritual control which is a based on value system and family belief. In this case spiritual belief, family and individual religiousity are the core of all copings and family adaptation. Moreover, family try to look for and use family spiritual belief to cope with stigma problem. In general, main concept of family spiritual consists of family religious coping, family interdependence, family togetherness dan personal spiritual (32,33)

Conclusions

The spiritual family includes the family religious coping, the family interdependence in religious and spiritual, the family support and togetherness in religious and spiritual, and the family member spiritual influence on the occurrence of family resilience as well as the stigma to the family with the leper.

Conflict of Interest: There is no conflict of interest for every author

Source of Funding: This research was funded by Directorate for Research and Community Service, Directorate General of Development and Research Enhancement, The Ministry of Research, Technology and Higher Education.

Ethical Clearance: All procedures performed in studies involving human participants had gotten ethical approval from the Health Research Ethics Committee, Faculty of Public Health *Airlangga* University

Informed Consent: Informed consent was obtained from all individual participants included in the study.

REFERENCES

1. Link BG, Phelan JC. Conceptualizing Stigma. Annu Rev Sociol. 2001;27(Lewis 1998):363–85.
2. Phelan JC. Handbook of the Sociology of Mental Health [Internet]. 2013. Available from: http://link.springer.com/10.1007/978-94-007-4276-5
3. Sermrittirong S. Stigma in leprosy : concepts, causes and determinants. 2014;36–47.
4. Nasrudin, Ah Yusuf C, Hargono R, Tjipto Suwandi. The Effect of Individual, Family and Environmental Factors on Family Stigma with leprosy. Adv Soc Sci Educ Humanit Res. 2018;98(Icpsuas 2017):153–7.
5. Scheff TJ. The Labelling Theory of Mental Illness [Internet]. Vol. 39, American Sociological Review. 1974. p. 444. Available from: http://www.jstor.org/stable/2094300?origin=crossref
6. Walsh F. Spiritual Resource In Family Therapy. 2nd ed. Walsh F, editor. New York London: THE GUILFORD PRESS; 2009.
7. Walsh F. Strengthening family resilience (3rd ed.). [Internet]. Strengthening family resilience (3rd ed.). 2016. Available from: http://ovidsp.ovid.com/ovidweb.cgi? T = JS&PAGE = reference&D = psyc12&NEWS = N&AN = 2015-51882-000
8. Benito E, Oliver A, Galiana L, Barreto P, Pascual A, Gomis C, et al. Development and Validation of a New Tool for the Assessment and Spiritual Care of Palliative Care Patients. J Pain Symptom Manage [Internet]. 2014;47(6):1008–1018. e1. Available from: http://dx.doi.org/10.1016/j.jpainsymman.2013.06.018
9. Black K, Lobo M. Family Resilience Factors. J Fam Nurs. 2008;14(1):33–55.
10. Black K, Lobo M. A conceptual review of family resilience factors. J Fam Nurs. 2008;14(1):33–55.
11. Kim S, Hayward RD, Koenig H, Kim S, Reed PG, Hayward RD, et al. Spirituality and Psychological Well- Being : Testing a Theory of Family Interdependence Among Family Caregivers and ... Spirituality and Psychological Well-Being : Testing a Theory of Family Interdependence Among Family Caregivers and Their Elders. 2011;(January 2017).
12. Reynolds N, A M, Mrug S, Ph D, Guion K, Ph D. Spiritual Coping and Psychosocial Adjustment of Adolescents With Chronic Illness : The Role of Cognitive Attributions, Age, and Disease Group. J Adolesc Heal [Internet]. 2013;52(5):559–65. Available from: http://dx.doi.org/10.1016/j.jadohealth.2012.09.007
13. Yeoun SK, Harold SK. Family Spirituality and Family Health Among Korean-American Elderly Couples. J Relig Health. 2016;55(2):729–46.
14. Pargament KI, Kennell J, Hathaway W, Grevengoed N, Kennell J, Hathaway W, et al. Religion and the Problem-Solving Process : Three Styles of Coping. J Sci Study Relig. 2013;27(1):90–104.
15. Nursalam. Metodologi Penelitian Keperawatan pendekatan praktis. 4th ed. Jakarta: Salemba medika; 2016.
16. Dhar N, Chaturvedi S, Nandan D. Spiritual health scale 2011: defining and measuring 4 dimension of health. Indian J Community Med [Internet]. 2011 Oct [cited 2017 Feb 20];36(4):275–82. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22279257
17. Dhar N, Chaturvedi SK, Nandan D. Self evolution : 1 st domain of spiritual health. 2012;33(2):174–7.
18. Walsh F. Strengthening family resilience (2nd ed.). [Internet]. Strengthening family resilience (2nd ed.). 2006. Available from: http://ovidsp.ovid.com/ovidweb.cgi? T = JS&PAGE = reference&D = psyc5&NEWS = N&AN = 2006 - 12492 - 000
19. Lietz CA, Julien-Chinn FJ, Geiger JM, Hayes Piel M. Cultivating Resilience in Families Who Foster: Understanding How Families Cope and Adapt Over time. Family Process. 2016;
20. Goffman E. Stigma: Notes on The Management of Spoiled identity. United States of America: Prentice-Hall, Inc. Englewood Cliffs, N.].; 1963.
21. Link BG, Phelan JC. Labeling and Stigma. In: Carol S. Aneshensel., Jo C. Phelan. ABE, editor. Handbook of the Sociology of Mental Health.

2nd ed. New York London: Springer Dordrecht Heidelberg; 2013. p. 525–41.

22. Link BG, Phelan JC. Onceptualizing tigma. Annu Rev Sociol. 2001;27(Lewis 1998):363–85.
23. Park S, Park KS. Family Stigma : A Concept Analysis. Asian Nurs Res (Korean Soc Nurs Sci) [Internet]. 2014;8(3):165–71. Available from: http://dx.doi.org/10.1016/j.anr.2014.02.006
24. ILEP. Guidelines to reduce stigma [Internet]. London/Amsterdam; 2011: The International Federation of Anti-Leprosy Associations (ILEP) and the Netherlands Leprosy Relief (NLR); 2011. 1-22 p. Available from: www.infolep.org/stigma-guides
25. Weiss MG, Ramakrishna J, Somma D. Health-related stigma: rethinking concepts and interventions. Psychol Health Med. 2006;11(3):277–87.
26. Rensen C, Bandyopadhyay S, Gopal PK, van Brakel WH. Measuring leprosy-related stigma - a pilot study to validate a toolkit of instruments. Disabil Rehabil [Internet]. 2011;33(9):711–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20690861
27. Van Brakel W. Measuring health-related stigma—A literature review. Psychol Health Med [Internet]. 2006;11(3):307–34. Available from: http://0-search.ebscohost.com.libus.csd.mu.edu/login.aspx?direct=true&db=s3h&AN=21806676&site=ehost-live
28. Walsh F. Strengthening Family Resilience. 2nd ed. Vol. 38, Adolescence. New York London: THE GUILFORD PRESS; 2003. 406 p.
29. Nalika Unantenne.Narelle Warren.,Rachel Canaway. LM. The Strength to Cope : Spirituality and Faith in Chronic. J Reli Heal. 2013;52:1147–61.
30. Chris J. Boyatzis, Davis C. Dollahite LDM. The Family As A Contexts For Religious And Spiritual Development in Childern And Youth. In: Eugene C. Roehlkepartain, Pamela Ebstyne Kin, Linda Wagener PLB, editor. the Handbook of Spiritual Development in Childhood and Adolescence. Lodon: Sage Publications; 2006. p. 297–309.
31. Walsh F. Community-Based Practice Applications of a Family Resilience Framework. In: Becvar DS, editor. Handbook of family resilience [Internet]. New York: Springer Science Business Media; 2013. p. 65–82. Available from: https://www.lib.byu.edu/cgi-bin/remoteauth.pl?url=http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2012-25734-025&site=ehost-live&scope=site%5Cnhttp://caldwllk1@appstate.edu
32. Fisher J. The Four Domains Model: Connecting Spirituality, Health and Well-Being. 2011;17–28.
33. Friedman, Marilyn M.; Bowden, Vicky R.;Jones EG. Family Nursing:Research, Theory, And Practice. 5th Edition. 5th ed. New Jersy: Prentice Hall; 2003.

Association between Socio-economic Status and Breast Feeding Practices in a Group of Women Delivered During the Previous Year in Kirkuk City

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ABSTRACT

Breastfeeding is considered as an ideal form of feeding in the neonate. It is feeding of babies with breast milk directly from women breasts instead of a baby bottle or other container. The present study aims at investigating the association between breastfeeding practices and socioeconomic status. This cross-sectional study was conducted at Pediatric General Hospital (PGH) in Kirkuk city over a period of seven months starting from January 2016. Consecutive sampling was employed to collect 377 mothers who have children (< 24 months) in PGH. A questionnaire was used to compile the information on the socio-economic factors and practices of breastfeeding. Data was analyzed through descriptive and inferential statistics (Chi-square test). Out of 288 mothers, 377 of them reported being breastfed. A significant difference has been found between breastfeeding practices and some maternal data. These include age ($p < 0.001$), parity ($p = 0.018$), and antenatal session attendance ($p < 0.001$). On the other hand, the regular visit to the PHC during the prenatal period did not affect breastfeeding practices ($p = 0.296$). Moreover, a highly significant association between breastfeeding practices and socioeconomic status of mothers has been shown. These include educational level ($p = 0.002$), occupational status ($p < 0.001$), and family income ($p < 0.001$). Breastfeeding has increased significantly with the increase in the level of education, family income, and being an employee.

Keywords: *Breastfeeding, Income, Education, Employment.*

Introduction

Breastfeeding is the process of feeding human breast milk to an infant. It is the usual way to provide babies with the nutrients they need to ensure healthy growth and development in the future.[1] Worldwide almost 38% of babies are just breastfed during their first six months of life. The duration of breastfeeding is shorter in high-income countries than in those that are resource-poor.[2] In Iraq, the early initiation rate of breastfeeding has risen from 25.1% in 2006 to 43% in 2011, whereas the exclusive breastfeeding rate was only 20%. [3]

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Breastfeeding is considered an important measure to secure optimal health and survival for children.[4] Breast milk is the optimal food for infants and its benefits are numerous, as they contain living components such as antibodies that fight infection, white blood cells, red blood cells, and antiviral agents.[5] Moreover, breastfeeding is a protective factor for chronic diseases that may occur later in life, such as diabetes, childhood asthma, obesity, high cholesterol, high blood pressure, and childhood leukaemia. As of intelligence and behavior in adulthood, it has been shown that breastfed infants achieve better results in the tests compared to infants who are formula-fed.[6]

The mothers likewise are no exception of breastfeeding benefits, it contributes to a lower risk of postpartum bleeding; maintains birth spacing; strengthens mother-infant relationship; and finally breastfeeding provides money and effort, as breast milk is ready and needs no preparation.[4] In addition, it protects against certain non-communicable diseases such as

heart disease, type 2 diabetes, breast cancer, endometrial cancer, and ovarian cancer.[6]

There is evidence showing that breastfeeding practices are influenced by many factors such as maternal age and higher parity. It has been shown that older mothers and higher parity are the strongest predictors of exclusive breastfeeding.[7,8] Socioeconomic status such as income, education, and employment also turn up affecting breastfeeding practices.[9] It has shown that rates of breastfeeding increase with high family incomes.[10] It was thought that parents, who are employed, have a higher level of education, and a higher income may have more positive attitudes towards breastfeeding [11] which in turn may lead to breastfeeding practices. Wherefore, the findings of this study would provide a database to the stakeholders in Iraq to design such an intervention programme to improve the practice of breastfeeding in the area with similar circumstances.

Method

Across-sectional study has been conducted at Pediatric General Hospital (PGH) in Kirkuk city over a period of seven months starting from January 2016 to the end of July 2016. The target population was mothers in Kirkuk city with children (< 24 months). Utilizing the sample size formula N= Z^2 x P x $(1-P)/ d^2$ for single proportion,[12] a 95% confidence level, a prevalence rate of 43%,[14] and a 5% allowable point of error, a sample size of 377 was arrived at. So, consecutive sampling was done on mothers who met the inclusion criteria from Pediatric General Hospital until the sample size was reached. Exclusion criteria were mothers who have not to breastfeed their babies due to barriers other than socioeconomic factors. A questionnaire was constructed to reach the purpose of the study. It consisted of three parts; the first part concerned with mothers' demographic attributes (age and parity), and maternal socioeconomic information (education, occupation, and income). The second part was supportive activities (visiting PHC regularly during pregnancy and participating in lectures regarding breastfeeding), and the last part was relating to breastfeeding practices. Family income was categorized as Low income (< 500000 ID), Adequate (500000-1000000 ID), and High income (> 1500000). The content validity the questionnaire was determined through a panel of ten experts. The questionnaire was piloted on 10 mothers who have been excluded from the final sample. The Statistical Package for Social Sciences software (SPSS, version 21) was used for data processing and statistical analysis. Data was analyzed through descriptive (frequency and percentages) and inferential statistics (Chi-square test). A P value of ≤0.05 was considered statistically significant.

Results

Table 1: Association of breastfeeding practices with some maternal data of (377) sample

Characteristics	Breastfeeding				Total		P value
	Practiced		Not practiced				
Age (Years)	**No**	**%**	**No**	**%**	**No**	**%**	
18-21	24	8.3%	5	5.6%	29	7.7%	<0.001
22-25	50	17.4%	16	18.0%	66	17.5%	
26-29	32	11.1%	12	13.5%	44	11.7%	
30-33	71	24.7%	46	51.7%	117	31.0%	
34-38	111	38.5%	10	11.2%	121	32.1%	
Total	288	100%	89	100%	377	100%	
Parity	No	%	No	%	No	%	0.018
Primiparous	80	27.8%	36	40.4%	116	30.8%	
Multiparous	208	72.2%	53	59.6%	261	69.2%	
Total	**288**	100%	**89**	100%	**377**	100%	
Visiting PHCc	**No**	**%**	**No**	**%**	**No**	**%**	0.296
Available	211	73.3%	62	69.7%	273	72.4%	
Un available	77	26.7%	27	30.3%	104	27.6%	
Total	288	100%	89	100%	377	100%	

Conted…

Lectures Attendance	No	%	No	%	No	%	
Available	203	70.5%	50	56.2%	253	67.1%	0.009
Un available	85	29.5%	39	43.8%	124	32.9%	
Total	288	100%	89	100%	377	100%	

N= number; %= percentage; P = level of probability ≤0.05

More than half of mothers (63.1%) have aged 30 years and over, (69.2%) of them have more than one child, a vast majority of mothers (72.4%) have regularly visited primary health care center (PHCc) during antenatal period, and (67.1%) of them have received antenatal orientation about breastfeeding. A total of 288 mothers out of 377 reported being breastfed (Table 1).

A significant difference has been found between breastfeeding practices and some maternal data. These include age (p <0.001), parity (p 0.018), and antenatal lectures attendance (p 0.009). On the other hand, regular visit to (PHCc) during antenatal period has not affected breastfeeding practices (p 0.296).

Table 2: Association of breastfeeding practices with maternal socioeconomic status of (377) sample

Characteristics	Breastfeeding				Total		P value
	Practiced		Not practiced				
Educational level	**No**	**%**	**No**	**%**	**No**	**%**	
Illiterate	36	12.5%	6	6.7%	42	11.1%	
Read and write	15	5.2%	5	5.6%	20	5.3%	
Primary school	43	14.9%	19	21.3%	62	16.4%	
Secondary school	11	3.8%	13	14.6%	24	6.4%	0.002
Institute graduate	14	4.9%	6	6.7%	20	5.3%	
College and above	169	58.7%	40	44.9%	209	55.4%	
Total	288	100%	89	100%	377	100%	
Occupational status	**No**	**%**	**No**	**%**	**No**	**%**	
Housewife	88	30.6%	47	52.8%	135	35.8%	
Employee	200	69.4%	42	47.2%	242	64.2%	<0.001
Total	**288**	100%	**89**	100%	**377**	100%	
Family Income	No	%	No	%	No	%	
Low income	12	4.2%	43	48.3%	55	14.6%	
Adequate income	233	80.9%	35	39.3%	268	71.1%	<0.001
High income	43	14.9%	11	12.4%	54	14.3%	
Total	288	100%	89	100%	377	100%	

N= number; %= percentage; P = level of probability ≤0.05

The findings of (Table 2) have been illustrated a highly significant association between breastfeeding practices and socioeconomic status of mothers. These include educational level (p 0.002), occupational status (p <0.001), and family income (p <0.001).

Discussion

Breastfeeding is considered as an ideal form of feeding in the neonate. It is a protective factor for both mothers and children because it contains antibodies that help children to fight microbial agents.[5] For mothers, it protects against uterine cervical and ovarian cancers as well as breast cancer.[6] Breastfeeding is influenced by several factors. The decision to breastfeed is associated with higher socioeconomic status.[9] A present study was designated to describe the influence of socioeconomic status on breastfeeding practices among mothers attending PGH in Kirkuk city. It used educational level, occupational status, and family income as indicators of socioeconomic status. It has shown a significant increase of the breastfeeding practice with an increasing level of

education and family income. This means uneducated women, and those with low income are usually less inclined to breastfeed their infants. The possible explanation for this finding is that uneducated mothers are at lower risk of social variables as a result of their contact with the community, and because of the lack of their health knowledge, they have fed their babies other than breast milk. This is because the mothers who have more education may understand the health benefits of breastfeeding.[14] This finding confirms previous similar studies,[10,15,16] while in contrast to others elsewhere.[17,18,19] This variance perhaps results from differences in the pattern of breastfeeding among women in different cultures. Another reason may be that mothers in those studies are more inclined to breastfeeding compared to other mothers. Furthermore, mothers' practices of breastfeeding have been affected by their occupation. It has shown mothers who work were more likely to breastfeed their babies than housewife mothers. This finding is coincide with that reported by other studies.[15,20] The explanation for this finding could be attributed to several reasons. First of all, in Iraq, a period of up to one-year maternal leave is given to female workers for taking care of their newborns. Second, during working hours, a nursing break of up to one hour is given for nursing mothers for the same reson.[13] The third reason is that parents, who are employed, have a higher level of education, and a higher income may have more positive attitudes towards breastfeeding.[11]

On the other hand, the current study also displays other maternal factors affecting breastfeeding practices. It has been shown that breastfeeding practices are higher among women who have an older age group. This finding is consistent with many studies.[7,21,22] A similar finding was observed for multiparous mothers, whereas the mothers who have more than one child are more inclined in practice to breastfeeding than those who have one child. This finding is also supported by other studies.[8,23] This could be attributed to mothers' experience of child rearing over the previous period. Moreover, mothers who have received antenatal orientation concerning breastfeeding are more likely to breastfeed their babies. This is mostly as a result of health education session they attended during antenatal visits. The classes are typically taught by well-informed educator in breastfeeding or lactation management. The information that has been giving for mothers during these classes are most often include certain problems related to ineffective breastfeeding and the benefits of breastfeeding to mother, baby, and society as well.[24]

In conclusion, socioeconomic status is responsible for such findings. Breastfeeding increased significantly with increasing level of education, family income, and being an employee. The study findings highlight the need for raising the level of women's education, expanding the chances for women to work can increase the income of the household which in turn participates in the financial stability for the families, and designing appropriate programmes for new parents to show the importance of breastfeeding and its benefits (e.g., social, psychological, and economic benefits) for mothers and babies in addition to showing the disadvantages of skipping breastfeeding.

Conflicts of Interest: The researcher reports no conflicts of interest.

Conflict of Interest: None of the authors have any conflicts of interest to declare.

Source of Funding: The research was performed independently, there is no funding, influence over study design, analysis, manuscript preparation, or scientific publication.

Ethical Clearance: The project was approved by the local ethical committee in University of Kirkuk.

REFERENCES

1. World health organization WHO. Health topics. Breastfeeding, 2016. (Accessed July 1, 2016, at http://www.who.int/topics/breastfeeding/en/).
2. Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. The Lancet 2016; 387(10017): 475-90.
3. International Baby Food Action Network (IBFAN). Report on the situation of infant and young child feeding in Iraq, the convention on the rights of the child session 68 / January 2015, Prepared by: Geneva Infant Feeding Association (IBFAN – GIFA) - IBFAN global liaison office. (Accessed July 7, 2016, at: http://tbinternet.ohchr.org/Treaties/CRC/Shared% 20Documents/IRQ/INT_CRC_NGO_IRQ_19081_E.pdf).

4. World Health Organization WHO. Strategic directions for improving the health and development of children and adolescents, Department of child and adolescent health and development. WHO Geneva. 2013.

5. Taylor S. Plymouth Laych-on Breastfeeding Groups, 2013. (Accessed September 18, 2016, at: http://www.plymouthlatchon.org.uk/id14.html).

6. The United Nations Children's Emergency Fund (UNICEF). Breastfeeding, 2015. (Accessed July 29, 2016, at:http://www.unicef.org/nutrition/index_24824.html).

7. Ukegbu AU, Ukegbu PO, Onyeonoro UU, Ubajaka CF. (2011). Determinants of breastfeeding patterns among mothers in Anambra State, Nigeria. South African Journal of Child Health 2011; 5(4):112.

8. Hackman NM, Schaefer EW, Beiler JS, Rose CM, Paul IM. Breastfeeding outcome comparison by parity. Breastfeeding Medicine. 2015; 10(3):156-62.

9. McDowell MM, Wang CY, Kennedy-Stephenson J. Breastfeeding in the United States: findings from the national health and nutrition examination surveys, 1999-2006. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2008 Apr.

10. Petry R. Breastfeeding and Socioeconomic Status An Analysis of Breastfeeding Rates Among Low-SES Mothers. 2013, (Accessed June 11, 2016, at: http://hdl.handle.net/11021/24084).

11. Sittlington J, Stewart-Knox B, Wright M, Bradbury I, Scott JA. Infant-feeding attitudes of expectant mothers in Northern Ireland. Health education research. 2007; 22(4):561-70.

12. Gahlinger PM, Abramson JH. Computer programs for epidemiological analysis (CPEA). Honolulu, Hawaii: Makapu Medical Press 1995; pp 138–41.

13. The United Nations Children's Emergency Fund (UNICEF), World Food Programme (WFP). Joint Statement on Breastfeeding/Nutrition stakeholders call for appropriate feeding of infants and young children in the Iraq. 2016, (Accessed June 24, 2016, at: http://fscluster.org/iraq/document/joint-statement-breastfeeding-iraq-june).

14. Heck KE, Braveman P, Cubbin C, Chávez GF, Kiely JL, Chárez GF. Socioeconomic status and breastfeeding initiation among California mothers. Public health reports. 2006; 51-9.

15. Moayyad NM. Factors Influencing Breast Feeding Patterns in Thi- Qar Governorate. Thi-Qar Medical Journal. 2009; 3(1):25-32.

16. Apostolakis-Kyrus K, Valentine C, DeFranco E. Factors associated with breastfeeding initiation in adolescent mothers. The Journal of pediatrics 2013; 163(5):1489-94.

17. Najdat, SM, Kareem AO. Significance of Parental Education in Choosing Breast Milk for Infant Feeding at Diyala Province, Hospital- Based Study. Diyala Journal of Medicine 2013; 4(1): 117-24

18. Bertini G, Perugi S, Dani C, Pezzati M, Tronchin M, Rubaltelli FF. Maternal education and the incidence and duration of breast feeding: a prospective study. Journal of pediatric gastroenterology and nutrition 2003; 37(4):447-52.

19. Tavoulari EF, Benetou V, Vlastarakos PV, Andriopoulou E, Kreatsas G, Linos A. Factors affecting breast-feeding initiation in Greece: What is important?. Midwifery. 2015 Feb 28;31(2):323-31.

20. Huda A. Habib. Breast Feeding and Mothers Employment. Al-Kindy College Medical Journal 2012; 8(2):32-9.

21. Sulfa AH, Suhair MH, Suha A. Effect of maternal factors on breast feeding pattern among women in holy Karbala. Journal of Kerbala University 2013; 11(2):176-81.

22. Oakley LL, Renfrew MJ, Kurinczuk JJ, Quigley MA. Factors associated with breastfeeding in England: an analysis by primary care trust. BMJ open 2013; 3(6):e002765.

23. Kitano N, Nomura K, Kido M, Murakami K, Ohkubo T, Ueno M, Sugimoto M. Combined effects of maternal age and parity on successful initiation of exclusive breastfeeding. Preventive medicine reports 2016; 3:121-6.

24. Shealy KR, Li R, Benton-Davis S, Grummer-Strawn LM; the CDC Guide to Breastfeeding Interventions. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005.

Quantitative Assessment of Factors Affecting Visual Acuity by Changing the Luminance

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ABSTRACT

In today's deregulated, the world continues its voyage towards modernization, and there is a great demand for inventive in product and services development, Visual acuity measurement has become one of the most successful clinical tests of visual function, Visual Acuity (V. A) Commonly refers to the clarity of vision, in another dimension, although V. A. is an estimate of the visual system's ability to resolve the details. However, the estimates of Visual acuity are taken by evaluating and measuring the eye's ability to realize and resolve varying sizes of letters and shapes in Snellen's chart. More recently attention has focused on the luminance of the visual acuity chart while it is essential to consider the overall room illumination during visual acuity measuring. It has commonly been assumed that the rise in ambient room illumination decreases the size of the pupil. A smaller pupil increases the depth of focus furthermore reductions the peripheral light rays that entering into the eye. Thus, the reduced pupil diameter great less spherical deviation and other higher order aberration, such as coma aberration. A clinician may achieve an artificially better estimate of visual acuity in a brightly-lit examination room. The aims of this study is to determine the factors affecting Visual Acuity by changing the luminance. Fourteen patients aged 19 to 24 years were chosen. Monocular visual acuity patients were assessed under five different luminance levels (different colors), and V. A was measured in the patients with each room color. The results showed that there is a clear difference in the measurement of V. A when the light was changed from color to another. The visual acuity of patients was assessed using the five different levels of illumination.

Keywords: *Visual Acuity, luminance, Snellen chart*

Introduction

Visual acuity is an estimate of the visual system's ability to resolve fine details. Visual acuity estimates are taken by assessing and quantifying the eye's ability to recognize and resolve the letters of varied sizes and shapes[1]. There are numerous environmental factors which might influence the operator's performance within the control-room and cause errors. Conditions of work surroundings like sound, illumination, and heat have a crucial impact on people's attitudes, performance and behavior[2]. Visual performance is critical for control-room operators thanks to most of the activities in the process the information is done by the system of the human visual. Moreover, it had been found in studies that inappropriate illumination will increase the attention fatigue, reductions the performance, and eventually ends up in an incident. If environmental conditions, specifically illumination, cannot meet the individual's performance necessities, it'll cut back the quality of performance and result in the prevalence of errors[3-6]. Thus, making valid illumination is significant to AN individual's correct performance. Varied illumination factors (such as color temperature and intensity) have an effect on the individuals' visual and psychological feature performance[7].Varied factors like color distinction, illumination level, individual variations, viewing time, gazing and etc., Are in the result of visual performance[8].The individual's potency within the control-room is directly littered with visual performance. People would like sensible illumination within the control-rooms to possess AN acceptable vision[9]. During this study, the results showed that there's

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a marked distinction within the measured optical intensity once ever-changing the space lightweight from color to a different color. Considering the potential disadvantages of measuring visual acuity below the bright area illumination with the traditional display, totally different intensities of sunshine with different wavelengths (traditional light, yellow light, red, green, and blue) were chosen and therefore the comparison for visual acuity among these sources of illumination was in deep trouble the identical patients. For this reason, this subject was chosen to attain this, the project to line the influence of adjusting brightness on visual acuity. Fourteen patients aged nineteen to twenty-four years were assessed. Monocular visual acuity patients were assessed underneath 5 totally different brightness levels (different colors), and V. A was measured within the patients with every area color. The results of the examination in patients showed that there's a transparent distinction within the mensuration of V. A once the sunshine was modified from color to a different. 2.0.

Materials and Methodology

Twenty-eight eyes of adults' students were examined in Dijlah University College/Optics techniques department/Refractive errors laboratory.

Essential colors were used to achieve this, the project as in the following tables and figures. These colors are different in colors which are related to wavelength, then energy [10].

The energy © of each color can be calculated using the Plank's equation:

$$E = h \upsilon = hc/\lambda \quad \ldots(1)$$

Where:

h: Plank's constant = $6.63*10^{-34}$ m^2 kg/s

υ: Frequency of the light.

C: Speed of the light in vacuum = $3*10^8$ m/s^2

ʎ: Wavelength of light (nm)

Table 1: The color spectrum used in this study

Color	Wavelength (nm)	E (e V)
Red	~ 700- 635	< 1.77
Yellow	~ 635 -590	2.14
Green	~ 590- 560	2.34
Blue	~ 520- 490	2.64



(a)



(b)



(c)



(d)

Figure 1: (a, b, c, and d): Examination room with different sources of light

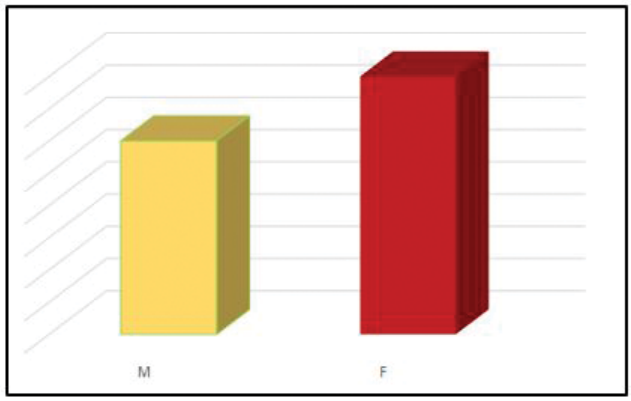


Figure 2: Percentage of the selected cases, according to gender

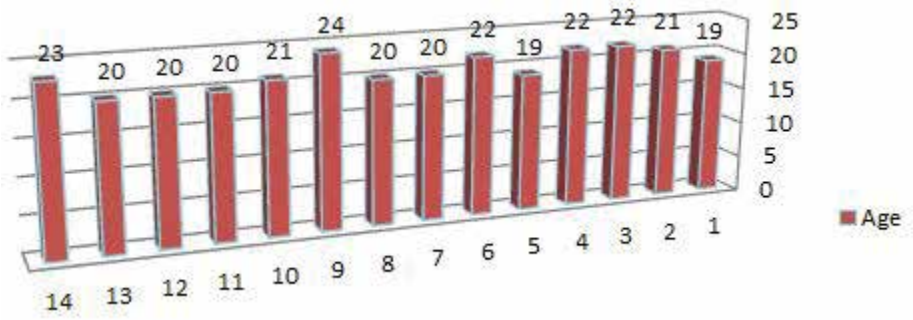


Figure 3: The age of the selected cases ranged between (19-24) years

Each patient was seated in front of the chart and the V. A is measured for each eye separately, first the right eye examined and the left eye closed by occluding then the right eye closed and the left examined.

The examination process repeated for every patient over a wide range of illumination (traditional, red, green, blue, and yellow) to study the effect of wavelength of each stimulus on the vision and to improve that one of the V.A. Problems its emphasis on fovia under one level of illumination furthermore one distance.

The examined patients selected randomly as the percentage shown in figure (2) 43% for male and 57% for females and them ages ranged between (19-24) years old as shown in figure (3).

Table 2: patients' properties and their response to essential colors

Case No.	Gender	Age	Eye	V.A. over a wide range of room illumination				
				Traditional	Red	Green	Blue	Yellow
1	F	19	R	CF 2m	CF 5m	CF 5m	CF 3m	CF 3m
			L	CF 3mp	CF 5m	6/60 p	CF 3m	CF 4m
2	M	21	R	6/9 p	6/9	6/12	6/12	6/12p
			L	6/6	6/6	6/9	6/9	6/9p
3	F	22	R	6/9 p	6/6	6/6p	6/6p	6/9p
			L	6/24	6/36p	6/18p	6/36	6/36p
4	M	22	R	6/36 p	6/36p	6/36p	6/36p	6/60
			L	6/6	6/9p	6/6p	6/6p	6/6p
5	F	19	R	6/9 p	6/6 p	6/9 p	6/9 p	6/12 p
			L	6/6	6/6	6/6	6/6	6/6
6	M	22	R	6/6	6/6	6/6	6/6	6/6 p
			L	6/6	6/6	6/6	6/6	6/6

Conted…

7	M	20	R	C.F 2m	C.F 2m	C.F 2m	C.F 2m	C.F 3m
			L	6/9	6/12	6/9	6/12p	6/18
8	F	20	R	6/6	6/6 p	6/6	6/6	6/6
			L	C.F 2m	C.F 2m	C.F 2m	C.F 3m	C.F 4m
9	M	24	R	C.F 6m	C.F 5m	C.F 6m	C.F 5m	C.F 6m
			L	6/6p	6/6	6/6	6/6	6/6
10	F	21	R	C.F 6m	C.F 5m	C.F 3m	C.F 6m	C.F 6m
			L	C.F 6m	C.F 3m	6/60	C.F 6m	C.F 4m
11	F	20	R	6/6	6/6	6/6	6/6	6/6
			L	C.F 3m	C.F 3m	C.F 3m	C.F 2m	C.F 6m
12	M	20	R	C.F 2m	C.F 2m	C.F 2m	C.F 2m	C.F3m
			L	C.F 2m	C.F 2m	C.F 3m	C.F 6m	C.F 4m
13	F	20	R	6/9p	6/18p	6/12p	6/18	6/12
			L	6/9	6/12	6/9	6/12p	6/1
14	F	23	R	6/6	6/6	6/6	6/6	6/6
			L	C.F 3m	C.F 6m	C.F 2m	C.F 1m	C.F 2m

Where: M: Male, F: Female, C.F: Count Finger, P: Partial

Results & Discussions

The results obtained at the table (1) showed that there is an opposite relationship between the wavelength of the light and its energy. The red color which has the longer wavelength has the minimum energy while the blue light which has the minimum wavelength has higher energy.

The examination with eye chart is quite satisfactory, but this is obviously incomplete. It emphasizes on fovea vision, usually at one level of illumination in order to be complete, in this study, the effect of the illumination was studied over a wide range of illumination.

The results of this study show that correct illumination has a positive effect on an individual's performance and decreases the accident's occurrence and V. An affected by the room light; it's diverse in a dim room compare with that light one.

Conclusions

Studies showed that when there was a reduction in chart luminance, the width of the point spread function of the letter's image increased in the retina, as a result of the rapid fall off of the letter contrast, which in turn resulted in decreased visual resolution.

The investigate the consistency of visual acuity under different ambient room illuminations.

The findings of this study demonstrate that changes in luminance have an influence on VA that may contribute to test/retest variability.

Ethical Clearance: This paper done under Ethical Approval is Required by our universities.

Source of Funding: By ourself

Conflict of Interest: There is no any potential conflicts of the manuscript

REFERENCES

1. Rosser DA, Cousens SN, Murdoch IE, Fitzke FW, Laidlaw DA. How sensitive to clinical change are ETDRS logMAR visual acuity measurements. Invest Ophthalmol Vis Sci. 2003;44(8):3278-81. PubMed PMID: 12882770
2. de Korte EM, Spiekman M, Hoes-van Oeffelen L, van der Zande B, Vissenberg G, Huiskes G, et al. Personal environmental control: effects of pre-set conditions for heating and lighting on personal settings, task performance and comfort experience. Build Environ. 2015; 86:166–76.

3. Wolska A. Visual strain and lighting preferences of VDT users under different lighting systems. Int J Occup Saf Ergon. 2003;9(4):431–40.

4. Kuller R, Ballal S, Laike T, Mikellides B, Tonello G. The impact of light and color on psychological mood: a cross-cultural study of indoor work environments. Ergonomics. 2006;49(14):1496–507.

5. CJ LIN, FENG W-Y, CHAO C-J, TSENG F-Y. Effects of VDT workstation lighting conditions on operator visual workload. Ind Health. 2008; 46:105–11.

6. Juslén H, Tenner A. Mechanisms involved in enhancing human performance by changing the lighting in the industrial workplace. Int J Ind Ergon. 2005;35(9):843–55.

7. Hawes BK, Brunyé TT, Mahoney CR, Sullivan JM, Aall CD. Effects of four workplace lighting technologies on perception, cognition and affective state. Int J Ind Ergon. 2012;42(1):122–8.

8. Parsons KC. Environmental ergonomics: a review of principles, methods and models. Appl Ergon. 2000;31(6):581–94.

9. Sivaji A, Shopian S, Nor ZM, Chuan N-K, Bahri S. Lighting does matter: preliminary assessment on office workers. Procedia Soc Behav Sci. 2013; 97:638–47.

10. Deshmukh, P. C., & Venkataraman, S., 100 years of Einstein's photoelectric effect. Bulletin of Indian Physics Teachers Association, published in two parts: September & October Issues of (2006).

Effect of Adding Probiotic with Different Levels of Citric Acid in Feed Supplementation to Laying Hens on Bacteria Content of Feed, Litter and Egg Shell

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ABSTRACT

Study conducted to determined effect of adding Probiotic (Iraqi Probiotic) with different levels of citric acid to Lohmann brown laying hens in order to know the effect of addition on the microbial content of the feed, litter and eggshell. The treatments were T1 without any addition (control), T2 (0.25) probiotic, T3, T4 and T5 add Probiotic each with a fixed level of 0.25% with levels 0.15, 0.30, 0.45% of citric acid sequentially. The Addition of probiotic with citric acid led to a significant decrease ($p < 0.05$) in both (Total count bacteria) and (Coliform bacteria) in feed and litter compared with the control treatment and the treatment of adding probiotic alone. The addition of either alone or with citric acid lead to a significant decrease in the total number of aerobic bacteria on the eggs product and no effect on the number of E.coli in the eggs product.

Keywords: *probiotic, citric acid, laying hens, feed, eggs shell, litter, bacteria Count*

Introduction

Poultry industry represented in last years quick developments in using various factors to increase productivity and these factors used are antibiotics to stimulate the growth, protection and treatment of domestic poultry from disease [(1)] However, this development has increased the animal's susceptibility to disease [(2)]. As well as the world orientation in recent years to prevent using of antibiotics to stimulate production [(3)]. Therefore, it was necessary to use alternative methods of antibiotics in breeding. From these substitutes have been use as Probiotic and acids including citric acid to stimulate growth and increase production of meat and eggs. as well as reduce the level of mortality by raising the immunity of the body as well as improving the conversion factor and protection against bacterial infection [(4)]. Probiotic is a living colonies of beneficial microorganisms, whether bacteria, yeast or fungus, which when introduced in sufficient quantities within the host, attached to the receptors located on the surface of the lining cells of the adrenal duct, thereby preventing the adhesion of harmful microorganisms [(5)] and [(6)]. Organic acids are a type of fatty short chain. Organic acids are naturally formed in plants as a result of metabolic processes and are found in different cells in varying amounts. For example, lemon fruits have a pH of about 2.5 due to the presence of citric acid (58 mg/mL). The acidity of the lemon fruits is due to the accumulation of this acid [(7)]. Organic acids have been used for many decades to preserve food and prevent the growth of pathogenic microbes [(8,9)] for the effectiveness of these acids in reducing the pH of the substances mixed to the level that affects the environment of pathogenic bacteria [(10)]. It has been used in the field of animal and poultry production as an effective and safe alternative to antibiotics used to stimulate growth, improve immunity and prevent the infection of many intestinal diseases and additives to feed and drinking water for domestic birds [(11)]. Adding of formic acid in level 0.5% to feed resulted in a reduction of pH to 6.62 compared to7.38 for control treatment, [(12)] study effect of adding Gallia acid (mixture of fumic acid, Formic, calcium propionate and Sorbic acid) by 1 g/kg feed, the preparation of bacteria *strptococcus Lactobacillus* in the intestines noticed a significant increase in the preparation of bacteria Lactococcus when adding the product compared to the control and thus enhance the role of the Probiotic when it used to promote production in poultry and the use of alternatives to additives antibiotics in poultry feed [(13)]. The aim of this study was to conduct the effect of adding Probiotic with organic acid to layer chicken ration on the bacterial count on feed, letter and egg shell.

Materials and Method

The experiment carried out in the field of poultry for 150 days by using of 195 Lohmann brown layers 20weeks old were rearing in cages and fed on a standard productivity diet (Table 1). The birds were distribute on five nutritional treatments

T1: (Control treatment) standard ration.

T2: Standard ration with 0.25% of Probiotic.

T3: Standard ration supplemented with 0.25% of Probiotic + 0.15 Citric Acid%.

T4: Standard ration with 0.25% Probiotic + 0.3 Citric Acid%.

T5: Standard ration with 0.25% Probiotic + 0.45% Citric Acid.

The Probiotic used is the Iraqi Probiotic, the microbiology was Lactobacilli, and Lactobacillus acidophilus, Bacillus subtitlis, and saccharomyces cerevisia yeast, Citric acid was 99% concentration.

Table 1: Ingredients using in diet and chemical composition of it

Composition	Percentage %
Corn	63.7
Soybean	26
Calcium	2.5
Die phosphate	7.5
Nacl	0.3
Chemical Composition	
Crude protein %	17
Energy k cal/kg	2740
Methionine%	0.140
Lysine %	0.92
Calcium %	3.45
Available phosphor %	0.63

- Mineral premix contained the following in milligrams per kilogram of diet: manganese, 120; zinc, 120; iron, 180; copper, 10; iodine, 2.5; Cobalt, 1.0.Vitamin premix contained the following per kilogram of diet: vitamin A, 13,200 IU; cholecalciferol, 4,000 IU; vitamin E, 66 IU; vitamin B12, 4.6 ug; riboflavin, 13.2 mg; niacin, 110 mg; pantothenic acid, 22 mg; vitamin K, 4 mg; folic acid, 2.2 mg; thiamine, 4 mg; pyridoxine, 8 mg; And biotin, 252 ug.3Selenium premix contained sodium selenite (Na2SeO3), roviding 0.3 mg/kg.
- Data expressed on a percentage of dry matter basis. Formulations Confirmed by proximate analyses

The samples of feed, letter and eggs collected every 30 days (5 replicates) by taking samples from different places of feed for each treatment after mixing well. The samples were placed in sterilized polythene bags. After that, 10 g of each sample was added and the saline solution was added in the sterile conditions and worked decays to 10^{-9} dilutions, and the same method was taken in taking samples from the mattress as samples of the mattress were taken from different places of each cage in which birds were breeding and samples were placed in sterile bags and worked the same dilutions. IN order to estimate the number of bacteria on the eggshell, the samples were collected by taking five eggs from each treatment, if there was no delay in collecting the eggs. The samples of each treatment were then placed in a sterilized bag and the solution was added 100 ml. Take 10 ml of suspension and dilute decimals until 10^{-9}. Bacterial content per cm^2 of egg surface was calculated. The spreading plating method [14] was followed by estimating both the numbers of coliform bacteria and the preparation of total bacteria, and the concentrations of these organisms were converted to logarithmic numbers of base 10 and expressed as Log10 cfu/gm for feed and letter. As for the bacterial preparation on the surface of the eggshell, it was expressed by Log10 cfu/cm^2 according to the method (15), using the following equation: $\mathbf{S = 4.68\ W^{2/3}}$

- Where S = the outer surface of the eggshell (cm^2) and W = the weight of the egg in grams.

To measure of Ph for feed, [16]. method used by use 1 g of feed per treatment, add 10 ml of distilled water, mix well, leave for 10 minutes at room temperature and pH were measure by pH meter. The data were analyzed using [17] using full random design (CRD) and the test of differences between coefficients using the[18].

Results and Discussion

The results of the statistical analysis in Table (2) showed that there was a significant effect ($p<0.05$) in the total bacterial count of the microbial content when adding the Probiotic with different amounts of citric acid

compared with the treatment of control and treatment of the addition of the Probiotic alone, Treatment of addition T5 was the lowest of the mean number of total bacteria followed by treatment T4 while the treatment T3 and T2 did not differ significantly from the control treatment. Table 2 also showed a significant decrease in colonic bacteria in the addition of the Probiotic with citric acid. The parameters T3, T4 and T5 showed the lowest values, which differed significantly from the control treatment without addition.

Table 2: Effect of the addition of the biocomponent with different levels of citric acid to the egg-white chickpea on the bacterial content of the egg-white chickpeas (5.65 log10 in m/g)

Treatments	Total number of aerobic bacteria	Number of E.coli
T1	7.39 ± 0.26	7.65 ± 0.65
T2	7.28 ± 0.19	5.31 ± 0.32
T3	6.98 ± 0.21	4.92 ± 0.72
T4	6.44 ± 0.05	4.63 ± 0.62
T5	6.15 ± 0.06	5.15 ± 0.43

Mean ± S.E

T1: (Control treatment) standard ration.

T2: Standard ration with 0.25% of Probiotic.

T3: Standard ration supplemented with 0.25% of Probiotic + 0.15%. Citric Acid.

T4: Standard ration with 0.25% Probiotic + 0.3%. Citric Acid.

T5: Standard ration with 0.25% Probiotic + 0.45% Citric Acid.

From this table we see that there is a significant decrease in the number of pathogenic bacteria. As the percentage of addition of citric acid increased to the Probiotic where the organic acid reduces the amount of harmful bacteria by reducing the pH when added to feed. Reducing the content Microbial, as the pathogenic microbes do not grow in the acidic medium. Which leads to the elimination of them and reduce their activity and reproduction through the destruction of the wall cell bacterial as well as disable the process of cloning the DNA of the cell and disorder in many physiological functions of the cell [19]. In contrast, beneficial bacteria thrive more in acidic media, making them grow, thrive and compete with harmful bacteria and microbes because of the constant competition between harmful and beneficial microbes. The results indicated in Table (3) that the addition of the Probiotic with alastric acid resulted in a significant decrease ($P < 0.05$) in the number of total bacteria of the letter. T5 and T4 were scored the lowest values for the average number of bacteria followed by treatment T3 while the treatment of addition of the Probiotic alone didn't different from the control treatment. It is also noted from Table (3) that the number of colonic bacteria has continued to decrease as we move towards the increase in the addition of organic acid to the Probiotic as recorded treatments T3, T4 and T5 significantly lower in the preparation of E.coli compared to the treatment of T1 and T2, due to the role of microbes in the Probiotic when the balance of these microorganisms within The gastrointestinal tract increases its ability to compete for food with pathogenic microorganisms, [20,21]. As well as its ability to secrete microbial growth agents, including Bactriocin, produced by Bifidobacterium, as effective bilogia compounds and inhibiting the growth of bacteria such as toxins, antibiotics, and bactericidal enzymes [22]. As well as the deadly and inhibitory effect of organic acid of pathogenic bacteria [23]. By reducing PH for the acid-sensitive cytoplasmic cytotoxicity, this will reduce the number of microbes present with glaucoma and thus will decrease its presence in the mattress of birds.

Table 3: Effect of the addition of the biocomponent with different levels of citric acid to egg white chicken eggs in the bacterial content of the chicken egg (log10 and L/g).

Treatments	Total number of aerobic bacteria	Number of E.coli
T1	6.99 ± 0.03	4.42 ± 0.04
T2	6.86 ± 0.13	4.29 ± 0.08
T3	6.78 ± 0.07	3.91 ± 0.04
T4	6.71 ± 0.1	3.67 ± 0.02
T5	6.62 ± 0.05	3.55 ± 0.05

Mean ± S.E

T1: (Control treatment) standard ration.

T2: Standard ration with 0.25% of Probiotic.

T3: Standard ration supplemented with 0.25% of Probiotic + 0.15%. Citric Acid

T4: Standard ration with 0.25% Probiotic + 0.3%. Citric Acid.

T5: Standard ration with 0.25% Probiotic + 0.45% Citric Acid.

From Table (4) we so that there is a significant difference between all additive treatments compared to the control treatment for the preparation of total bacteria on the eggshell and there was no significant difference between all treatments for the preparation of E.coli.

Table 4: Effect of the addition of the biocomponent with different levels of alastric acid to the brown chicken lemehannum in the bacterial content of the eggshell (log10 in C/cm²)

Treatments	Total number of aerobic bacteria	Number of E.coli
T1	7.61 ± 0.62	5.53 ± 0.63
T2	6.57 ± 0.61	5.36 ± 0.57
T3	6.55 ± 0.16	5.31 ± 0.05
T4	6.48 ± 0.04	4.74 ± 0.38
T5	6.43 ± 0.14	4.46 ± 0.15

Mean ± S.E

T1: (Control treatment) standard ration.

T2: Standard ration with 0.25% of Probiotic.

T3: Standard ration supplemented with 0.25% of Probiotic + 0.15%. Citric Acid

T4: Standard ration with 0.25% Probiotic + 0.3%. Citric Acid.

T5: Standard ration with 0.25% Probiotic + 0.45% Citric Acid.

From Figure (1), there is a significant decrease in the pH of the feed used for the addition of the Probiotic with citric acid compared to the addition of Probiotic alone and control treatment. The treatment T5 and T4 were fewer values for pH Followed by treatment T3 while no significant differences were observe between the addition of Probiotic alone and control treatment. The diagram below shows the value of the feed pH. We note that there is a significant decrease in the percentage of addition of citric acid.

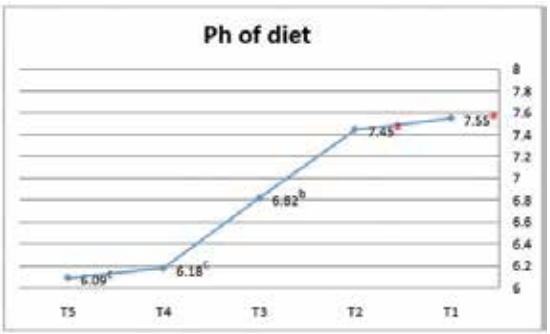


Figure 1: Effect of addition of Probiotic with different levels of acidic acid in pH () for white chick larvae

Conclusion

We consoled from this search that the addition of either alone or with citric acid lead to a significant decrease in the total number of aerobic bacteria on the eggs product and no effect on the number of E.coli in the eggs product.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Not required.

REFERENCES

1. Eid KM, Radwan AA, Gebriel GM, Iraq MM. The interaction effects of strain, sex and live body weight on antibody response to SRBCs in broiler chickens. Annals of Agric, Sc, Moshtohor. 2010. 48:1-11.
2. Alfred D. Gut flora in health and disease: Potential role of probiotic Micronutrients and health www. nutrivitorg/vic/staple/index.htm. Microbiology Enzymol. 2005, 43:329.
3. Alwan D, Swierczewska E, Riedel J. Effect of probiotic (cerbiogalli) or antibiotic on performance variation of three broiler strains Annals of Warsaw Agricultural Univ, Anim. sci. 1997, 33;37-46
4. Eckert NH, Lee JT, Hyatt D, Stevens SM, Anderson S, Anderson PN, Beltran R, Schatzmayr G, Mohnl M, Caldwell DJ. Influence of probiotic administration by feed or water on growth parameters of broilers reared on medicated and no medicated diets Poultry Science Association. 2010, 19:59 – 67.
5. Liong MT. Probiotics, Biology, Genetics and Health Aspects. Sp ringer- Verlag, Berlin Heidelberg. 2011.
6. Ari S, Kittelmann S, McGregor AP. From shavenbaby to the naked valley: trichome formation as a model for evolutionary developmental biology. Evol. Dev. 2015, 17(1): 120--126.
7. Penniston KL, Nakada SY, Holmes RP, Assimos DG. Quantitative assessment of citric acid in lemon juice,lime juice and commercially available fruit juice products. J. of Endourology. 2008, 22(3):567-570.

8. Freitag M. Organic acids and salts promote performance and health in animal husbandry. In: Acidifiers in Animal Nutrition-A Guide of Feed Preservation and Acidification to Promote Animal Performanc (Ed. C. Lückstädt). Nottingham University Press. 2007, pp.1-11.

9. Giesen A. The value of organic acids in drinking water.World Poult. 2005, 21:15-17.

10. Chowdhury RK, Islam MS, Khan MJ, Karim R. Effect of citric acid,av-ilamycin and their combination on the performance, tibia ash and immune status of broilers. Poultry Sci. 2009, 88:1616-1622.

11. Yasin, Ali Abdul Khaliq and Mohammed Hassan Abdul Abbas. Feeding domestic poultry. College Agriculture, University of Baghdad, Ministry of Higher Education and Scientific Research. 2011.

12. Czerwinski J, Hojberg O, Smuliko wska S, Engberg RM, Mieczkowska A. Influence of dietary peas and organic acids and probiotic supplementation on performance and caecal microbial ecology of broiler chickens.British Poultry Sci. 2010, 51(2):258-269.

13. Hernandez F, Garcia V, Madrid J, Orengo J, Catala P, Megias D. Effect of formic acid performance, digestibility, intestine histomor-phology and plasma metabolic level of broiler chickens. British Poultry Sci. 2006, 47(1):50-56.

14. Samanta S, Haldar S, Ghosh TK. Comparative efficacy of an organic acid blend and Bacitracin Methylene Disalicylate as growth promoters in broiler chickens: Small intestinal milieu. SAGE-Hindawi Access to Research Veterinary Medicine International. 2010, 1-8.

15. Wall H, Tausonands R, Sorgjerd S. Bacterial contamination of egg shells in furnished and conventional cages. J. Appl. Poult. Res. 2008, 17:11–16.

16. Baurhoo A, Letellier X, Zhao C, Ruiz-Feria A. Cecal Populations of Lactobacilli and Bifidobacteria and *Escherichia coli* Populations After In Vivo *Escherichia coli* Challenge in Birds Fed Diets with Purified Lignin or Mannanoligosaccharides. *Poultry Science*, Volume 86, Issue 12, 1 December 2007, Pages 2509–2516,

17. SAS Institute. SAS User's Guide: Statistics Version 6. 12ed. SAS Inst. Inc., Cary, NC., USA. 2001.

18. Duncan DB. Multiple range and multiple F-test. Biometrics. 1955, 11:1-42.

19. Gheisari AA, Heidari M, Kermanshahi RK, Togiani M, Saraeian S. Effect of dietary supplementation of protected organic acids on ileal microflora and protein digestibility in broiler chickens. European Poultry Nutrition. 2006, 65:519-522.

20. Choudhari A, Shinde S, Ramtake BN. Prebiotic and probiotic as health promoter. Veterinary world. 2008, 1(2): 59-61.

21. Gunal M, Yayli G, kaya O, karahan N, Sulak O. The effect of antibiotic growth promoter, probiotic or organic acid supplementation on performance, intestinal micro flora and tissue of broilers. Int. J. Poult. Sci. 2006, 149: 145-155.

22. Chaveerach PD, Keuzenkamp A, Urlings HAP, Lipman LJA, Van Knapen F. In vitro study on the effect of organic acids on campylobacter Jejunil coli populations in mixtures of water and feed. Poultry Sci. 2002, 81:621-628.

23. Stringfellow KJ, Reynolds MC, Lee J, Byrd J, Nisbet D, Farnell M. Effect of bismuth citrate, lactose, and organic Acid necrotic enteritis in broilers. Poult. Sci. 2009, 88: 2280- 2

Occurrence of MBLs and Carbapenemases among MDR and XDR *Acinetobacter baumannii* Isolated from Hospitals in Iraq

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ABSTRACT

The current study was conducted to determine carbapenemase-producing *Acinetobacter baumannii* clinical isolates recovered from two hospitals in Iraq. A total of 540 different clinical samples were collected. Isolates were identified and Carbapenemase production were detected using MBL E-test, Modified Hodge's Test (MHT), and Modified Carba NP test. A total 30 *A. baumannii* isolates were obtained from clinical specimens. It was found that 73.3% isolates were carbapenem resistant. Out of 30 *A.baumannii* isolates, 22 (73.3%) isolates were confirmed to be MBL positive by MBL E-test method, 5(16.6%) by MHT, and 27 (90%) isolates by Modified Carba NP test. Results revealed that 21 *A.baumannii* isolates (70%) were found to be MDR and only 9 isolates (30%) were XDR. It can conclude that most of carbapenem resistant *A.baumannii* clinical isolates were MDR. The CNPt assay was the most reliable among phenotypic assays to detect MBL production.

Keywords: *Acinetobacter baumannii, MBLs, Carbapenemases, MBL E-test.*

Introduction

One of the greatest threats to modern medicine is the increasing prevalence of antibiotic-resistant bacteria, particularly Gram-negative bacteria[1-4]. One of these bacteria, *Acinetobacter baumannii*, has raised to prominence due to the international dissemination of multidrug-resistant lineages resistant to the carbapenem antibiotics[5]. Centers for Disease Control and Prevention (CDC) recognizes MDR *A. baumannii* as a source of global outbreaks especially due to its effectiveness in colonizing hospital environments and due to its increasing resistance to commercially available antibiotics [6].

Mechanisms of resistance in *Acinetobacter* strains include efflux pumps, β-lactamases, and modifications in porin proteins. Enzymatic degradation by β-lactamases is the most Prevalent mechanism of β-lactam resistance in *A. baumannii*. Serine oxacillinases and metallo-β-lactamases (MBLs) are β-lactamases with carbapenemase activity [7]. The prevalence of MDR *A. baumannii* strains have been increasing during recent years continually and causing of highly mortal hospital infections [8]. The increase in drug resistance of *Acinetobacter* to the most of antibiotics is resulting from abuse of antimicrobial agents[9]. Carbapenem resistance is now observed worldwide in *A. baumannii* isolates, leading to limited therapeutic options. Several carbapenem-hydrolyzing lactamases have been documented in *A. baumannii*. Lactamases from class B illustrate highly hydrolyzing activity of carbapenems [10].

The aim of this study was to investigate the characterization of Carbapenemase–Producing *A.baumannii* isolates recovered from two hospitals in Iraq.

Method

Sampling and study design: This cross sectional study was designed to investigate the characterization of Carbapenemase –producing *A. baumannii* isolates recovered from main hospitals in Babylon province, Iraq. A total of 540 different clinical specimens (burns, wounds, urine and blood) were collected from patients admitted to the out-patient clinics in Hillah Teaching Hospital and Babylon Teaching Hospital for Maternity

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and Pediatrics at Babylon province, Iraq. These samples were collected during the period between January to June, 2018. Verbal consent was taken from each patient before sampling.

Isolation and Identification of A. baumannii: All clinical samples were streaked on MacConkey agar, Blood agar and Chrom agar. Isolates were identified to the level of species using biochemical tests (oxidase and catalase) and Vitek 2 system, in addition to the phenotypic characteristics of colonies on Chrom agar [11].

Determination of antibiotic susceptibility patterns: Thirty isolates of *A. baumannii* were selected for determination of antibiotic susceptibility patterns using modified Kirby-Bauer disc diffusion test (DDT) against the following antibiotics (CONDA-Spain): Ampicillin (AM), Pipracillin (PRL), Cefepime (FEP), Ceftazidime (CAZ), Cefotaxime (CTX), Aztreonam (ATM), Imipenem (IMP), Meropenem (MEM), Amikacin (AK), Gentamicin (CN), Tetracycline (TE), Doxycycline (DO), Ciprofloxacin (CIP), Trimethoprim- Sulphamethoxazole (SXT), Colstin (CT), Polymyxin B (PB). Results are interpreted according to guidelines recommended by CLSI guidelines [12]. Determination of MDR and XDR among *A. baumannii* isolates was done according to Magiorakos et al [15].

Phenotypic detection of Carbapenemases: All bacterial isolates that resistant to β -lactam antibiotic were tested for β- lactamase production by rapid iodometric method as described by Forbes et al. [11]. MBL production and Carbapenemase production by MBL E test method was performed as described by Behra et al. [13], Modified Hodge's Test (MHT), was performed as described by Lee et al. [14] and Modified Carba NP test was recommended by CLSI [12].

Results

Isolation of Acinetobacter baumannii: Results of distribution of different clinical samples showed that most samples obtained, were from burns (48.1%) while other samples distributed among samples of urine, blood, and wound (Table 1).

A. baumannii were isolated and identified depending on biochemical tests and Vitek 2 system, in addition to, cultural properties on Chrom agar medium. However, other species of *Acinetobacter* were also identified as (A. p*itti*, 2 isolates; and A. *calcoaceticus*, 3 isolates) depending on the appearance of red colonies on Chrom agar, in addition to Vitek 2 system.

Out of 540 clinical samples, only 30 isolates (5.5%) were belonged to *A. baumannii*. Out of 360 (66.6%) that showed positive cultures, 35 isolates were belonged to genus *Acinetobacter*. Only 30 isolates (8.3%) were belonged to *A. baumannii* (Table 1); out of which 29 (96.6%) isolates were obtained from Hillah Teaching Hospital and only one isolate (3.3%) from Babylon Teaching Hospital for Maternity and Pediatrics.

Table 1: Distribution of *A. baumannii* isolates among different clinical samples

Clinical sample type	No. (%) samples	No. (%) of *A. baumannii* isolates
Burn swab	260 (48.1%)	24 (9.23%)
Wound swab	30 (5.5%)	1 (3.33%)
Urine	100 (18.5%)	1 (1%)
Blood	150 (27.7%)	4 (%)
Total	540	30 (5.55%)

Regarding distribution of *A. baumannii* isolates among different clinical samples, results found that the majority of *A. baumannii* isolates recovered in this study was from burn units (24/260; 9.23%), and only 6 isolates were recovered from other clinical sites. Only one isolate (1%) was detected in urine samples (Table 1).

Antibiotic Susceptibility of A. baumannii isolates: The results showed that all *A. baumannii* isolates (100%) were able to produce β-lactamase using rapid iodometric method. They also exhibited different pattern of resistance to different antibiotics (Figure 1). All *A. baumannii* isolates (No.=30) demonstrated highest resistance to penicillins (carbenicillin and ampicillin) (100%), whereas they showed high susceptibility to piperacillin. A low resistance was detected (40%) among isolates to ceftazidime but they showed relatively high resistance (93.3%) to cefotaxime and cefepime. Results also revealed that *A. baumannii* isolates displayed relatively high resistance rate (73.33%) towards imipenem, and meropenem.

Aminoglycosides and quinolones resistance were variable among by *A.baumannii* isolates; (86.6%) to gentamicin and (50%) to amikacin, however, resistance to quinolones (ciprofloxacin) was detected as 20% among isolates.

Rates of resistance of our isolates to the remaining antibiotics were as follows: 12 (40%) to each of tetracycline and doxycycline, trimethoprim-sulfamethoxazole 18 (60%), Polymyxin B 15 (50%), and Colistin 18 (60%). For tetracycline, the resistance rate was 40%. The present study showed relatively low resistance level to polymyxin B (50%).

Results revealed that 21 *A.baumannii* isolates (70%) were found to be multidrug resistant (MDR) and only 9 isolates (30%) were XDR.

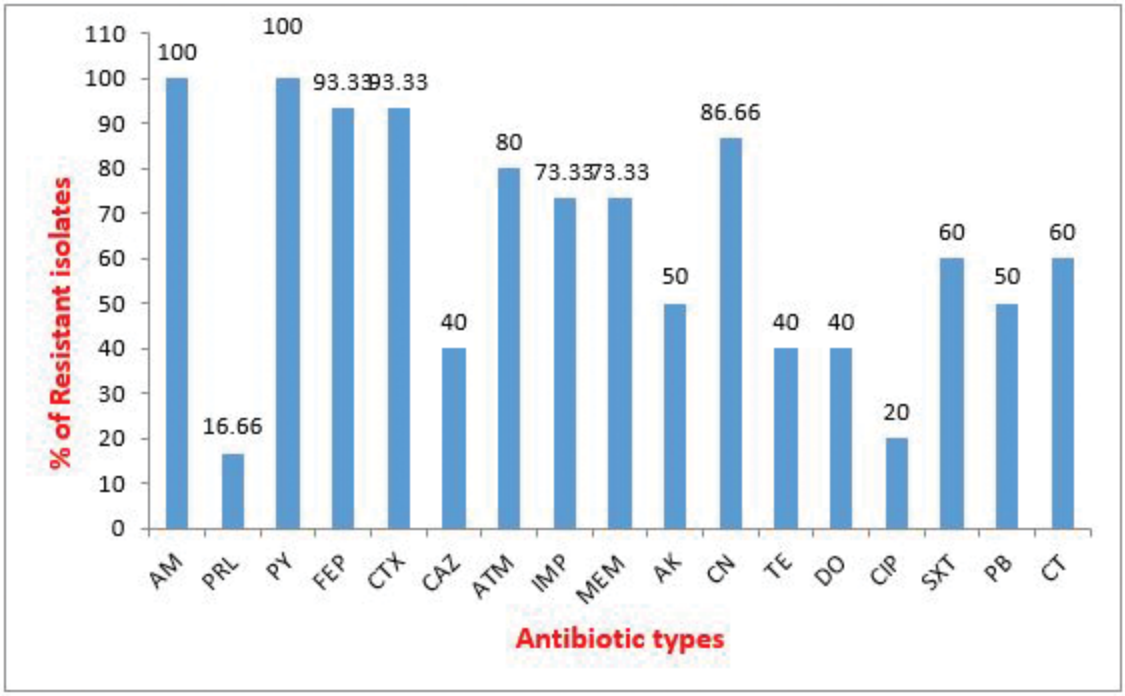


Figure 1: Antibiotic resistance pattern of *A. baumannii* isolates

Carbapenemase Production in A. baumannii: Metallo β-lactamases detection of *A.baumannii* isolates was performed by MBL E-test (Imipenem/Imipenem+ EDTA). Results found that 22 isolates out of 30 (73.3%) were positive to this test (Figure 2).

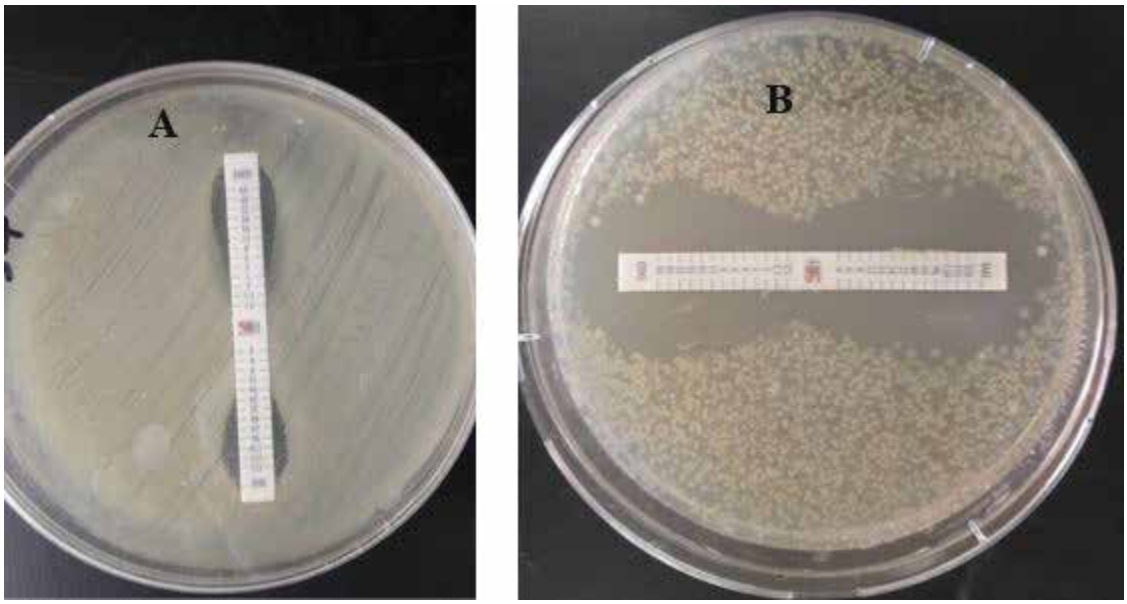


Figure 2: MBL-producing of *A.baumannii* isolate. A: *A.baumannii* BU1: B: *A.baumannii* BU28

In the modified Hodge's test, only five isolates of *A.baumannii* out of 30 (16.6%) displayed a clover leaf like indentation with imipenem disk indicating a positive result (Figure 3). In Modified Carba NP test, 27 (90%) of *A. baumannii* isolates were positive (Figure 4).

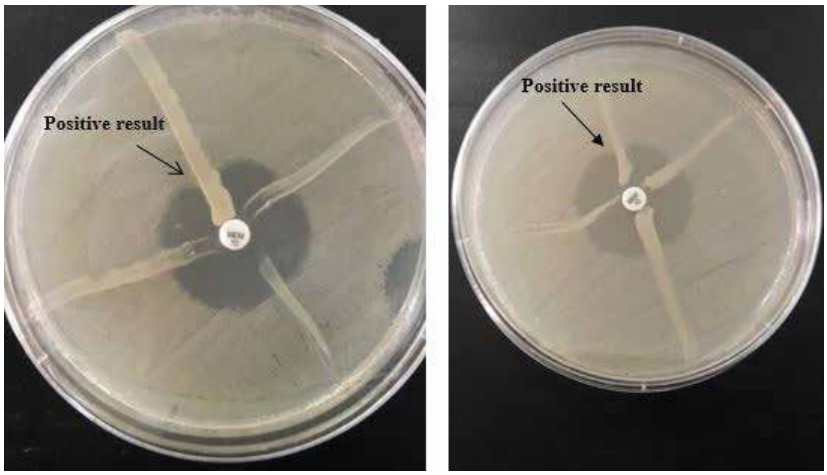


Figure 3: Modified Hodge's test (MHT)

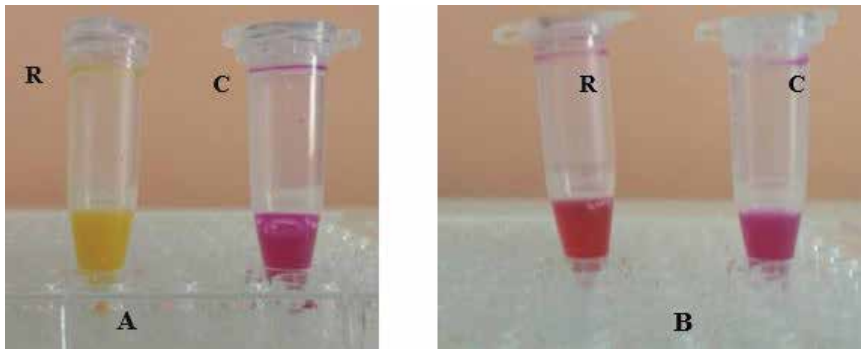


Figure 4: A: yellow color (Reaction tube) of carbapenemase-producing isolates *A.baumannii* BU1. B: Red color (control tube). non-carbapenemase-producing isolate *A.baumannii* BU28.

Only 5 *A. baumannii* (22.7%) isolates were able to produce the carbapenemase enzyme when detected by MHT and all the remaining isolates were carbapenemase negative (Table 2).

Regarding phenotypic detection of MBL using E-test, results found that 22 isolates (%73.3) were positive to this test. Comparing the results of this test with MHT, E-test has shown high positivity (73.3%) when compared to MHT, which showed a low positivity (22%), due to its false positive results (Table 2).

Carba NP test (CNPt) (CarbAcineto test) recommended by Nordmann and his colleagues was also used for detection of MBL *A.baumannii* producing isolates. Results found that 27 isolates of *A.baumannii* (90%) were positive to this test. This result makes CNPt is superior to other tests performed (MHT and MBL-E-test) that showed a relatively low positivity rate of 22% and 73.3% respectively (Table 2).

Table 2: Comparison of different methods for detection of carbapenemase producing *A. baumannii* isolates (No. = 30)

Detection Method	No. of isolates (%)	
	Carbapenemase Producer	Non-carbapenemase Producer
MHT*	5 (16.6%)	25 (83.3%)
Modified Carba NP test	27 (90%)	3 (10%)
MBL E test	22 (73.3%)	8 (26.6%)

*Modified Hodge test

Discussion

The isolation rate of *A. baumannii* from different clinical specimens was 8.3%. This result was also confirmed by several autors worldwide, who reported that the isolation rates of *A. baumannii* were 7.8%, 3.7%, 1.5%, and 0.76% respectively [16-19].

The reason for relatively high isolation rate of *A. baumannii* compared with the different studies mentioned above, may be due to that this study focused on selected samples that are well-known site of infections of this bacterium (Table 1). Other reason may be attributed to the use of a selective medium for isolation of *A. baumannii* (Chrom agar).

Results of distribution of different clinical samples showed that most samples obtained, were from burns. This perhaps resulted from ability of *A. baumannii* to survive for long periods of time in the hospital equipment's and capacity to acquire drug resistance this helps it in the spread of the infection [20].

Regarding isolation of *A.baumannii* from other clinical sites, only one isolate (1%) was detected in urine samples (Table 1). Nahar, *et al*. [21] reported that 3.1% of these bacteria were isolated from urine samples. This result shows that *A. baumannii* has relatively low prevalence in causing UTI.

Based on our findings, all *A. baumannii* isolates exhibited different pattern of resistance to several antibiotics. Al-Sehlawi *et al*. [22] noted that that all *A. baumannii* isolates were resistant to carbenicillin (100%) but half of them (50%) were resistant to ampicillin-sulbactam. High resistance to this class of antibiotics may be due to widespread use of these antibiotics in Iraqi hospitals.

The resistance of *A. baumannii* to cephalosporins in Iraq was recorded by several researchers AL-Kadhmi [23] reported that resistance rate of *A. baumannii* isolates to cefepime, ceftazidime and cefotaxime and were 100%. In Saudi Arabia, the resistance rates of *A. baumannii* to Ceftazidime was 91% [24].

Results of this study also revealed that *A. baumannii* isolates displayed relatively high resistance rate towards imipenem, and meropenem. The resistance of *A.baumannii* to Carbapenem was recorded by several authors in Iraq. Al-Harmoosh [19] reported that resistance rates of *A. baumannii* isolates to imipenem, and meropenem were 1% and 47%, respectively. The carbapenem resistance rates were lower when compared to the rates reported from another medical facility in Kuala Lumpur [25].

Resistance to Aminoglycosides by *A.baumannii* in this study was also reported by several authors worldwide [19,22,24].

Results of this study against ciprofloxacin was detected as 20% among isolates. Resistance to quinolones by *A.baumannii* was also reported by several authors worldwide. Alsehlawi *et al*. [22] found that resistance against ciprofloxacin was (91.6%). Result of resistance to trimethoprim-sulfamethoxazole was (60%) it came in dissparallel with study in Turkey by Kulah *et al* [26].

Based on our findings, the low rate of carbapenemase enzymes detected by MHT may be due to the fact that although this method is easy to perform, but occasional isolates may show false positive results [27].

In previous studies, using modified Hodge's test, several authors reported that 60%, 33.3%, and 53% of *A. baumannii* isolates, were confirmed as carbapenemase producer respectively [19,22]. Though CLSI does not advocate the use of MHT for detection of Carbapenemase production in non-fermenting gram negative bacilli, several authors have found MHT with Imipenem, EDTA and $ZnSO_4$ as a useful screening test for Carbapenemase production [28].

Regarding phenotypic detection of MBL using E-test, and comparing the results of this test with MHT, E-test has shown high positivity when compared to MHT which showed a low positivity due to its false positive results. Previously published data showed that E-test to be very sensitive for detection of antimicrobial resistance especially for MBLs[13,29]. One of the advantages of this technique can detect the MBL class (by supplemented inhibitor EDTA) and determine the resistance of organism to the carbepenems (Imipenem) simultaneously.

Detection of MBL *A. baumannii* producing isolates by Carba NP test (CNPt) showed high positivity (90%) of detected carbapenemase enzymes. This result makes this test is superior to other phenotypic assays used (i.e. MHT and MBL-E-test).

Conclusion

High isolation rate of carbapenem resistant *A. baumannii* (CRAB) was detected in this study. Most of them were recovered from burn unit. The CNPt assay was the most reliable among phenotypic assays to detect MBL production.

Conflicts of Interest: None of the authors have any conflicts of interest relevant to what is written.

Source of Funding: University funding was provided for: data collection, analysis, and interpretation; trial design; patient recruitment. No public funding was received.

Ethical Clearance: The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local Ethics Committee.

REFERENCES

1. Al-Charrakh AH, Obayes MH. First record of isolation and characterization of methicillin resistant *Staphylococcus lugdunensis* from clinical samples in Iraq. BioMed Res Int. 2014; Volume 2014, Article ID 736259, 8 pages.
2. Al-Charrakh, AH. Frequency and antimicrobial resistance of bacteria isolated from oral and topical medicaments from Hilla, Iraq. J Infect Develop Ctries, 2012; 6(6):489-494.
3. Al-Charrakh AH, Al-Awadi SJ, Mohammed AS. Detection of metallo-β-lactamase producing *Pseudomonas aeruginosa* isolated from public and private hospitals in Baghdad, Iraq. Acta Medica Iranica 2016; 54(2):107-113.
4. Al-Charrakh AH, Yousif SY, Al-Janabi HS. Occurrence and detection of extended-spectrum β- lactamases in *Klebsiella* isolates in Hilla, Iraq. Afr J Biotechnol 2010; 10 (4): 657-665.
5. Higgins PG, Dammhayn C, Hackel M, et al (2010) Global spread of carbapenem-resistant *Acinetobacter baumannii*. J Antimicrob Chemother 65(2):233-8.
6. Cai Y, Chai D, Wang R, *et al*. Colistin resistance of *Acinetobacter baumannii*: clinical reports, mechanisms and antimicrobial strategies. J Antimicrob Chemother 2012; 67 (07): 1607-1615.
7. Heritier C, Poirel L, Lambert T, et al. Contribution of acquired carbapenem-hydrolyzing oxacillinases to carbapenem resistance in *Acinetobacter baumannii*. Antimicrob Agents Chemother 2005; 49(8):3198–202.
8. Zhang Y, Giurleo D, Parhi A, et al. Substituted 1,6-Diphenyl-naphthalenes as FtsZ-targeting Antibacterial Agents. Bioorg Med Chem Lett 2013; 23(7):2001–6.
9. Poirel L, Nordmann P. *Acinetobacter baumannii*–Basic and Emerging Mechanisms of Resistance. Eur Infect Dis 2008; 2(2):94-97.
10. Karah N, Sundsfjord A, Towner K, et al. Insights into the global molecular epidemiology of carbapenem non-susceptible clones of *Acinetobacter baumannii*. Drug Resist Updat 2012; 15(4):237-247.
11. Forbes B, Saham D, Weissfeld A. Bailey and Scott's Diagnostic Microbiology. 12th ed., Mosby Elsevier; 2007.
12. Clinical and Laboratory Standards Institute. Performance standards or antimicrobial susceptibility testing: 26th Informational Supplement. M100-S26. Clinical and Laboratory Standards Institute. Wayne, PA: 2016.
13. Behra B, Mathur P, Das A, et al. An Evaluation of four different phenotypic techniques for detection of metallo-β-lactamase producing *Pseudomonas aeruginosa*. Ind J Med Microbiol 2008; 26(3):233-7.
14. Lee K, Chong Y, Shin HB, et al. Modified Hodge and EDTA-disk synergy tests to screen metallo-β-lactamase-producing strains of *Pseudomonas* and *Acinetobacter* species. Clin. Microbiol. Infect 2001; 7:88-91.
15. Magiorakos A, Srinivasan P, Carey RB, et al. Multidrug-resistant, extensively drug-resistant and pan drug resistant bacteria: An international expert proposal for interim standard definitions for acquired resistance. Clin Microb Infect 2012; 18:268-81.
16. Al-Karkhi MKM. Study on Pathogenicity of *Acinetobacter baumannii* Bacteria Locally Isolated. M.Sc. Thesis. University of Baghdad: 2001.
17. Al-Garaawi SA. Isolation and Identification of *Acinetobacter baumannii* from Nosocomial Infections in Al-Diwaniya Province and Study of Some Pathogenicity and Genetic Aspects. M.Sc. thesis, College of Education, Al-Qadisiyah University: 2012.
18. Gales AC, Jones RN, Sader HS. Contemporary activity of colistin and polymyxin B against a worldwide collection of Gram-negative pathogens: Results from the SENTRY Antimicrobial Surveillance Program (2006-09). J Antimicrob Chemother 2011; 66: 2070-2074

19. Al-Harmoosh RA. Detection of Carbapenem-Resistant Genes of *Acinetobacter baumannii* Isolated from Clinical Samples in Babylon Province. Ph.D Thesis. University of Babylon: 2015.

20. Jabur MH. Isolation of *Acinetobacter baumannii* from Different Clinical Source and Study some Antibiotic Resistant and β-Lactamase Production. Med J Babylon 2014; 11(2):456-464.

21. Nahar A, Anwar S, Saleh A, et al. Isolation of *Acinetobacter* species and their antimicrobial resistance pattern in an Intensive Care Unit (ICU) of a tertiary care hospital in Dhaka, Bangladesh. Bangladesh J Med Microbiol 2012; 6(1): 3-6.

22. Alsehlawi ZS, Alshara JM, Hadi ZJ. et al. First report of the blaOxa-23 gene in a clinical isolates of *Acinetobacter baumannii* in Najaf hospitals-Iraq. Int J Recent Sci Res 2014; 5(8): 1407-1411.

23. AL-Kadhmi NA. Multidrug Resistant *Pseudomonas aeruginosa* and *Acinetobacter baumannii* Isolated from Patient's wounds. A Report of Higher Diploma. Genetic Engineering and Biotechnology Institute for Postgraduate Studies/University of Baghdad: 2015.

24. Asaad AM, Al-Ayed MS, Qureshi MA. Emergence of unusual nonfermenting Gram-negative nosocomial pathogens in a Saudi Hospital. Jpn J Infect Dis 2013; 66:507-511.

25. Kong BH, Hanifah YA, Yusof MYM, et al. Antimicrobial susceptibility profiling and genomic diversity of multidrug-resistant *Acinetobacter baumannii* isolates from a teaching hospital in Malaysia. Jap J Infect Dis 2011; 64(4), 337–40.

26. Kulah C, Aktas E, Comert F, et al. Detecting imipenem resistance in *Acinetobacter baumannii* by automated systems (BD Phoenix, Microscan WalkAway, Vitek 2); high error rates with Microscan WalkAway. BMC Infect Dis 2009; 9:30.

27. Peleg AY, Seifert H, Paterson DL. *Acinetobacter baumannii*: emergence of a successful pathogen. Clin Microbiol Rev 2008; 21(3):538–582.

28. Amudhan SM, Sekar U, Arunagiri K, et al. OXA Beta-lactamase-mediated carbapenem resistance in *Acinetobacter baumannii*. Ind J Med Microbiol 2011; 29(3):269-74.

29. Al-Charrakh AH, Al-Mamory ZO, Al-Malaky KA. Antifungal susceptibility patterns of *Aspergillus* species isolated from patients with pulmonary diseases in Iraq. J App Pharmaceut Sci. 2018; 8(05):88-93.

The Effect of the Adding *Ganoderma Lucidum* Fungus Powder in the Production Performance for the Brown Japanese Quail Bird

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ABSTRACT

This study was conducted in the poultry field belonging to the Department of Animal Production, College of Agriculture, University of Tikrit for the period from (29/8/2016 to 31/10/2016). The study aimed to investigate the effect of adding different levels of *Ganoderma Lucidum* powder in the production and physiological performance of the Japanese quail bird. It was used 160 birds from Japanese quail bird in the experiment (40 males and 120 females), with 16 weeks age. The experiment consisted of four treatments, each treatment contains 10 replicates and in each replicate is four birds (one male and three females). The birds were distributed randomly to the treatments, treatments were as follows: First treatment T1: a diet without adding the Ganoderma fungus powder (control). T2: a diet adding to it the Ganoderma fungus powder with the ratio of (0.5: 1000 g feed). T3: a diet adding to it the Ganoderma fungus powder with the ratio of (1: 1000 g feed). T4: a diet adding to it the Ganoderma fungus powder with the ratio of (1.5: 1000 g feed). The results showed that the addition of red Ganoderma fungus led to a decrease in the level of feed consumption for the second and third treatment compared to the control group. There was also a significant improvement in the feed conversion coefficient for the added treatments compared to the control group. A significant increase was also occurred in egg production and egg mass for the third treatment (1g/kg feed) compared to other treatments, while the fourth treatment was excelled in the traits of the average weight of the egg compared to the rest of the treatments.

Keywords: *Ganoderma Lucidum, Productive traits, Japanese quail bird*

Introduction

Fungi are similar to microorganisms, which grow like plants but without chlorophyll. Fungi depend on living organisms or other plants to feed them. The available information in literature showed that fungus was first identified by Greeks in early time and Romans who made them edible, toxic, and medicinal fungi[1]. The fungus is a thallophyte organism that spreads in different environments in wet and dry soil, fresh water, and in the air, and attacks many organisms, including plants, animals, and humans. It has a solid cellular wall identifying their shape except for Myxomycetes, which are usually immobile but have moving genital cells. Fungi are used in food and medicine. The fungus is called vegetarian meat, which contains a high percentage of protein. Some fungi are composed of monocellular and some of the Multicellular. The fungus consists of thallophyte, which is not characterized by roots, stems, and leaves but is organized into the strings known as Hyphae and Hyphae groups that form the body of the fungus is called Mycelium. Such these fungi are *Ganoderma Lucidum* fungus belonging to the *Polyporaceae* family, this fungus has popular names such as Mannentake, Holy Mushroom, Ling Chi, Ling Zhi Cao. The fungus is commercially cultivated in China, Japan, Malaysia, and the United States. It grows in Japan on wild plum trees but most of the supplies for the industry come from agriculture, and the *Ganoderma* fungus is a fungus with meaty texture with a shiny solid stalk and a cap that resembles a somewhat solid umbrella with yellowish color at first, they turn to scarlet red and maybe brown. This study was conducted to investigate the effect of *Ganoderma Lucidum* fungus on the productive and physiological traits for the Japanese quail bird as a laboratory bird[2].

Materials and Method

This study was conducted in the poultry farm belonging to the Department of Animal Production, College of Agriculture, University of Tikrit for the

period from (29/8/2016 to 31/10/2016). The study aimed to investigate the effect of adding different levels of *Ganoderma Lucidum* powder in the production and physiological performance of the Japanese quail bird. It was used 160 birds from Japanese quail bird in the experiment (40 males and 120 females), with 16 weeks age. The birds were bred in three-storeyed cages, with dimensions (40 x 40 x 40 cm) for one cage, the number of cages is 40 cage, where each cage was considered as a replicate. Water was provided by plastic Manhals with one Manhal per cage. The feed was provided by an external feeder of 150 g feed connected to the cage in such a way as to be easily separated for cleaning and to measure the remaining feed, with the rate of one feeder per cage. The experiment consisted of four treatments, each treatment contains 10 replicates and in each replicate is four birds (one male and three females). The birds were distributed randomly on the treatments, treatments were as follows: First treatment (T1): a diet without adding the Ganoderma fungus powder. T2: a diet adding to it the Ganoderma fungus powder with the ratio of (0.5: 1000 g feed). T3: a diet adding to it the Ganoderma fungus powder with the ratio of (1: 1000 g feed). T4: a diet adding to it the Ganoderma fungus powder with the ratio of (1.5: 1000 g feed).

Chemical Analysis of *Ganoderma* fungus Powder: The chemical analysis for the *Ganoderma* fungus of DXN Malaysia Company was used to estimate the amount of energy, protein, carbohydrate, fat and dietary fiber per 100 g as shown in Table (2).

Table 1: Chemical analysis for the Ganoderma fungus powder per 100 g.

Material	Amount
Energy	348 kcal
Protein	4.0 g
Carbohydrates	86.0 g
Fats	2.7 g
Dietary Fiber	0.9 g

The Studied Traits:

Egg Production: The eggs were collected at 9 am every day throughout the breeding period (9 weeks) and the average of total egg production was calculated during the period of the experiment.

Egg Weight: Egg weighed daily individually for each replicate using a sensitive balance (Citizrn type, Fr-H1200 Model), with accurately 0.01 (two digits after the point).

Produced Egg Mass: The produced egg mass and the percentage of egg production were calculated on the basis of H.D using the following equations:

The average of Egg mass = an average number of the produced eggs during a given period of time × egg weight (g).

Feed Consumption: The amount of feed consumption was calculated by weighing the feed remaining at the end of each week and subtract it from the feed provided at the beginning of the week to extract the daily average of feed consumption for the bird according to the following equation:

The daily average of feed consumption (g/bird)

$$= \frac{F}{X + 7 \times L}$$

F = feed consumed within a week.

L = number of live chicks at the end of the week

7 = Number of days of the week.

X = The total number of days in which the mortality chicks were fed.

Food Conversion Coefficient: The food conversion coefficient necessary to produce one gram of eggs was calculated according to the following equation:

Food conversion coefficient (g feed/g egg) = The daily average of feed consumption/the average of the produced egg mass (g/day).

Experimental data were analyzed using a completely randomized design (CRD) to study the effect of studied treatments on different traits. The significant differences between averages were compared using the Duncan Multiple Range Test[3], and The Statistical Analysis Software (SAS) was used in the statistical analysis[4].

Results and Discussion

Table (2) shows the average weight of the egg, it was noted a significant superiority of T4 on T3, while no significant differences between T4, T1 and T2. There were no significant differences between T1 and T4 with T3, The averages weights of egg amounted to (11.83, 11.45, 11.02, 12.03 g), respectively, while the traits of the egg production during the experiment period (60 days), T3 was excelled and showed significant differences with T1 and T2, while no significant difference was shown

with T4. There were no significant differences between T1, T2 and T4, the egg production amounted to (46.07, 47.16, 51.87, 48.83 eggs/birds) respectively, and the percentage of production on the basis HD amounted to (76.77, 78.61, 86.44, 81.38%), respectively. As for the trait of the daily egg mass, the second and third treatments were significantly excelled on the first treatment. No significant differences were found between them. No significant differences were observed with the fourth treatment. No significant difference was observed between the first treatment and the fourth treatment. The results of the third treatment were agreed with[5,6] in his study on the Japanese quail bird, where showed that the egg weight of the Japanese quail bird amounted to (11.00 g) while its results did not match the results of the first, second and fourth treatments. The results of the experiment did not agree with the results of in their study on the Japanese quail bird[7], where they found that the percentage of average egg production amounted to 68.97%. The reason for the improvement in the percentage of average eggs production on the basis of (HD) in the adding treatments for the *Ganoderma* fungus, where some of the materials directly affect the production and synthesis of Prostaglandins, the main material in its synthesis is the Arachidonic acid and other essential fatty acids, the survival it in the circulatory system and the Prostaglandins work to stimulate and manufacture the adenosine monophosphate (CAMP), because this reporter regulates or mediates the work of many peptide hormones that cannot penetrate the target cell wall but are associated with the receptors on the cell membrane and the complex hormone receptor, which indirectly activates an enzyme called Adenylate Cyclase, which converts the partial energy (ATP) Adenosine try phosphate to the CAMP inside the cell and this acts as a second reporter by indirectly activating other enzymes and proteins within the target cell, In the middle of which the work of several hormones, including the Luteinizing hormone (LH) and Follicle-stimulating hormone (FSH)[8]. The release of these two hormones led to stimulating the ovary and increases its activity in the formation of eggs and increasing egg production because of a positive correlation between the concentration of these hormones in blood plasma and egg production[9]. The regularity of secretion of LH hormone leads to the regularity of progesterone secretion from Granulosa Cells for mature follicles, leading to increased secretion of LH by positive feedback at the hypothalamus level, thereby increasing LH secretion, increasing ovulation, and increasing egg production[10]. Which lead to increasing the progesterone production, which is a precursor to estrogen, is important for the synthesis of the vitellogenin precursors and lipoproteins, and increasing the speed of transmission to the ovary, faster vesicle growth, and increase the ovulation[9].

Table 2: Effect of adding the Ganoderma fungus powder to the diet on the productive traits for the eggs of the Japanese quail

Productive traits	T1	T2	T3	T4
Egg weight (g)	11.83 ± 0.14 ab	11.45 ± 0.25 ab	11.02 ± 0.12 b	12.03 ± 0.17 a
Number of produced eggs (egg/bird)	46.07 ± 1.56 b	47.16 ± 0.31 b	51.87 ± 1.01 a	48.83 ± 0.29 ab
percentage of egg production (HD)%	76.77 ± 1.01 b	78.61 ± 1.05 b	86.44 ± 1.82 a	81.38 ± 1.12 ab
Eggs mass	9.63 ± 0.12 b	9.86 ± 0.09 a	9.83 ± 0.14 a	9.79 ± 0.08 ab

a,b in the row means significant differences at level ($p < 0.05$).

Table (3) indicates that the adding of *Ganoderma* fungus powder to the diet at different levels indicates no significant differences between the first, second, third and fifth weeks from the breeding period. The results showed a significant difference in the first treatment with the second, third and fourth treatments. The first treatment recorded the highest amount of feed consumption amounted to (29.14 g/bird/day). The results also showed significant differences between the first and fourth treatments compared to the second and third treatments in the sixth week, while the first, second and third treatments were significantly excelled on the fourth treatment in the seventh week. A significant difference was shown for the third treatment compared to the second treatment, while did not record significant differences between the third treatment and the first and fourth treatments in the eighth week. The final results of the breeding period showed a significant difference between the first treatment and the second and third treatments, while no significant difference was recorded

with the fourth treatment. where the first treatment recorded the highest percentage for feed consumption between the first treatment and the second and third treatments, while no significant difference was recorded with the fourth treatment where the first treatment recorded the highest percentage for the feed consumption between the treatments amounted to (28.76 g/bird/day), where indicated that the percentage of feed consumption for Japanese quail bird amounted to (24.40 g/bird/day), and did not agree with[10] found that the percentage of feed consumption for the Japanese quail birds amounted to (35.71 g/bird/day). The reason for the low feed consumption adding treatments compared to control to contain red Ganoderma fungus many active substances with more than 200 active substances, including organic germanium, Ergesterois, adenosyl, and polysaccharides, as well as containing it Ganoderic acids and triglycerides contained in the bright red cap components for the fungus, These substances are beneficial for cardiovascular, liver health. They also promote metabolism, inhibit tissue degradation, and make maximum use of nutrients and their metabolism for use in egg production. also indicated to that the chemical composition of the fungus contains a significant amount of crude protein, carbohydrates, raw fiber, raw fat, and low fatty acids, making it a valuable food component for use in poultry production[11].

Table 3: Effect of adding the Ganoderma fungus powder to the diet on the percentage of feed consumption (g) and the feed conversion coefficient for the Japanese quail bird.

Period (week)	T1	T2	T3	T4
1 – 2	24.82 ± 0.31	24.39 ± 0.53	24.39 ± 0.59	25.12 ± 0.31
2 – 3	26.51 ± 0.33	26.19 ± 0.59	26.36 ± 0.39	26.50 ± 0.34
3 – 4	28.11 ± 0.31	27.10 ± 0.67	25.46 ± 2.26	27.98 ± 0.48
4 – 5	29.14 ± 0.54 a	27.46 ± 0.49 b	27.60 ± 0.39 b	27.76 ± 0.33 b
5 – 6	31.53 ± 0.42	30.64 ± 0.67	30.64 ± 0.34	31.46 ± 0.36
6 – 7	28.44 ± 0.44 a	24.89 ± 0.85 b	25.86 ± 0.51 b	28.35 ± 0.61 a
7 – 8	31.12 ± 0.31 a	30.96 ± 0.56 a	31.86 ± 0.50 a	28.55 ± 0.60 b
8 – 9	30.41 ± 0.45 ab	28.81 ± 0.37 b	30.69 ± 0.89 a	29.74 ± 0.55 ab
1 – 9	28.76 ± 0.15 a	27.55 ± 0.35 b	27.86 ± 0.33 b	28.18 ± 0.20 ab
feed conversion coefficient	3.01 ± 0.09 a	2.92 ± 0.11 ab	2.77 ± 0.03 b	2.82 ± 0.14 b

a,b in the row means significant differences at level ($p < 0.05$).

Table (4) shows that there was a significant difference between T1 with T3 and T4 in the feed conversion coefficient. There was no significant difference between T1 and T2. The results did not show significant differences between T3 and T4 with T2, the averages of feed conversion coefficient amounted to (3.01, 2.92, 2.77, 2.82 g fed/g egg), respectively. The results of T3 were agreed with in his study on the Japanese quail bird, where the feed conversion coefficient amounted to (2.79 g fed/g eggs), while the results of the rest of the treatments did not agree with him. The improvement in the feed conversion coefficient and the increase in egg production lead to an increase in the mass of produced eggs compared to the number of feed grams. The reason is due to the fact that Ganoderma fungus contains many important nutrient elements and enzymes that increase nutrient elements availability within the digestive tract and thus increase the benefit of Feed consumption and turn it into eggs[12].

Conclusion

We consoled from this search that the addition of red Ganoderma fungus led to a decrease in the level of feed consumption for the second and third treatment compared to the control group. There was also a significant improvement in the feed conversion coefficient for the added treatments compared to the control group. A significant increase was also occurred in egg production and egg mass for the third treatment (1 g/kg feed) compared to other treatments, while the fourth treatment was excelled in the traits of the average weight of the egg compared to the rest of the treatments.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Not required.

REFERENCES

1. Zakhary JW, Taiseer M, Abo-Bakr A, EL-Mahdy AR, El-Tabey SAM. The chemical composition of wild mushrooms collected from Alexandria, Egypt. Food Chemistry. 1983. 11(1): 31-41.
2. NRC, National Research Council. *Nutrient requirements of Poultry*,9th ed.National Academy press, Washington, D.C. 1994.
3. Duncan DB. Multiple range and multiple F-test-Biometrics. 1955, 11:1-42.
4. SAS. SAS/STAT User's Guide: Statistics Version 6.12 Edition. SAS. Institute Inc., Cary, NC. The USA**. 2001.**
5. Latif Osama Ahmed. Effect of Addition Different Levels of Ginger Oil in the Diet on some Productivity Traits and Quality of Quail's Coturnix japonica Temminck & Schlegel, 1849 Eggs. Basra Journal of Agricultural Sciences, 2016. 29 (2): 107-118.
6. Al-Tikriti Samawal Saadi Abdullah. The Effect Of Divergent Selection For Body Weight on Egg Quality Traits In Japanese Quail Brown. Tikrit University Journal of Agricultural Sciences, 2016. 16 (2): 121-127.
7. Al-Daraji HJ, Al-Mashadani HA, Al-Hayani WK, Al-Hassani AS, Mirza HA. Effect of n-3 and n-6 Fatty Acid Supplemented Diets on Semen Quality in Japanese quail (Coturnix coturnix japonica). International Journal of Poultry Science. 2010. 9 (7): 656-663.
8. Al-Hassani Diaa Hassan. Poultry bird physiology. Baghdad, Dar Al-kutub for Printing and Publishing. College of Agriculture, University of Baghdad. 2000.
9. Sturkie PD. Avian physiology. Itheca, New York: comstock publishing associates. 1986.
10. Novero RP, Beck MM, Gleaves EW, Johnson AL, Deshazer JA. Plasma progesterone, luteinizing hormone concentrations, and granulosa cell responsiveness in heat-stressed hens1,2. Poultry. Science. 1991. 70(11):2335-2339.
11. Ogbe AO, Obeka AD. Proximate, Mineral and AntiNutrient Composition of Wild Ganoderma lucidum: Implication on It Utilization in Poultry Production, Department of Animal Science, Faculty of Agriculture, Nasarawa State University, Keffi, Nigeria. 2013.
12. Kalsum U, Soetanto H, Achmanu A, Sjofjan O. Influence of a probiotic containing lactobacillus fermentum on the laying performance and egg quality of Japanese Quails. International Journal of Poultry Science. 2012. 11(4): 311-315.

Effect of Non-pharmacological pain Management Methods on Reduction the Severity of Labor Pain in Primigravida Women at AL-Elwyia Maternity Teaching Hospital

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Abstract

Objectives: To evaluate the effect of non-pharmacological practices on reducing level of pain between study groups during labor.

Methodology: A quasi-experimental study conducted on non-probability of (60) women (30) control and (30) study group whom admitted to Al-Elwyia Maternity Teaching Hospital suffering from labor pain for the period of (4th July 2018 through 24th October 2018). Descriptive& Inferential statistical analyses were used to analyze the data.

Results: The highest percentages of both groups were in age group (< 20) years, primary schools graduates, housewife, from "urban area", within low category of socioeconomic, at gestational age between (39 – 40 weeks +6day. With highly significant differences concerning reducing the severity of pain in (1st, 2nd, and 3rd) stages of labor among study and controlled groups at (P=0.000), (P=0.000), &(at (P=0.002) respectively.

Conclusions: The study concluded that are a highly significant differences concerning reducing level of pain in (1st, 2nd, & 3rd) stages of labor between study and control groups.

Recommendations: Need to develop training program to all midwives working in delivery room to upgrade their knowledge and skills about importance of using non-pharmacological methods to help them perform their role effectively in reducing level of pain for women during labor.

Keywords: *Effect, Non-Pharmacological, Labor Pain, Management, Primigravida.*

Introduction

The intensity of the pain experienced during labor is considered to be one of the most painful experiences in life. It is mainly dependent on stages of labor. At the onset of labor (in first stage) the pain is related to continuous contractions of the uterine muscle, dilation of the cervix, stretching of the perineal tissue and pelvic floor muscle, while at the second stage of labor the descent of fetus presenting part, fetus position, and pressure on bladder, bowel and the pelvic structure lead to intensify the pain. Also fear of birth process, anxiety, sense of control loss and stress all affecting on women's childbirth experiences and their perception towards labor. Therefore, the first priority in confirm a positive labor outcome and satisfying the physiological need of women is by effective labor pain management (1).

Methodology

A quasi-experimental study design was conducted on purposive sample, of (60) women (30) control group and (30) study group whom admitted to Al-Elwyia Maternity Teaching Hospital suffering from labor pain. Study implemented for the period of (4th July 2018 through 24th October 2018). Data collection will be gathered by application one of non-pharmacological strategies of pain relief methods include: (frankincense, jasmine,& olive oils), massage,body movement and change position (squatting, side-lying,& standing),breathing technique, and therapeutic touch),and by used questionnaire format which consisted of four parts, including demographic, reproductive characteristics, non-pharmacological methods the delivering woman received during labor and FLACC behavior scale to measure intensity of pain level. A pilot study was carried out between the 25th June 2018,

to 1st July 2018, on (10) women to determine the reliability of the questionnaire and content validity was carried out through the 12 experts. Descriptive and inferential statistical analyses were used to analyze the data.

Results

Table 1: Distribution of the Socio-demographic Characteristics for the studied Sample with Comparisons Significant

Variables	Groups	Study (n = 30)		Control (n = 30)		C.S. (*) P-value
		No.	%	No.	%	
Age Groups (Per Years)	< 20	14	46.7	16	53.3	C.C. = 0.224 P = 0.365 (NS)
	20 _ 24	10	33.3	11	36.7	
	25 _ 29	3	10	3	10	
	30 _ 34	3	10	0	0	
	Total	30	100	30	100	
Educational level for wife	Illiterate	2	6.7	0	0	C.C. = 0.291 P = 0.476 (NS)
	Read &write	2	6.7	3	10	
	Primary school	9	30	11	36.7	
	Intermittent school	6	20	10	33.3	
	Preparatory school	4	13.3	3	10	
	Baccalaureate	6	20	3	10	
	Higher studies	1	3.3	0	0	
	Total	30	100	30	100	
Occupation status of wife	Housewife	28	93.3	28	93.3	C.C. = 0.147 P = 0.513 (NS)
	Employee	1	3.3	0	0	
	Others	1	3.3	2	6.7	
	Total	30	100	30	100	
Residential environment	Urban	27	90	26	86.7	C.C. = 0.052 P = 0.688 (NS)
	Suburban	3	10	4	13.3	
	Total	30	100	30	100	

(*) NS: Non Sig. at P>0.05; Testing based on a contingency coefficient (C.C.) test.

Table (1) shows that the highest percentage (46.7%), (53.3%) respectively for both study and control groups were in age group (< 20) years old, (30%) (36.7%) respectively in study and control groups were at (primary school), (93.3%) in both groups were housewife, (90%) (86.7%) respectively were from urban area.

Table 2: Distribution of the Reproductive Characteristics for the Studied Sample with Comparisons Significant

Variables	Classes	Study (n = 30)		Control (n = 30)		C.S. (*) P-value
		No.	%	No.	%	
Gestational Age (per weeks)	37- 38 + 6day	12	40	11	36.7	C.C. = 0.035 P = 0.964 (NS)
	39- 40 + 6day	16	53.3	17	56.7	
	41 & more	2	6.7	2	6.7	
	Total	30	100	30	100	
Membrane Status	Ruptured	14	46.7	10	33.3	C.C. = 0.135 P = 0.292 (NS)
	Intact	16	53.3	20	66.7	
	Total	30	100	30	100	

(*) NS: Non Sig. at P>0.05; Testing based on a contingency coefficient (C.C.) test.

Table (2) shows that the highest percentage (53.5%) (56.7%) respectively for both study and control groups were at gestational age between (39 weeks – 40 weeks $^{+6day}$), and (53.3%) (66.7%) respectively for study and control groups have intact membrane status.

Table 3: Type of Practices Concerning Pain Management Methods Uses for Study group

No.	Items	No.	Yes		No		Order
			F	%	F	%	
1.	Frankincense Oil	30	9	30.0%	21	70.0%	1.0
2.	Jasmine Oil	30	7	23.3%	23	76.7%	2.0
3.	Side-Lying Position &Breathing	30	4	13.3%	26	86.7%	3.0
4.	Squatting Position	30	4	13.3%	26	86.7%	3.0
5.	Massage	30	1	3.3%	29	96.7%	4.0
6.	Massage &Standing position	30	1	3.3%	29	96.7%	4.0
7.	Therapeutic Touch &standing	30	1	3.3%	29	96.7%	4.0
8.	Olive Oil	30	1	3.3%	29	96.7%	4.0
9.	Breathing Technique	30	1	3.3%	29	96.7%	4.0
10.	Therapeutic Touch & side-lying position	30	1	3.3%	29	96.7%	4.0

Table (3) results show that " Frankincense Oil" method has recorded the high and first ordered method, and accounted 9 (30%), then followed with Jasmine Oil" method, and accounted 7 (23.3%), then followed with "Squatting Position, and Side-Lying Position &Breathing" methods, and accounted 4 (13.3%), Massage, Massage& Standing position, Therapeutic touch & Standing, Olive oil, breathing technique, & side lying position accounted 1(3.3%).

Table 4: Distribution of Pain Assessment in different Stages between studied groups using (FLACC behavioral scale) with Comparisons Significant

Stages of labor	FLACC behavioral scale category	No. and %	Groups		Total	C.S. (*) P-value
			Study	Control		
1st Stage	Mild	No.	0	0	0	C.C. = 0.647 P = 0.000 (HS)
		%	0.00%	0.00%	0.00%	
	Moderate	No.	30	2	32	
		%	100%	6.7%	53.3%	
	Sever	No.	0	28	28	
		%	0.00%	93.3%	46.7%	
	Total	No.	30	30	60	
		%	100%	100%	100%	
2nd Stage	Mild	No.	0	0	0	C.C. = 0.695 P = 0.000 (HS)
		%	0.00%	0.00%	0.00%	
	Moderate	No.	29	0	29	
		%	96.7%	0.00%	48.3%	
	Sever	No.	1	30	31	
		%	3.3%	100%	51.7%	
	Total	No.	30	30	60	
		%	100%	100%	100%	
3rd Stage	Mild	No.	30	20	50	C.C. = 0.408 P = 0.002 (HS)
		%	100%	66.7%	83.3%	
	Moderate	No.	0	6	6	
		%	0.00%	20.0%	10.0%	
	Sever	No.	0	4	4	
		%	0.00%	13.3%	6.7%	
	Total	No.	30	30	60	
		%	100%	100%	100%	

(*) HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a contingency coefficient (C.C.) test.

Table (4) results show that concerning 1st & 2nd stages the pain intensity level have recorded a moderate level in the study group, while sever level in controlled, then followed in the 3rd stage, all study cases 30(100%) has recorded mild level, while only 20(66.7%) in controlled group has recorded mild level, and the leftover has recorded moderate and sever, and they are accounted 6(20.0%), and 4(13.7%) respectively.

Discussion

Regarding to Socio Demographic Characteristic: (Table 1) The results show that the highest percentages (46.7%), (53.3%) respectively for both study and control groups are (< 20) years old. This finding is in agreement with a retrospective study which found that out of the (60) sample of primigravida women, the highest age groups were between (18-22) years that was (41.7%) and the lowest were found in the age group of (30-34) and they are accounted (11.7%) [2].The highest percentages (30%) (36.7%) respectively for both study and control groups are primary schools graduates. This finding is in agreement with study that finds that the women with low educational level will have minimum level of performance to cope with pain during childbirth process. While it was pointing that woman with higher level of educational ‘’such as college’’ was more perception to the childbirth preparation methods, presenting classes, and books reads to cope with labor pain [3]. The height significances in occupational status of wife, are “Housewives”, and they are accounted (93.3%) in both study and control groups, this finding is constant with the study that found unemployed women will have more free time in order to read book s, watch videos, and attend classes. Which all lead to a more positive childbirth experience [4]. The vast majority (90%) (86.7%) respectively of the both study and control groups were living at urban areas the researcher noted that although these women living in urban area and were have sufficient awareness that labor is painful, but there is lack of knowledge regarding the methods of non-pharmacological pain relief, and there advantages and disadvantages.

Reproductive Parameters: Table (2) Results show that the highest percentage (53.5%) (56.7%) respectively for both study and control groups were at gestational age between (39 weeks – 40 weeks +6day), these result are agreement with study that found that physiological factors such as uterine contractions, cervical dilation, and gestational age though essential parts of labor, are major contributors to labor pain[2]. the highest percentages (53.3%) (66.7%) respectively for both study and control groups have intact membrane status. These group of women artificial rupture of membrane were done for them to enhance progress of labor and increase cervical dilation,and this mean the women exposed to more painful than those with spontaneous rupture of membrane at term, and need to arrange for educating them about how copy with pain

Non Pharmacological Methods: The results of table (3) show that “ frankincense oil” method has recorded the highest and accounted 9 (30%), then followed with jasmine oil” method, and accounted 7 (23.3%), then followed with “squatting position, and side-lying position &breathing” methods, and accounted 4 (13.3%), finally, massage, massage and standing position, therapeutic touch and standing, olive oil, breathing technique, and therapeutic touch and distraction’’ are accounted 1 (3.3%). In this study noted that essential oils (Frankincense, jasmine, and olive) recorded the high number of uses and accounted 17(56.7%), because its promoting general relaxation, reduce anxiety and helpful to reduce labor pain, Then as observed in this study some women prefer changing positions which include squatting that accounted 4(13.3%) and side-lying position and standing which used as combine with other method. These positions help to speed labor by adding the benefits of gravidity and changing the shape of the pelvis in addition the position that women assumes have a profound effect on uterine activity and efficiency [5].Related to use breathing technique in this study one woman chose to apply breathing technique as alone be sit in bed and 4 of them use breathing technique with slid lying position and they are accounted 4(13.3) the researcher teaches woman how to apply this method based on evidence-based studies[6-8]. Relative to use of massage technique the results show that there are two women were choosing massage (one massage combined with standing position and other with side-lying position). The massage is one of the best non pharmacological therapies useful in labor. Because it has the potential benefits such as decreasing the intensity of pain. Relative to use therapeutic touch observed that there are two women chose therapeutic touch but in different way one therapeutic touch with standing position and another one use therapeutic touch with side-lying position.

Pain Assessment in Different Stages between Studied Groups Using (FLACC Behavioral Scale): In present study the researcher used FLACC behavior scale to measure the intensity of labor pain because the labor pain affects a woman's emotional control and it can be associated with fear that leads to a prolonged childbirth process and so mother are request for an unnecessary cesarean section[9]. In addition to that the intense and prolonged uncontrolled labor pain can cause long-term excitement imbalance and can psychologically disturb mother's health.[10],So that the researcher application some methods of non-pharmacological pain relief and reassess the pain level for study group, it was found that there are high significant at level of pain in two groups and in all labor stage as shown in table (4) show that concerning 1st & 2nd stages the pain intensity level have recorded a moderate level in the study group, while sever level in controlled, then in the 3rd stage, all study cases 30(100%) has recorded mild level, while only 20(66.7%) in controlled group has recorded mild level, and the leftover have recorded moderate and sever, and they are accounted 6(20.0%), and 4(13.7%) respectively. These findings are in agreement with study which measures the effects of breathing exercises on maternal pain during the second stage of labor revealed that the mean visual analog scale score of intervention group and control group were (88.2 ± 6.3) and (90.5 ± 7.0), respectively ($P < 0.001$). Based on this study, breathing exercises for women are effective in reducing the perception of labor pain, therefore the breathing exercises consider an effective method for labor pain management and lessening the duration of labor [7]. Another study which revealed that the primiparous women distributed in to two groups the (experimental and the control) group. Where the experimental group received a 30-min massage during the three phases of labor. Then the intensity of pain between the two groups was compared in the latent phase, active phase, and transitional phase. A t-test demonstrated that the massage group had significantly lower pain reactions in the latent, active and transitional phases [11]. Relative to change position a systematic reviews evidence several possible benefits for upright positions (squatting, sitting, chairs, kneeling, and birthing stools) in women without epidural anesthesia, such as a very small reduction in the duration of second stage of labor, when compared with supine positions [12]. Related to essential oils the effect on reduction of labor pain are consistent with the findings of study which assessed the effectiveness of jasmine oil massage, it is evident that the jasmine oil was effective in reducing level of first stage labor pain among primigravida women [13]. Furthermore, the use of touch therapy helps women maintain their sense of body integrity and increases the ability to their compatibility with the delivery [14].

Conclusions

The study concluded that there are a highly significant differences concerning reducing level of pain in (1st, 2nd, & 3rd) stages of labor between study and control groups.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Obtained from the

- Ministry of Health/Al-Russafa Health Directorate
- Ministry of Planning and Development Cooperation/ Central Statistical Organization Technique and Information.
- Al-Elwyia maternity teaching hospital.
- All laboring women participants in the research -have been approved before the questionnaire is started.

Recommendations

The study recommended developing training program to all midwives working in delivery room to upgrade their knowledge and skills about importance of using non-pharmacological pain management methods to help them perform their role effectively in reducing level of pain for women during labor.

References

1. Xavier, T., and Viswanath, L.: Effect of music therapy on labor pain among women in active labor admitted in tertiary care hospital, kochi city. Journal on Recent Advances In Pain, 2017, 3(1),pp:3-6.
2. Vyas Kartavya J.; Shadyab Aladdin H.; Lin Chii-Dean, and Crum-Cianflone Nancy F.: Trends and factors associated with initial and recurrent methicillin-resistant staphylococcus aureus

(MRSA) Skin and soft-tissue infections among HIV-infected persons: An 18-Year Study; Journal of the International Association of Providers of AIDS Care, 2014,13(3) pp: 206-213.

3. Al Ahmar E., and Tarraf S.: Assessment of the socio-demographic factors associated with the satisfaction related to the childbirth experience. Open Journal of Obstetrics and Gynecology, 2014, 4, pp: 585-611.
4. Gunger, I., and Kizilkaya Nezihe B.: Effects of father`s attendance to labor and delivery on the experience of childbirth in turkey. Western Journal of Nursing Research, 2007, 29 (2), pp: 231.
5. Ricci S.: Essentials of Maternity, Newborn & Women's Health Nursing, 3rd ed., Walters Kluwer Health, Lippincott Williams & Wilkins; 2013, pp. 439-440.
6. Yıldırım, Y.K.; Kanser Ağrısının Nonfarmakolojik, and Yntemlerle Kontrolü,: Kanser ve Palyatif Bakım, In M. Uyar, R. Uslu, YK. Yıldırım, (Eds), 2006, pp.97-126; Meta Press Matbaacılık, İzmir.
7. Yuksel, H.; Cayir Y.; Kosan Z.,and Tastan K. : Effectiveness of breathing exercises during the second stage of labor on labor pain and duration: a randomized controlled trial. Journal of Integrative Medicine, 2017,15(6), pp: 456–461.
8. Vakilian K.; Davoud Abadi M., and Seyed Zadeh Aghdam N.: The Effects of breathing techniques on the length of labor active phase and its second stage in women's first labor. CMJA, 2014, 3 (4), pp: 666-673.
9. Lang AJ.; Sorrell JT.; Rodgers CS., and Lebeck MM.: Anxiety sensitivity as a predictor of labor pain. European Journal of Pain, 2006,10, pp: 263–270. http://dx.doi.org/10.1016/j.ejpain.2005.05.001.
10. Gunasheela S., and Biliangady R.: Practical management of obstetric problems. FOGSI Publication; 2004, 1st ed. India.
11. Chang MY. ; Wang S Y., and Chen, CH.: Effects of massage on pain and anxiety during labor: a randomized controlled trial in Taiwan. Journal of Advanced Nursing, 2002, 38, 68-73.
12. Gupta JK.; Sood A.; Hofmeyr GJ., and Vogel JP.: Position in the second stage of labour for women without epidural anesthesia. Cochrane Database of Systematic Reviews, 2017, Issue 5.
13. Joseph R. & Fernandes P.: Effectiveness of jasmine oil massage on reduction of labor pain among primigravida mother; Nitte University Journal of Health Science (Nujhs), 2013, 3(4),Issn (2249-7110).
14. Chand, Chen: Effects of massage on pain and anxiety during labor. American Journal of Nursing, 2001, pp:68-73.

Cholera Outbreak in Iraq, 2017

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ABSTRACT

Background: In Aug, 2017, Iraq as one of the Eastern Mediterranean Region countries experienced cholera outbreak. Iraq is a cholera endemic country with epidemics every 3-4 years. Poor services due to the wars and conflicts, the influx of internally displaced people reinforce many outbreaks in the last 10 years.

Aim of the study: To assess the Cholera Outbreak in Iraq, 2017

Method: We defined a case of Cholera as a patient with diarrhea that had a positive stool sample for vibrio cholera. Epidemiological investigations were carried for each case and their contacts was examined also the type of drinking water was determined.

Results: The total suspected cholera cases were 505. Most of the cases (98%) were inaba with a peak in W47 giving a case fatality rate of 0.6%. Generally, the diarrheal cases were in the middle and south of Iraq and the proportion of cholera cases was higher in those who use river, vehicle and other sources of water while most of cases occurred in autumn.

Conclusions: Provision of adequate and safe water supply besides other control measures should be in place to prevent further outbreaks. Epidemiological and laboratory evidence suggested that the water was the source of this outbreak.

Keywords: *Cholera, Iraq 2017, epidemics, water, endemic countries*

Introduction

Cholera is an infectious disease caused by ingestion of bacterium *Vibrio cholerae* with contaminated food or drinking water [(1)]. Only two serogroups (O1 and O139) cause outbreaks among many serogroups of *V. cholerae*. *V. cholerae* O1 has caused all recent outbreaks and the world now under the seventh pandemic, which started since 1961 in South Asia [(2)].

The disease is endemic in many countries and the discrepancy in the estimated burden of the disease may be related to the fact that many cases are not recorded due to weak surveillance systems, weak records and fear of impact on trade and tourism. The provision of safe water and sanitation is important in control of cholera transmission and other waterborne diseases [(2)].

In the Eastern Mediterranean Region, many outbreaks of cholera were reported from Afghanistan, Djibouti, Iraq, Pakistan, Sudan, Somalia and Yemen in the last decade [(3)].

Cholera is endemic in Iraq[(4)] and it was reported in 1820 for the first time in Basrah [(5)]. Iraq faced several epidemics during the last 5 decades all together due to underdevelopment and damage of infrastructures as a result of wars and conflicts. Shortage in provision of safe water in addition to bad sweage system, reinforce many outbreaks in the last ten years [(6)(7)].

Publishing on cholera epidemics in Iraq is scarce, therefore this report was carried out to highlight this problem, also to elucidate the picture of the epidemic and the factors potentiate the occurrence of the disease.

Aim of the study: To assess the Cholera Outbreak in Iraq, 2017

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Material and Method

Data were collected from communicable diseases center (Minisry of Health) for the year 2017. Cholera case was defined according to WHO definition [8].

Laboratory Tests and Confirmation: Stool samples were collected in primary health care centres (PHCCs) and hospitals positive for *V. Cholera* is transferred to the Reference Laboratory at the Central Public Health Laboratory for confirmation. Each case was visited and interviewed by a team, their contacts were examined. Epidemiological investigation was carried out for each case (home visit for interview, examination of contact, type of water used and personal data).

Results

In year 2017, the first laboratory confirmed sporadic case of cholera was female 37 years old, lives in Baghdad Al Resafa/Al Kamaliya District which diagnosed in W22/ May. Then cases continued through Augest to December by a gradual occurrence of cases that progressed to an outbreak to register 505 (36.9%) cholera cases which confirmed by Central Public Health Laboratory/Iraq (CPHL) out of 1367 suspected cases. Most of the cases, 497(98.4%) caused by V. cholerae O1, El Tor, Inaba serotype while the remaining cases caused by V. cholerae O1, El Tor, Ogawa serotype, 8(1.58%). The peak was demonstrated at W47 (114 cases)**(Figure 1).**

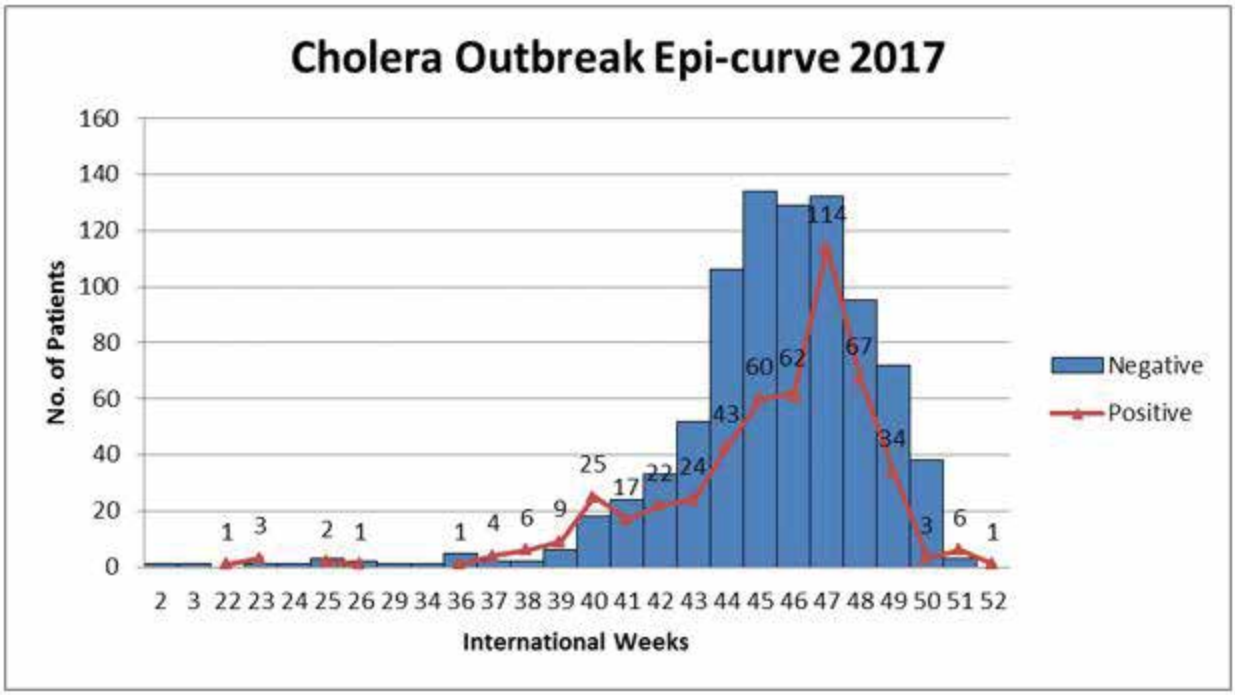


Figure 1: Epi-curve of cholera cases by international weeks

The overall rate was 1.33/100000 population and 3 patients with cholera died giving a case fatality rate 0.6%. Out of 505 cases, 254 were male (37.3%) giving male to female ratio 1.01:1.

The mean age was 31.5 ± 19.95 years old and ranged from 2 months to 90 years old.

Although the proportion of suspected cholera cases among females was higher than males [686 (50.18%) vs. 681(49.82%)], however, it showed no significant association between sex and cholera infection (χ^2=0.074, P=0.786). **(Table 1)**

Table 1: Distribution of cholera cases by gender, Iraq, 2017

Variable	Suspected	Positive
Gender	Total (N = 1367) No. (%)	Confirmed (n = 505) No. (%)
Male	681 (49.82)	254 (37.3)
Female	686 (50.18)	251 (36.59)

χ^2=0.074 , d.f =1, P-value = 0.786

The suspected cholera cases were distributed over 11 governorates out of 18 in Iraq. The higher number of diarrheal cases was in Baghdad Resafa and the lowest

was in Missan [706 (51.64) vs. 10 (0.37%)]. The highest proportion of cholera cases among diarrheal cases were in Kerbala while the lowest in Najaf as [66(98.51%) vs. 2 (5.88%)] respectively, whereas other governorates showed a percentage ranged between (10% to 67%), giving a significant association between cholera infection and governorate (P=0.000). **(Table 2)**

Table 2: Distribution of cholera cases by governorates, Iraq, 2017

Variable	Suspected	Positive
Health Directorate	**Total (N = 1367) No. (%)**	**Confirmed (n = 505) No. (%)**
Baghdad Resafa	706 (51.64)	265 (37.54)
Kerbala	67 (4.90)	66 (98.51)
Diwaniya	187 (13.68)	54 (26.88)
Babylon	207 (15.14)	59 (28.5)
Wassit	50 (3.65)	25 (50)
Missan	10 (0.73)	4 (40)
Kirkuk	15 (1.09)	3 (25)
Nineveh	47 (3.43)	5 (10.64)
Najaf	34 (2.48)	2 (5.88)
Baghdad kerkh	14 (1.02)	2 (14.29)
Muthana	30 (2.19)	20 (66.67)

χ^2=168.9,d.f =10,P-value = 0.000

Similarly, suspected cholera cases showed a significant association with the source of water being used along the study period (χ^2=32.8, P=0.000). As the highest proportion of suspected cases were found among those who used tab water and R.O, 60.79%(831). On the other, the proportion of cholera cases was higher among diarrheal cases that use the river, vehicle and other sources of water while the lowest in those used R.O water [9 (64.29%) vs. 60 (25.97%)] respectively, as shown in **Table 3**.

Table 3: Distribution of cholera cases by source of water, Iraq, 2017

Variable	Suspected	Positive
Source of water	Total (N = 1367) No. (%)	Confirmed (n = 505) No. (%)
Tab water	291 (21.29)	86 (29.55)
R.O.	231 (16.9)	60 (25.97)

Conted…

Tab water & R.O.	831 (60.79)	350 (42.13)
Others (river and vehicle water)	14 (1.02)	9 (64.29)

χ^2=32.8, d.f =3,P-value = 0.000

The highest proportion of cholera infection among diarrheal cases were in May while the lowest in July [2 (100%) vs. 0 (0.0%)] respectively, on the other hand the second highest percentage of infections among diarrheal cases was in September (64.18%). A significant association was found between the cholera occurrence and seasons as shown in **Table 4** (P=0.000).

Table 4: Distribution of cholera cases by months, Iraq, 2017

Variable	Suspected	Positive
Month	Total (N = 1367) No. (%)	Confirmed (n = 505) No. (%)
May	2 (0.146)	2 (100)
June	12 (0.88)	5 (41.67)
July	1 (0.08)	0 (0)
August	6 (0.44)	1 (16.67)
September	67 (4.9)	43 (64.18)
October	364 (26.63)	119 (32.69)
November	838 (61.3)	316 (37.71)
December	77 (5.63)	19 (24.68)

χ^2= 34.5, d.f = 7,P- value = 0.000

Discussion

The index case was diagnosed in W36/29August in Baghdad Risafa/Al Kamalea which followed by several cases from multiple governorates as an outbreak continued to W51/17December with total number cases 505. In 2007 outbreak, the total number of cholera cases were 4659 and most of cases were occurred in the north of Iraq while in the current study the number cases were 505 and most of them were occurred in the middle and south of the country this is because the outbreak may occur every 3 to 5 years [(4)].

The first case in 2007 an outbreak was diagnosed in Baghdad on W38/19 September in a study conducted

by Khwaif et al (2010) [5], alternatively in the current outbreak the first cholera case was diagnosed in Baghdad at the end of August 2017, whereas in 2015 the first case was diagnosed in Diwania/Gamas in September [9].

In this epidemic the serotypes were Inaba and Ogawa. In 2016 outbreak in which only 3 cases of Inaba were diagnosed, as well as in 2007, also Inaba was reported [5]. In Iraq two serotypes in which Inaba was dominant followed by ogawa,this confirmed by a study conducted by Saleh et al (2011) on 80 clinical samples from diarrheal patients in Iraq during the period 2007-2009 to explore bacterial isolates [10].

In the current epidemic the rate of cholera cases was 1.33/100000 population while in 2015 and 2016 the rate was 8.2/100000 and 0.01/100000 respectively [11,12] which explain that cholera can be seasonal or sporadic[2].

In fact in 2016, 38 countries reported 132121 cases which represent 23% drop in the number of cases reported compared with 2015 (172454 cases)[13], although WHO considered the officially reported cases represent only 5-10% of the actual number occurring annually worldwide[14] because various factors influence the underreporting such as weakness in the surveillance system, use of inappropriate case definitions, laboratory diagnostic capacities, and reluctance to report for fear of negative economic impact on trading and tourisim, in addition to limited registration in areas of conflicts [13].

CFR in this outbreak was 0.6% while the CFR in 2015 outbreak was 0.07% [11] and it is lower the CFR in Baghdad 2007 outbreak (2.2%) [5], in Camerone (6.1%) [15] and (>5%) in Zimbabwe [16]. In 2016, 38 countries reported cholera outbreak with CFR 1.8% (2420 death), of which 19 countries reported CFR > 1% while the overall CFR was 0.8% in 2015[13]. The low CFR in Iraq can be attributed to early detection and proper mangement of cases that prevent death.

In the current study the mean age was around 30 years old (31.5 ± 19.95 years), this result agreed with the results reported by Tamang et al (2005) a study conducted in Nepal on 148 patients with acute diarrhea showed that 46 patients (31%) were positive for V. cholerae O1 strains in which younger age group less than 30 years was mostly affected [17]. Similarly, a study conducted by Jabeen et al (2003) in Pakistan also showed that the mean age of patients infected with V. cholerae serogroup O1 was 23 years when compared with those infected with serogroup O139 their mean age as 40 years [18].

Also in the present study the highest percentage of suspected cholera cases was in age group 16-45 years 47.18% (645), which correspond to the results of study conducted in Mexico (2012) showed similar age distribution in which the greatest proportion of cholera in age group 25-44 years and those aged more than 65 years which interpreted to occupational exposure and eating habit [19].

Not all areas of Iraq served by tab water network, especially the remote and rural areas in which the people depend on rivers, streams and estuaries for domestic use and may be for drinking or served by vehicle water. There may be shortage in water provision and use electrical pumps to draw unsafe water from the old pipes that may be contaminated with sewage disposal net due to damge of both systems or contaminated with sewage stream in area not served by sewage net [5, 20].

The people may digging wells due to either shortage of tap water or unserved areas like outskirt and rural areas, which also considered unsafe because not tested bacteriolgicaly. Also, unplanned temporary camps for IDPs with shortage in provision of many standards for basic life as electricity, clean water and sewage [5]. Another explanation, that high population density in Urban areas and breakdown of water system and sewage disposal net have a great effect on spread of infection[16].

Iraqi Ministery of Environment in 2009 explain that the bacteriological contamination in water supply varies between governorates ranging between 2.5%-30% with average 16% which is beyond Iraqi National Driniking Water Standards and WHO Guidelines for Drinking Water permissible limit of 5% [20]. Around 250000 tones of sewage disposal thrown into Tigris river which contaminat the water sources and water nework [20]. Also, many houses in suburb and rural areas illegaly puncture the raw water transfer pipes for domestic use. Nowadays, many water filtration factories (R.O) were manged by people and they are not under supervision of Health control of Iraq MOH. These factories sail water to the families and not sure about its safety for drinking. Because of scarcity of water during dry seasons with reduction in provision even in the areas served. Many families with middle and low income, those living in poor and rural areas and IDPs in the camps depend on tab water but many people become gradually depend on R.O water [11].

The highest proportion of suspected cases was among those who use both tab water and R.O (60.79%) and followed by those who depened on tab water and those who used R.O, (21.29%) and (16.9%) respectively, as tab water may not be safe because there is no enough free chlorine in water or high turbidity that prevent chlorine function as the turbidity have a significant effect on the efficiency of chlorine as a disinfectant [21]. Also R.O water may be unsafe because it is not under the control of health authorities [11] and not tested physically, chemically and biologically.

Conclusions

1. The rate of cholera cases was 1.33/100000 population and the CFR was 0.6%.
2. Although the highest significant proportion of suspected cases were among age group 16-45years but the risk of infection decreased after 1 year of age.
3. Source of water is most important independent variable that were more likely increased the risk of cholera infection transmission, especially tab water and R.O water as well as the river's and other source water (vehicle water).
4. Cholera cases reported from 11 governorates out of 18.
5. The outbreak occurred in autumn and reached the peak on W47.

So we recommend the following

1. Strengthen the surveillance of suspected cholera cases specially active case detection.
2. Improve case management to decrease case fatality rate below 0.2%.
3. Increase orientation about the disease, especially in the autumn season.
4. Control of the environment by callobration with other menistries and health sectors that responsible for purification of water, safe food and good sanitation.
5. Health promotion by education of community at risk specially improving personal hygein.

No financial disclosure

No conflict of interest to declare

Informed consent has been obtained from all patients

REFRENCES

1. WebMD. Cholera [Internet]. WebMD medical reference. 2017 [cited 2018 Mar 23]. p. 1. Available from: https://www.webmd.com/a-to-z-guides/cholera-faq#2
2. WHO. Cholera [Internet]. Media Centre Fact Sheet. 2017 [cited 2018 Mar 25]. Available from: http://www.who.int/mediacentre/factsheets/fs107/en/
3. WHO. Cholera Health Topics [Internet]. Regional Office for EM. 2018 [cited 2018 Mar 25]. Available from: http://www.emro.who.int/health-topics/cholera/index.html
4. World Health Organization. Iraq's 2015 response to cholera outbreak minimizes future risk [Internet]. 2018 [cited 2018 Mar 25]. p. 1. Available from: http://www.emro.who.int/irq/iraq-news/iraqs-2015-response-to-cholera-outbreak-minimizes-future-risk.html
5. Khwaif JM, Hayyawi AH, Yousif TI. Cholera outbreak in Baghdad in 2007: An epidemiological study. East Mediterr Heal J. 2010;16(6):460–5.
6. WHO. Global Task Force on Cholera Control CHOLERA COUNTRY PROFILE : ZIMBABWE. 2009;(November 2007):1–2. Available from: http://www.who.int/cholera/countries/ZimbabweCountryProfileOct2009.pdf?ua=1
7. Abdul Ridha M. Al-Abbasi SMA. THE CHOLERA EPIDEMIC IN IRAQ DURING 2015. TOFIQ J Med Sci [Internet]. 2015;2(2). Available from: https://tjms.tofiq.org/tjms/article/view/48
8. WHO. Prevention and control of cholera outbreaks: WHO policy and recommendations [Internet]. Global Task Force on Cholera Control. 2018 [cited 2018 Jul 29]. p. 2. Available from: http://www.who.int/cholera/technical/prevention/control/en/index1.html
9. World Health Organization. Iraq's 2015 response to cholera outbreak minimizes future risk [Internet]. Regional Office for EM. 2015 [cited 2018 Mar 31]. Available from: http://www.emro.who.int/irq/iraq-news/iraqs-2015-response-to-cholera-outbreak-minimizes-future-risk.html

10. Saleh TH, Sabbah MA, Jasem KA, Hammad ZN. Identification of virulence factors in Vibrio cholerae isolated from Iraq during the 2007–2009 outbreak. Can J Microbiol [Internet]. 2011;57(12):1024–31.

11. Communicable Diseases Control Centre AEDS. Surveillance Data. Baghdad: Personal Communication; 2017.

12. Annual Statistical Report 2016/MoH Iraq [Internet]. 2016. Available from: https://moh.gov.iq

13. Weekly epidemiological record 2016 Relevé épidémiologique hebdomadaire. 2017;(20):269–92.

14. WHO. The global burden of cholera [Internet]. Bulletin of the World Health Organization. [cited 2018 Mar 26]. p. 157–244. Available from: http://www.who.int/bulletin/volumes/90/3/11-093427/en/

15. Djomassi LD, Gessner BD, Andze GO, Mballa GAE. National surveillance data on the epidemiology of cholera in cameroon. J Infect Dis. 2013;208(SUPPL. 1):2–7.

16. Mason PR. Zimbabwe experiences the worst epidemic of cholera in Africa. J Infect Dev Ctries. 2009;3(2):148–51.

17. Tamang MD, Sharma N, Makaju RK, Sarma AN, Koju R, Nepali N, et al. An outbreak of El Tor cholera in Kavre district, Nepal. 2005;

18. Jabeen K. Re-emergence of Vibrio Cholerae O139 in Pakistan : report from a Tertiary Care Hospital. 2000;(July).

19. Sepúlveda J, Valdespino JL, García-García L. Cholera in Mexico: The paradoxical benefits of the last pandemic. Int J Infect Dis. 2006;10(1):4–13.

20. M. Aenab A. Evaluation of Drinking Water Pollution and Health Effects in Baghdad, Iraq. J Environ Prot (Irvine, Calif). 2012;03(June):533–7.

21. WHO, WEDC. Measuring chlorine levels in water supplies. Tech Notes Drink Sanit Hyg Emergencies [Internet]. 2013;1–4. Available from: http://www.who.int/water_sanitation_health/emergencies/WHO_TN_11_Measuring_chlorine_levels_in_water_supplies.pdf?ua=1

White Blood Cell, Procalcitonin, C-Reactive Protein and TNF-α as Prognostic Factors in Pediatric Sepsis

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ABSTRACT

Sepsis is the leading causes of morbidity and mortality in critical patients in many intensive care units. There were numerous parameter and biomarkers available to confirm the presence of sepsis**.** The aim of this study was to determine which one the parameter or biomarkers (white blood cell, CRP,procalcitonin and TNF-α) has a role as an outcome predictor in pediatric sepsis patient. This prospective cohort study was conducted in Pediatric Intensive Care Unit WahidinSudirohusodo hospital fromJanuari 2016untilMay 2017. A total of 108 sepsis patients were included. Plasma specimens were collected at admission, then the patients were being followed up for survived or non-survived. The diagnosis of sepsis is using the International Pediatric Sepsis Consensus 2005 criteria. Serum CRP,Procalcitonin TNF-α were measured using Enzyme Linked Immunosorbent Assay technique. Initial serumprocalcitonin level and TNF-α in non-survived children with septic were very significantly higher than those in the survived groupswith p=0.000 with OR2,46 CI(0,905-6,697) in procalcitonin and p=0.000 with OR 44,69 CI(5,749-347,36)in TNF-α**.** The initial serum level of PCT and TNF-α can be used as a predictor outcome of sepsis patient in children

Keywords: *WBC, CRP, Procalcitonin, TNF-α, Sepsis, Predictor*

Introduction

Septic shock is the primary cause of death in intensive care units (ICUs). With a mortality rate in excess of 50%, it results in more than 100 000 deaths a year in the United States.[1]Sepsis-induced organ failure leading to death appears to be due to the activation of a mediator cascade initiated by microbial components.[1,2]

Several biomarkers have been suggested for the early diagnosis of sepsis, including IL-1b, IL-8, TNF-α, and procalcitonin (PCT).[3] Located in the lower range in normal subjects, PCT, a calcitonin prohormone, increases significantly in patients with bacterial infections caused by a broad spectrum of gram-positive and gram-negative bacteria.[4] In three separate studies, the sensitivity of PCT in the diagnosis of sepsis was found to be 97%, 78%, and 85%, while WBC, CRP, and ESR levels did not have high accuracy in the diagnosis of bacterial infection in immunocompromised and neutropenia patients.[4]By measuring serum PCT, antibiotic therapy can be commenced or terminated to help doctors with the diagnosis of suspected sepsis. Compared with CRP and ESR levels, PCT levels are a better marker in diagnosing lobar pneumonia in children.[4]

PCT has been considered a reliable biomarker for differentiating sepsis from noninfectious systemic inflammatory response syndrome (SIRS).[5,6]

In the case of suspected sepsis, drug therapy is performed immediately after the patient'sadmission to hospital, as any delay in treatment can worsen the disease. However, delays can occur due to the lack of specific symptoms of sepsis or inaccurate microbial culture results. Blood cultures may be negative for various reasons, such as the use of antibiotics before hospital admission, which is common in our society, although the results of blood cultures are reported after at least 48 hours. They may also be negative in the early stages of SIRS and sepsis. Moreover, many organisms require

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specific media and exclusive culture environments that are not available in most medical centers. However, microbial cultures do not reflect the host'sinflammatory responses nor do they detect organ dysfunction.[5]

TNF αcan cause intravascular thrombosis, inhibit muscle contractility of heart, lowers blood pressure (shock), vascular dilation, and plasma leakage which then lead to septic shock.Therefore, it is important to investigate the effects of cytokines as the prognostic value in patients with sepsis. [1]

Previous studies showed numerous biomarker also can determine the diagnosis in sepsis patients.[1]If we can predict the outcome of patients with sepsis earlier, thepatient can betreated more progressively, sothe mortality rate in patients with sepsis can be reduced. Based on the fact above, it needs an approach from biological parameter and biomarkers(WBC, CRP, PCT and TNF-α) to identify the role and prognostic value for sepsis.

Material and Method

This study included children aged 1 month to 18 years who were diagnosed with sepsis from December 2015 untilMay 2017 based on International Pediatric Sepsis Consensus of 2005, which was treated in the Pediatric Intensive Care Unit (PICU) WahidinSudirohusodo Hospital Makassar, Indonesia [21]. Samples are the entire population that meets the inclusion criteria. Inclusion criteria were patients with sepsis, age 1 month to 18 years, who was willing to sign an informed consent agreement. Exclusion criteria were patients with trauma, burns, malnutrition, malignancy, being received corticosteroid treatment and patients with immune deficiency

Written informed consent was obtained from all the patients and their guardians, and all the patients were examined clinically. Patients' characteristics, including their ages; sexes; temperatures; respiratory rates; heart rates per minute; systolic and diastolic blood pressures; alertness statuses at the time of admission and during hospitalization; underlying diseases.

Sepsis is SIRS caused by either a suspected or proven infection. This study used the the International Pediatric Sepsis Consensus 2005 criteria to diagnosis sepsis.

Five ml blood samples were used to measure PCT levels, CRP levels, TNF-α, blood cultures and CBC-Diff blood samples were taken.

After blood extraction, experiment should be conducted immediately as well. Samples may be stored at 2-8°C.Allowtheserumtoclotor 10-20 minutesatroomtemperature and centrifuge (at 2000-3000 RPM) for 20 minutes. Collect the supernatant carefully. When sediments occurred during storage, centrifugation should be performed again. Sample the assay, bring samples to room temperature. First, add prepared sample 40 µl standards and ELISA solutions. times. Add chromogen solution A and B. Incubate for 10 minutes at 37°Cforcolordevelopment. Thenaddstopsolution. Readthevaluewithin 10 minutes.

The data obtained are grouped into two groups of patients; survived and non-survived. Then, suitable statistic method was chosen to analyze the data, which was univariate and bivariate analysis, power=80%, α=0,05.Chi factor was used to determine the significance of predictor factor relationship with the outcome of survived and non-survived. Mann withney test is used compare the median initial serum of white blood cell, CRP,PCT and TNF-αlevel of the sepsis patient to the outcome survived or not survived if data not normally distributed. For normality test, Kolmogorov-Smirnov test was used. Statistical Analysis was processedbyusingSPSS 21

Results

An observational study with prospective cohort approach in108 sepsis patient sin childrenhas been conducte din Dr.Wahidin Sudirohusodo Hospital Makassarf rom Januari 2016 until May 2017.

The sample consisted of 40 sepsis and 68 with septic shock and then we observed for survived and non-survived. Fifty five sample in survived group consisted37 (52,1%) boys and 34 (47,9%) girls, while in 53 sample non-survived group consisted of 18 (47,4%) boys and 20 (52,6%) girls. Statistical analysis showed no significant difference between the two groups with p=0,59. The age was divided into ordinal. Statistical analysis showed that there wasno significant difference in age between the two groups with p=0.11 (Table 1). White blood cell (WBC), CRP, PCT and TNF-α was classified into ordinal. There were no significant difference in WBC,PCT and CRP between two groups, only TNF-α showed very significant difference with between survived and non-survived group with p= 0,000

Table 1: Sample Characteristic

Characteristic	Sepsis n = 108		P value
	Survive (55)	Non survive (53)	
	n (%)	n (%)	
Sex			
Boy	37 (52,9%)	33 (47,1%)	0,59*
Girl	18 (47,4%)	20 (52,6%)	
Age (years)			
1 month-1 year	15 (48,4%)	16 (51,6%)	0.11*
1,1-5 year	14 (38,9%)	22 (61,1%)	
5,1-10 year	7 (58,3%)	5 (41,7%)	
10,1-15 year	15 (68,2%)	7 (31,8%)	
>15,1	4 (57,1%)	3 (42,9%)	
WBC (mg/dL)			
0-4.999	2 (33,3%)	4 (66,7%)	0,761*
5.000 – 9.999	6 (75,0%)	2 (25,0%)	
10.000-19.999	26 (59.1%)	18 (40,9%)	
20.000-29.999	13 (38,2%)	21 (61,8%)	
30.000-39.999	4 (57,1%)	3 (42,9%)	
> 40.000	4 (44,4%)	5 (55.6%)	
CRP (mg/dL)			
0 – 0.9	7 (70,0%)	3 (30,0%)	
1 – 2.9	7 (46,7%)	8 (53,3%)	
3 – 4,9	2 (66,7%)	1 (33,3%)	
5 – 9,9	5 (100%)	0 (0%)	
10 – 19,9	5 (55,6%)	4 (44,4%)	
20 – 49,9	14 (51,9%)	13 (48,1%)	
>50	15 (38,5%)	24 (61,5%)	0,302*
PCT (ng/ml)			
0 - 0,5	15 (88,2%)	2 (11,8%)	0,228*
0,51 – 2	10 (83,3%)	2 (16,7%)	
2,1 - 10	19 (48,7%)	20 (51,3%)	
10,1 – 50	5 (21,7%)	18 (78,3%)	
50,1 – 100	4 (50,0%)	4 (50,0%)	
> 100,1	2 (22,2%)	7 (77,8%)	
TNF –α (pg/ml)			
< 200	0 (0,0%)	0 (0%)	0,000*
201 - 500	44 (80,0%)	11 (20,0%)	
501 – 1000	10 (31,3%)	22 (68,8%)	
1001-1500	1 (5,6%)	17 (94,4%)	
1501-2000	0 (0,0%)	3 (100%)	

Conted…

Mann withney test is used compare the mean initial serum of white blood cell, CRP,PCT and TNF-α level of the sepsis patient to the outcome survived or not survived because they were not in normal distribution. (Table.2). Serum level of WBC in survived group the mean was 20077,53 mg/dL and range 3640 to 61730 mg/dL. While in non-survived group was 22050,57 mg/dL and range 3100 to 55200 mg/dL. Mann Whitney test results showed that there was no significant differences between the two groups with p=0.071

Serum level of CRP in survived group the mean was 45,27 mg/dL and range 0 to 238 mg/dLWhile in non-survived group was 68,70 mg/dL and range 0 to 289 mg/dL. Mann Whitney test results showed that there was no significant differences between the two groups with p=0.104

Serum level of PCT in survived group the mean was 16,00ng/ml and range 0 to 210 ng/ml. While in non-survived group was 44,26ng/ml and range 19 to 210 mg/dL. Mann Whitney test results showed that there was very significant differences between the two groups with p=0.000 with OR2,46 CI(0,905-6,697)

Serum level of TNF-α in survived group the mean was 429,77pg/ml and range 269,36 to 1009,17 pg/ml. While in non-survived group was 848,92 pg/mland range 231,11-1784,68pg/ml. Mann Whitney test results showed that there was very significant differences between the two groups with p=0.000 with OR 44,69 CI(5,749-347,36)

Table 2: WBC, CRP,Procalcitonin and TNF-α between survived and non-survived

	Survived	Non-Survived	P Value	OR
WBC (mg/dL)				
Mean	20077,53	22050,57	*0,071	
Median	16600,00	21250,00		
Std. Deviation	12,835,57	11,243,54		
Minimum-Maximum	3640 – 61730	3100 – 55200		

Conted…

CRP (mg/dL)				
Mean	45,27	68,70	*0,104	
Median	22,00	40,00		
Std. Deviation	57,66	79,42		
Minimum-Maximum	0 – 238	0 - 289		
PCT (ng/ml)				
Mean	16,00	44,26	*0.000	2,46 CI(0,905-6,697)
Median	2,33	16,70		
Std. Deviation	37,09	65,99		
Minimum-Maximum	0-210	19 - 210		
TNF-α (pg/ml)				
Mean	429,77	848,92	*0,000	44,69 CI(5,749-347,36)
Median	414,56	825,07		
Std. Deviation	110,89	358,06		
Minimum- Maximum	269,36-1009,17	231,11-1784,68		

Discussion

The result so four research demonstrated thatPCTlevel and TNF-αin non-survived children withseptic were significantly higher than those in the survived groups.

This result similar withAygun F, that evaluated procalcitonin value is an early prognostic factor related to mortality in admission to pediatric intensive care unit, the result showed there was statistically significant relationship between PCT and TNF-α levels with MV support, NIV, inotropic drug use, mortality, AKI, hospitalization in the intensivecareunit,CRRT,andblood component transfusion.[7,8]

Performing procalcitonin and TNF-α test routinely in patients of sepsis can give rapid results in a day rather than the three to seven days required for bacterial culture and can act as surrogate markers of microbial infection. An increased of procalcitonin and TNF-α should be classified in higher risk of mortality and should be monitor and aggressive treatment started.[9,10,11]

At high levels, TNF-α induce pathologic abnormality of septic shock.[12] Results of previous studies have shown that TNF-α is a good marker for the diagnosis of sepsis, to assess the effectiveness of therapy, and prognosis of sepsis disease.[1]

Elevation of PCT levels usually occurs earlier during the course of infection than elevation of CRP levels, peaking at approximately 24 - 36 hours. Some studies of critically ill pediatric patients showed that the accuracy of PCT measurement in detecting bacterial infections is better than that of other markers, especially CRP. However, its sensitivity and specificity vary.[13,14]

In a cohort in an American tertiary hospital (78 children with criteria for sepsis and septic shock and 12 critically ill children without sepsis), persistently high PCT in children with bacterial sepsis was related to a poor outcome.[14,15,16]

In this study, white blood cell and CRP showed not significantly difference between 2 groups. CRP generally consider a nonspecific biomarker in sepsis.

C-reactive protein (CRP), one of the biomarkers that has been in longer use in pediatric sepsis, is a non-specific, acute-phase protein that increases 4-6 hours after exposure to an inflammatory trigger Its levels decrease rapidly with the resolution of inflammation and is usually high in invasive bacterial infections.[7,10] In a systematic review of CRP diagnostic accuracy for bacterial infection in non-hospitalized children with fever, the sensitivity and specificity of CRP were estimated at 77% and 79%, respectively. However, its predictive value increases with the number of serial measurements, thus rendering it possibly useful for therapeutic management. Serial measurements in which CRP levels remain elevated or increase after 48 hours of antibiotic therapy suggest treatment failure.[8]It is

worth remembering that CRP is not a specific biomarker for differentiating infection from inflammation or for identifying specific infectious agents. As in the case of other biomarkers, its use should always be associated with bedside clinical evaluation of patients, and other clinical decision-making criteria should always be used. When available, the use of CRP combined with other biomarkers including procalcitonin (PCT), IL-6 and IL-8 to increase its specificity in the diagnosis of infectionsand to assess changes in therapeutic approaches, including changes in antibiotic therapy, is also promising.[17,18]

Limitations of this study, we only examined the initial parameter and biomarker, not serially and we didn't analyzed the the outcome based on severity of illness. While the strength of this study is a prospective cohort design is used so that we can follow the effects of these prognostic factors

Conclusion

The initial serum levels of procalcitonin and TNF-α as the prognostic values for outcome in pediatric sepsis hopefully can be an additional reference, for more comprehensive sepsis treatment to prevent complications and deaths. Sepsis patients with initial serum levels of procalcitonin and TNF-α high, require a close monitoring. Further research needs to be done with the involvement of other factors are also associated with sepsis outcomes such as genetic polymorphism, and serial examination of the biomarker in patients with sepsis.

Ethical Clearance: taken from hasanuddin University Ethics Committee, approval 423/H.4.8.4.5.31/PP-36-KOMETIK/2016

Source of Funding: Self-funding

Conflict of Interest: The author declares no conflict interest regard

REFERENCES

1. Ganda IJ, Andriani Y, Lawang SA.Initial serum level of TNF-α as an outcome predictor in pediatric patient with sepsis. CurrPediatr Res 2018; 22 (2): 146-15
2. Carcillo JA. Pediatric septic shock and multiple organ failure. Crit Care Clin 2003; 19: 413-440
3. Asadi F, Pourmoshtagh H, Mazloomzadeh S. Koosha A. Procalcitonin levels compared with CRP and ESR levels in septicemic children aged 3 months to 13 years in the pediatric and PICU wards of Ayatollah Mousavi Hospital, Zanjan. Arch Pediatr Infect Dis, 2016 Oct;4(4):e34435
4. Casado Flores J, Blanco Quiros A, Asensio J. Serum procalcitonin in children with suspected sepsis: a comparison with c reactive protein and neutrophil count. PediatrCrit Care Med; 2003;4(2)390-5
5. Lanziotti VS, Póvoa P, Soares M, LapaJR, Silva. Use of biomarkers in pediatric sepsis: literature review.Rev Bras TerIntensiva. 2016;28(4):472-482
6. Salluh JI, Nobre V, Povoa P. Using procalcitonin to guide antimicrobial duration in sepsis: asking the same questions will not bring different answers. Crit Care. 2014;18(3):142.
7. Aygun F.Procalcitonin Value Is an Early Prognostic Factor Related to Mortality in Admission to Pediatric Intensive Care Unit.Hindawi Critical Care Research and Practice Volume 2018, Article ID 9238947, 5 page
8. Maged A El Wakeel, Ghada M El-Kassas, Gihan A Fathy.Diagnostic and prognostic values of high sensitive C- Reactive Protein, Tumor Necrosis Factor and Interleukin-1 β in Neonatal Sepsis. Aust. J. Basic & Appl. Sci., 6(3): 224-228, 2012
9. Sakha K, Husseini MB, Seyyedsadri. The role of the procalcitonin in diagnosis of the neonatal sepsis and correlation between procalcitonin and C-reactive protein in these patients. Pak.J.Biol. Sci, 11(14):1785-90, 2008
10. Bortolovic D, IgnjatovicS, Stankovic S. Procalcitonin and other biomarker of sepsis in newborns in the intensive care unit. eJIFCC2011Vol22No1pp024-030
11. McWilliam S, Riordan A. How to use: C-reactive protein. Arch Dis Child Educ Pract Ed. 2010;95(2):55-8.
12. Abbas A, Lichtman AH, Pillai S. Cellular and molecular immunology. 8th Ed. Philadelphia: Saunders Comp. 2014.

13. Rey C, Los Arcos M, Concha A, Medina A, Prieto S, Martinez P, et al. Procalcitonin and C-reactive protein as markers of systemic inflammatory response syndrome severity in critically ill children. Intensive Care Med. 2007;33(3):477-84.

14. Fioretto JR, Martin JG, Kurokawa CS, Carpi MF, Bonatto RC, de Moraes MA, et al. Comparison between procalcitonin and C-reactive protein for early diagnosis of children with sepsis and septic shock. Inflamm Res. 2010;59(8):581-6.

15. Han YY, Doughty LA, Kofos D, Sasser H, Carcillo JA. Procalcitonin is persistently increased among children with poor outcome from bacterial sepsis. Pediatr Crit Care Med. 2003;4(1):21-5.

16. Fioretto JR, Borin FC, Bonatto RC, Ricchetti SM, Kurokawa CS, de Moraes M, et al. Procalcitonin in children with sepsis and septic shock. J Pediatr (Rio J). 2007;83(4):323-8.

17. Santolaya ME, Alvarez AM, Avilés CL, Becker A, Venegas M, O'Ryan M, et al. Prospective validation of a risk prediction model for severe sepsis in children with cancer and high-risk febrile neutropenia. Pediatr Infect Dis J. 2013;32(12):1318-23.

18. Kitanovski L, Jazbec J, Hojker S, Derganc M. Diagnostic accuracy of lipopolysaccharide-binding protein for predicting bacteremia/clinical sepsis in children with febrile neutropenia: comparison with interleukin-6, procalcitonin, and C-reactive protein. Support Care Cancer. 2014;22(1):269-77

Reactive Thrombocytosis after Caesarean Section and Normal Vaginal Delivery: Implications for Maternal Thromboembolism and its Prevention

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ABSTRACT

Objective: To assess the duration and severity of reactive thrombocytosis after caesarean section and after normal vaginal delivery.

Design: A prospective study.

Setting: Al-Elwiya Maternity Teaching Hospital -Baghdad -Iraq.

Materials and Method: Seventy pregnant women who were admitted for delivery at Al-Elwiaya Maternity Teaching Hospital were recruited into the study, the platelets count was measured at the time of first visit in the antenatal period. The second sample was taken just before normal vaginal delivery or caesarean section, followed by postnatal blood samples on days: 3, 8, 12, 16, 20 and 24 for the measurement of platelets count. Seventy pregnant women were recruited and forty completed the study, twenty of whom were delivered by normal vaginal delivery and twenty by caesarean section. A random effects model was used to compare the platelets counts within and between the two groups (normal vaginal deliveries group and caesarean sections group) to assess the severity and timing of reactive thrombocytosis.

Results: Antenatally: there were no statistically significant differences in platelets count measurement in the first antenatal visit and the pre delivery visit between the two groups. There was a slight fall in the pre-delivery platelets count in both groups compared with first visit platelets count but this fall was not significant. Postnatally: I. in the normal vaginal deliveries group; the platelets count continued to fall until the third postnatal day, then it rose, reaching peak values, compared with first visit and pre-delivery values at days 8 and 12 of the postnatal period which was statistically significant. The mean platelets count decreased gradually thereafter. II. in the caesarean sections group; the platelets count gradually increased, the rise started from the third post-operative day reaching a significantly high value, compared with first visit and pre-delivery values at day 8 of the postnatal period. The platelets count peaked at days 12 and 16 of the postnatal period. The platelets counts remained significantly higher than the first visit and pre-delivery values for 24 days after the caesarean section.

Keywords: *Postpartum. Thromboembolism.Prevention. Postpartum Reactive Thrombocytosis.*

Introduction

In vivo action of the clotting mechanism is balanced by limiting reactions that normally prevent clots from developing in uninjured blood vessels and maintain the blood in a fluid state. During pregnancy and early puerperium, this balance between coagulation and fibrinolysis is disturbed; towards hypercoagualability. The maintenance of normal haemostatic function requires the successful interaction of three main Components: Intact blood vessel wall, intact platelets

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function system, intact plasma coagulation and fibrinolytic components [1]. Platelets are central to normal haemostasis and to all thromboembolic disease [2]; they appear to be necessary for the first phase of haemostasis i.e. the formation of the initial plug (temporary haemostatic plug)[1, 2]. Platelets are the smallest cellular elements present in human blood. They are granulated non-nucleated, 2-4 µm in diameter [1] with a concentration from 150,000-400,000/µL[2,3].

Patients and Method

This study was done in Al- Elwiya Maternity Teaching Hospital, Baghdad-Iraq. In cooperation with the Department of Haematology in the same hospital, during the period from the 1st of June 2017 to the 1st of August 2018.

Patients:

***Selection of patients:** Seventy pregnant women were recruited into the study during the antenatal visits to the antenatal care unit in the mentioned hospital. They had an age-range of 19-39 years (mean 31 years). Primiparous as well as multiparous women were included. The patients chosen were those who were committed to deliver in the mentioned hospital and agreed to take part in the study after explaining its aims to them. They had to comply with the following criteria: Gestational age was confirmed by history, clinical examination and ultrasonography done at 8-14 weeks of gestation. They had regular antenatal care, no major pregnancy complications, no history of essential hypertension or diabetes mellitus, no history of any medical disorder affecting the platelets count. The following pregnant women were excluded from the study: women with medical disorders affecting the platelets count such as thrombocytopenia, women with history of malignant disease and genetic blood disorders like antithrombin III deficiency. The following puerperal women were later excluded from the study: women who were delivered by instrumental delivery like forceps or ventouse, those who suffered from postpartum haemorrhage and those with anaemia.

***Questionnaire:** A questionnaire was made for each woman and it was in two parts: antenatal part and postnatal part. Serial blood samples were taken for the measurement of platelets count in the antenatal and in the postnatal periods.

Methods of samples taking from the patients: Seventy pregnant women who were admitted for delivery at Al-Elwiaya Maternity Teaching Hospital were recruited into the study, forty pregnant women completed the study, twenty of whom were delivered by normal vaginal delivery (NVD group) and twenty by caesarean section(CS group). the platelets count was measured at the time of first visit in the antenatal period. The second sample was taken just before normal vaginal delivery or caesarean section, followed by postnatal blood samples on days: 3, 8, 12, 16, 20 and 24 for the measurement of platelets count.

Statistics: A random effects model was used to analyze the platelets counts and to allow for the correlation between the repeated measures of platelets counts. The statistical significance of the difference between mean values was assessed by the student's (t) test probability value (p-value). Values of <0.05 were considered significant.

Results

Table 1: The mean & range of platelets counts of first visit and predelivery counts in the two groups

Time of blood sample taking	Normal vaginal deliveries group (mean & range of platelets counts) ($x10^9/L$)	Caesarean sections group (mean & range of platelets counts) ($x10^9/L$)	p-value (Caesarean sections counts compared with vaginal deliveries counts)
1st Visit	259.2 (157-393)	280.5 (145-385)	0.30
Pre-delivery	254.15 (138-384)	261.2 (136-370)	0.72
p-value (pre-delivery counts compared with 1st visit count)	0.81	0.32	

There were no statistically significant differences in the first visit and pre-delivery platelets counts between the two groups. There was a slight fall in the pre-delivery platelets count in both groups compared with 1st visit platelets count but this fall was not statistically significant (Table 1).

Table 2: The mean & range of platelets counts in the normal vaginal deliveries group

Time of blood sample taking	Normal vaginal deliveries group (The mean & range of platelets count x 10^9/L)	p-value compared with 1st visit platelets count	p-value compared with pre-delivery platelets count
Antenatal blood samples:			
1st Visit	259.2 (157-393)		
Pre-delivery	254.15 (138-384)		
Postnatal blood samples:			
Day3	250.2 (132-424)	0.2	0.3
Day8	373.55 (264-650)	0.000001 **	0.000001**
Day 12	378.3 (277-522)	0.000002 **	0.000003 **
Day 16	327.4 (235-420)	0.0003*	0.0002*
Day 20	321.6 (234-392)	0.0004*	0.0003*
Day24	291.5 (176-393)	<0.05*	0.04*

* Significant difference

** Highly significant difference (peak values)

In the normal vaginal deliveries group: The platelets count continued to fall until the third postnatal day, this fall was not statistically significant. The platelets count increased rapidly after the third postnatal day, reaching peak values at eighth and twelfth days of the postnatal period. These peak values were statistically significant compared with first visit and pre-delivery values. The platelets count exceeded the upper limit of normal range (400x10^9/L) in seven women (35%). The mean platelets count decreased gradually after the twelfth postnatal day (Table 2).

Table 3: The mean & range of platelets counts in the caesarean sections group

Time of blood sample taking	Normal vaginal deliveries group (The mean & range of platelets count x 10^9/L)	p-value compared with 1st visit platelets count	p-value compared with pre-delivery platelets count
Antenatal blood samples:			
1st Visit	280.5 (145-385)		
Pre-delivery	261.2 (136-370)		
Postnatal blood samples:			
Day 3	288.95 (148-421)	0.6	0.1
Day8	462.55 (269-635)	0.003*	0.002*
Day 12	537.15 (282-910)	0.0000002**	0.0000007* *
Day 16	542.3 (286-1107)	0.000003**	0.000001 **
Day20	475.95 (264-690)	0.005*	0.001 *
Day 24	430.3 (194-798)	0.002*	0.005*

* Significant difference

**Highly significant difference (peak values)

In the caesarean sections group: Reactive thrombocytosis began on the third post-operative day, but the rise was not significant. A significant high value of the platelets count was reached on the eighth post-operative day, compared with first visit and pre-delivery counts. Peak values of platelets counts were reached at twelfth and sixteenth post-operative days. These peak values were statistically significant higher levels, compared with the first visit count and pre-delivery count. The platelets counts remained statistically higher than the first and pre delivery values for 24 days of the postnatal period. So the rise in platelets count was continued for a longer period than in the normal vaginal deliveries group.

The platelets count exceeded the normal range (400xl0^9/L) in sixteen women (80%) (Table 3, Figure 1).

Table 4: The mean & range of platelets counts in the caesarean section group compared with normal vaginal delivery group

Time of blood sample taking	Normal vaginal deliveries group (The mean & range of platelets count x 10^9/L)	Caesarean sections group (The mean & range of platelets count x 10^9/L)	p-value (Caesarean section s counts compared with vaginal delivery counts)
Antenatal blood samples:			
1st Visit	259.2 (157-393)	280.5 (145-385)	0.31
Pre-delivery	254.15 (138-384)	261.2 (136-370)	0.73
Postnatal blood samples:			
Day3	250.2 (132-424)	288.95 (148-421)	0.09
Day8	373.55 (264-650)	462.55 (269-635)	0.01
Day 12	378.3 (277-522)	537.15 (282-910)	0.001*
Day 16	327.4 (235-420)	542.3 (286-1107)	0.0001*
Day20	321.6 (234-392)	475.95 (264-690)	0.00005*
Day24	291.5 (176-393)	430.3 (194-798)	0.005 *

* Significant difference

There was a greater rise in the platelets counts in the caesarean section group compared with the normal vaginal delivery group.

The platelets counts in women delivered with caesarean section were significantly higher than in women delivered normally from day 12 to day24 of the postnatal period (Table 4).

Table 5: The mean & range of platelets counts in the normal vaginal delivery group & caesarean section group (Summary of the results)

Time of blood sample taking	Normal vaginal delivery group (The mean & range of platelets counts (x10^9/L))	p-value (Vaginal deliveries counts compared with antenatal counts)	Caesarean sections group (The mean & range of platelets counts (x10^9/L))	p-value (Caesarean sections counts compared with vaginal deliveries counts)	p-value (Caesarean sections counts compared with antenatal counts)
Antenatal blood samples:					
1st **visit**	259.2 (157-393)		280.5 (145-385)		
Pre-delivery	254.15 (138-384)		261.2 (136-370)		
Postnatal blood samples:					
Day3	250.2 (132-424)		288.95 (148-421)		
Day5	373.55 (264-650)	0.000001 *	462.55 (269-635)		0.002*
Day 12	378.3 (277-522)	0.000002*	537.15 (282-910)	0.001**	0.0000007*
Day 16	327.4 (235-420)		542.3 (286-1107)	0.0001 **	0.000001 *
Day20	321.6 (234-392)		475.95 (264-690)	0.00005**	0.001 *
Day24	291.5 (176-393)		430.3 (194-798)	0.005**	0.005*

* Statistically significant high value compared with 1st visit & pre-delivery platelets counts.

** Statistically significant high value compared with normal vaginal delivery group.

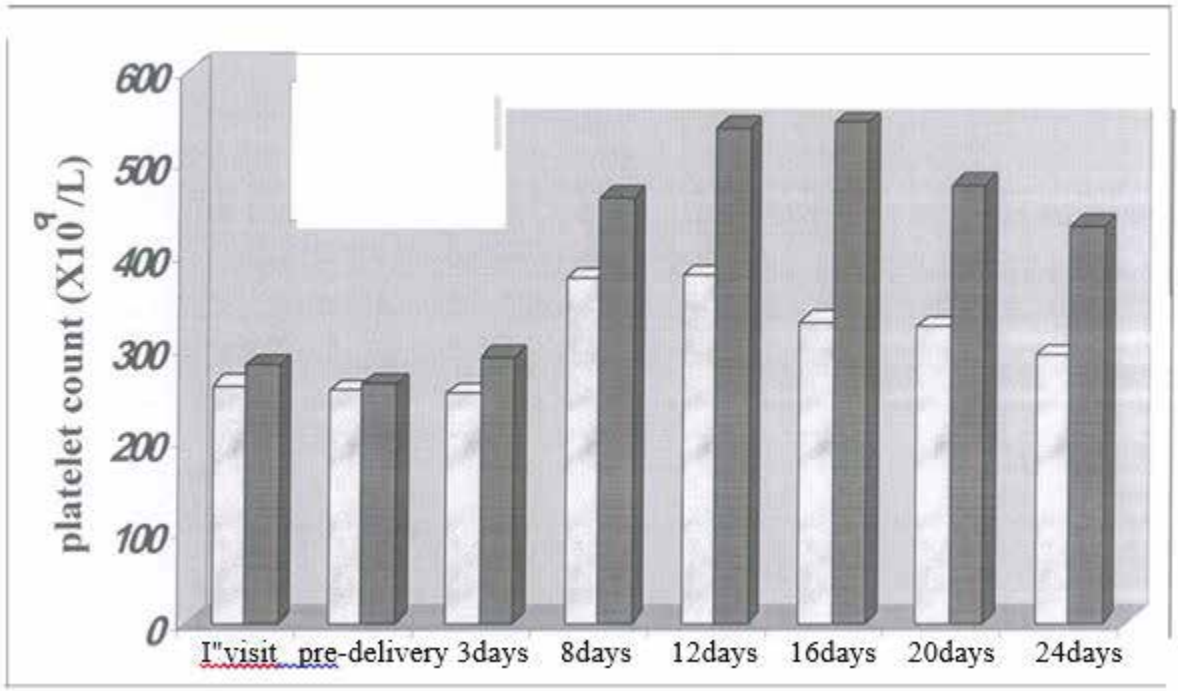


Fig. 1: Mean of platelets counts in the Normal Vaginal Deliveries group (NVD) and Caesarean Sections group (C-S)

Significant thrombocytosis occurred at days 8 and 12 after normal vaginal deliveries and caesarean sections. In the normal vaginal deliveries group, the mean platelets count decreased gradually thereafter. In the caesarean sections group, however, thrombocytosis continued till the sixteenth day. It stayed at significantly higher level than in the normal vaginal deliveries group for 24 days after delivery. The platelets counts in women in the caesarean sections group were significantly higher than in women in the normal vaginal deliveries group from day 12 to day 24 of the postnatal period (Table 5, Figure 1).

Discussion

Previous studies about this subject: Reactive (secondary) thrombocytosis (elevated platelets count > 450,000/µl and usually < 1,000,000/µl) [4]. P Saha, D Stott, R Atalla (2009) studied thrombotic changes during the postnatal period up to 6 weeks after delivery and assess the extent of risk period. In their study the mean platelets counts were low on predelivery days and rose sharply to a peak on day 11, and continued to be elevated until 25 days after delivery. The time to peak values is between (7-15) days, usually at a time when the patients are discharged from hospital. Their prospective study, showed that some women recruited antenatally in the vaginal delivery group required C-S. The coagulation parameters of women have been separately analysed in both groups (vaginal and cesarean), the result was that platelets counts and fibrinogen levels were significantly high till day 25 and 15 postpartum, respectively, after delivery (in C-S and VD groups). Reactive thrombocytosis that has been found to be a common occurrence during postpartum period is associated with an increased incidence of thrombosis. Increased fibrinogen is considered to contribute to hypercoagulable state as well. Also their study shows an exaggerated change towards hypercoagulability in cesarean sections group compared with vaginal deliveries group [5].

The overall incidence of VTE is approximately 1 in 1000 Maternities (Pregnancy and Puerperium) The puerperal period is the highest risk period for VTE, when it increases 20-fold [6]. The risk is greater in women who undergo c-section and is about 3 in 1000[7]. The risk was between 3-4 times higher for women who underwent an emergency (unplanned c-section) [8]. What is more important that the frequency of the thrombosis and the risk of fatal PE development are 10 times higher after cesarean delivery compared with normal vaginal deliveries in the

postpartum period (as observed by autopsies) [9, 10]. On the basis of the results of our study and other studies, it has been shown that the time of development of thromboembolic complications coincides with the time of significant reactive thrombocytosis, which was more prominent in the caesarean sections group. So there must be an association between reactive thrombocytosis and the increased incidence of thromboembolic complications, especially after operative delivery. Clinical presentation of postpartum VTE perceived to be rare and does not reflect the true incidence of silent venous thrombosis and many episodes of thrombotic events occur after discharge from hospital. Thrombosis and thromboembolism continue to be the leading cause of direct death in UK and the rate has not changed significantly, with a mortality rate of 1.01 per 100,000 maternities [11], despite wide spread use of thromboprophylaxis. There is a strong suggestion that inadequate thromboprophylaxis is a major cause of this preventable condition.

Conclusion

Our study data indicate that puerperium is a high-risk period for the development of TED. A significant thrombocytosis occurred at day 8 and day 12 after NDV and C-S. In NVDs group, the mean platelet count reaches peak values at 8th and 12th days of the puerperium and decreased gradually after the 12th postnatal days. In the C-Ss groups thrombocytosis continued till the 16th day. It stayed at significantly higher level than in normal vaginal deliveries group for 24 days after delivery. Such reactive (postpartum) thrombocytosis is associated with a hypercoagulable state and increase risk of TED and it is more prominent in the C-S group compared to the VD group where it extended up to 24 days postpartum. C-S was highlighted as the main risk factor for thromboembolism in the postpartum period. This could partly explains why the risk of puerperal thromboembolic events is about four times greater following C-S than following NVD and these events are more common ten days or more after delivery.

Recommendation

TE which is accepted as a complication, is a preventable one. Our recommendation is to consider anticoagulant prophylaxis for at least 21-25 days after delivery. Perhaps this would reduce the incidence of postpartum venous thrombosis and hence maternal morbidity and mortality. It is the task of the gynaecologic surgeon to identify patients at risk for development of a perioperative VTE and to apply the safest, most effective, and most cost-efficient method of prophylaxis to decrease the risk of thrombus development.

Acknowledgment

DR. S.A. WADI Author thanks Mr. HAYDER SAAD MAHDI for his exerted efforts in this study.

Ethical Clearance: The Research Ethical Committee at scientific research by the Arab Board for Medical Specializations/Ministry of Higher Education and Scientific Research.

Conflict of Interest: The authors declare that they have no conflict of interest.

Source of Funding: Self-funding.

REFERENCES

1. Barrett K, Brooks H, Boitano S, Barman S. Cardiovascular Physiology: Blood as a Circulatory Fluid and the Dynamics of Blood and Lymph Flow. Ganong's Review OF Medical Physiology. 23th Edition, 2010; 32 (VI): 523-524; 531-534.
2. Katzung, B G, Masters, S B, Trevor, A J. Drugs Used in Disorders of Coagulation. BASIC AND CLINICAL PHARMACOLOGY. 11th Edition, 2009; 34 (VI): 587-588.
3. Boundless. Cardiovascular System: Blood; Hemostasis. Platelets. Boundless Anatomy and Physiology. Book Version 29, 2013; 16(4, 5).
4. Liesveld J, James P, Reagan P. Reactive Thrombocytosis (Secondary Thrombocythemia). Blood Disorders. MSD MANUAL. Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Kenilworth, NJ, USA; 2016.
5. Saha P, Stott D, Atalla R. Haemostatic changes in the Puerperium, 6 weeks postpartum (HIP Study)-implication for maternal thromboembolism. June 13, 2009; P 1,4,5,6,7,10.
6. Troy Brown, RN. Guidelines Updated on Thromboembolic Disease in Pregnancy. WebMD, LLC; 2015.

7. Norton A. C-Section Raises Risk of Blood Clots After Childbirth: Review. HealthDay; 2016.

8. Boyles S. C-Section: Independent Risk Factors for Postpartum VTE. www.medpagetoday; 2016.

9. Glenview IL. (2016). Cesarean section carries increased risk for postpartum venous thromboembolism (VTE). Pregnancy and Childbirth News – Science Daily; 2016.

10. Ozsoy S, Akduman B, Karapirli M, Tugcu H. Death induced by pulmonary thromboembolism after caesarean section. Roman. J. Legal Med., 2012, xx(4): 261.

11. Payne J. Mortality rates and main causes of death. Maternal Mortality. WHO, May 19, 2016.

The Impact of Hormonal Replacement Therapy on Herpes Simplex Infection and Gingival Health in Post-Menopausal Women

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ABSTRACT

The fluctuating levels of sex hormones throughout menopause have an influence on oral health and periodontal disease. Deficiency of sex hormone during menopause and aging process mostly associated with local tissue and salivary flow changes make oral tissue more prone for infection. Few studies that assessed the rate of oral herpes simplex infection, bacterial growth and rate of gingivitis among postmenopausal women receiving Hormonal Replacement Therapy. So **aims** of study to assess the association of using the HRT and the incidence and recurrence rate of oral HSV infection, bacterial growth and gingivitis among post-menopausal women.

Subjects and Method: a cross sectional study carried out between 1st.oct.2017-1st.May 2018. Participants selected from private and outpatients' clinics of Dentistry College of Mustansiriyah University. Fifty -eight women in post-menopausal phase were selected randomly and categorized to two groups according to using the HRT. Frequency, severity of herpes simplex, relation of recurrence status to duration of using HRT, gingival index and bacterial growth were analyzed.

Results: Proportion of participants had mild, moderate and sever herpes simplex infection were 36.2, 34.5, 29.3% respectively. Proportion of subjects who are receiving HRT that reported sever herpes simplex infection and recurrence rate of >8 per year was significantly lower in comparison to non-user (18.4 vs.50%), (13.2 vs.45%) respectively. No significant association was found between severity or recurrence rate of HSV infection and duration of HRT use. Significant lower gingival index (GI) and bacterial growth (p=0.01 for all) with women who were on HRT (1.6 vs.2.8),(74.5 vs.127.3) respectively. The mixed bacterial isolate was reported with 55.2% of participants but no significant association found between type of isolate and status of using HRT and recurrence of HSV infection, in addition it has impact on gingival health of post-menopausal women

Keywords: *Herpes simplex infection, Hormonal Replacement Therapy, post-menapouse*

Introduction

The menopauses are considered an important phase as this physiological state result in adaptive changes at systemic and oral level [(1)]**.** Gums and teeth are mostly liable to any hormonal changes on post menopause and cant preserve a healthy equilibrium of useful and harmful bacteria within the oral environment [(2)]. Because oral mucosa comprises estrogen receptors, variations in hormone levels affect the oral cavity [(3)].

Herpes simplex virus (HSV) transferred through mucosal membrane and skin then spread to nerve tissues. The factors supposed to activate HSV not completely understood but endogenous factors such as immune deficiency, emotional stress and exogenous factors such as UV radiation were implicated [(4)].However, psychosocial stress is the most significant factor in the recurrence of lesions [(5)].

Certain types of bacteria promote viral disease symptoms, suggesting these bacteria may aid viral infection. Certain enteric viruses clarify how a bacterial constituent—attached or independent to the bacterium itself promotes the virus infection cycle [(6)]

Previously several studies were carried to assess the influence of (HRT) in adjusting periodontal circumstances

in postmenopausal women due to a potential connection between osteoporosis and periodontitis [7]. The HRT associated with a decreases of alveolar bone loss, but a number of researches failed to revealed an inverse relationship between alveolar bone density and periodontal disease. Additionally, some authors failed to establish positive effect for HRT on alveolar bone density[8]. There are conflicting results on the role of HRT on periodontal status in postmenopausal. While former research suggests that positive effects on periodontal status, a recent report challenges these results [9].

Hormonal Replacement Therapy has also been linked with decreased level of gingival bleeding. It has proposed that estrogen have an inhibitory influence on gingival inflammation by inhibiting mediators that includes IL-1, TNF-, IL-6, IL-1B, IL-8 and cellular mechanism of inflammation [10]. Conflicting findings about influence of HRT on probing pocket depth and attachment level [11].In several studies, the risk of tooth loss lowered among women who used HRT than those who did not [12]

The objectives of this study was to evaluate the rate, severity and recurrence rate of herpes simplex infection in addition to gingivitis and bacterial growth status in a group of post-menopausal women receiving HRT.

Materials and Method

Cross sectional study carried out from 1st Oct.2017to 1st May 2018, 58 women at postmenopausal phase were selected from outpatient clinic of Dentistry College of Mustansiriyah University and private clinics involved. The participants were categorized to two groups according to status of receiving the HRT. The participant received any immunosuppressive therapy, any medicine that affects the salivary flow, with any harmful habits such as smoking, chewing tobacco, alcohol etc. was excluded. All participants were examined looking for herpes simplex infection and asked about history of similar condition and it frequency per year. The frequency, severity and status of recurrence of herpes simplex infection and bacterial growth and their association with using of HRT were reported and stat. The gingival index also assessed and compared according to status of HRT use.

The growth of bacteria was assessed in two groups. The washing sample was diluted with sterile saline (10^{-1} -10^{-6}), the three last dilutions (10^{-4}- 10^{-6}) were cultured on BHI-A (Brain Heart Infusion Broth and Agar) for total bacterial count and on MSF-A for counting of oral streptococci and incubated at 370C for 24 hours. Triplicate plates were cultured for each dilution before and after chewing.

Statistical Analysis

SPSS version 23 was used for data entry and analysis. The appropriate tests (student T test and chi-square test) used to confirm significance. P <0.05 was considered significant

Results

The participants were categorized to two groups; 20(34.5%) was used HRT and 38(65.55) was didn't. The mean age was 50.6 ± 4.6 (range 48–61 years) for HRT+ group and 49.8 ± 3.6 (range 47–62 years) for the control group and this difference non-significant statistically (P=0.1).The clinical characteristics and type of isolate were summarized in table.1.

Table 1: Descrptive characteristics of studied group

		No.	%
status of HR	Mild	21	36.2%
	Moderate	20	34.5%
	Sever	17	29.3%
Frequency of recurrence of HS	<4	11	19.0%
	4-8	32	55.2%
	>8	15	25.9%
Type of isolate	Single	26	44.8%
	Mixed	32	55.2%

Our data indicated, there was significant association (p=0.005) between using the hormonal replacement and status of herpes simples as the frequency of subjects with moderate and sever status of herpes simples was lower with group who are receiving HRT in compare to control group as seen in table 2

Table 2: Association between severity status of Herpes simplex and status of using the HRT

		Using HRT				p-value
		Yes		No		
		No.	%	No.	%	
Severity status of herpes	Mild	19	50.0%	2	10.0%	0.005
	Moderate	12	31.6%	8	40.0%	
	Sever	7	18.4%	10	50.0%	

The results of current study showed that the proportion of subjects who were presented with high attack frequency (4-8 or >8/year) of herpes simplex significantly lower with group who were used HRT as seen in table 3.

Table 3: Association between frequency status of herpes simplex and status of using the HRT

		Using HRT				p-value
		Yes		No		
		No.	%	No.	%	
Frequency of recurrence/ year	<4	26	68.4%	5	25.0%	0.01
	4-8	7	18.4%	6	30.0%	
	>8	5	13.2%	9	45.0%	

The results revealed the was no significant association between type of growth in term of mixed or single isolate and status of using the hormonal replacement therapy as displaced in table 4.

Table 4: Association between type of isolate and status of using the HRT

		Using HRT				p-value
		Yes		No		
		No.	%	No.	%	
Type of isolate bacterial growth	Single	18	47.4%	8	40.0%	0.5
	Mixed	20	52.6%	12	60.0%	

The data showed there was no significant association between the duration of using the hormonal therapy and status of herpes simplex infection or frequency of recurrence (p=0.3, 0.7) respectively as showed in table.5.

Table 5: Association between duration of using the HRT, severity status and frequency of Herpes simplex infection

		Duration/year						p-value
		<2		2-4		>4		
		No.	%	No.	%	No.	%	
Severity status of herpes	Mild	0	0.0%	1	20.0%	1	20.0%	0.3
	Moderate	3	30.0%	2	40.0%	3	60.0%	
	Sever	7	70.0%	2	40.0%	1	20.0%	
Frequency of recurrence	<4	2	20.0%	1	20.0%	2	40.0%	0.7
	4-8	3	30.0%	1	20.0%	2	40.0%	
	>8	5	50.0%	3	60.0%	1	20.0%	

The results of current study demonstrated that the mean value of CFU colony forming unit of bacteria was significantly lower (p=0.01) with group of subjects who are using the HRT in compare to control group (127.3, 5.4) respectively as displaced in table 6.

Table 6: The mean value of CFU and GI according to status of using the HRT

	Using HRT	N	Mean	Std. Deviation	p-value
CFU	Yes	38	74.5	5.4	0.01
	No	20	127.3	6.7	
G I	Yes	38	1.6	0.7	0.01
	No	20	2.8	0.3	

The findings of current study showed there was no significant correlation between the duration of hormonal therapy used and CFU colony forming unit or GI gingival index as by using pearson correlation analysis.

Discussion

Menopause is usually followed by a number of physical changes in oral cavity therefor high prevalence of oral discomfort and changes could occur [13].Few studies focused on gingival changes and flow of saliva and other mucosal discomfort during and after menopause [14]

The results of this study show there was significant association between using the hormonal replacement therapy and decreasing frequency, recurrence, growth of and severity of herpes simplex infection as the results

revealed that the attack of herpes simplex 4-8 or >8/ year significantly lower with group who were used HRT. This relationship can be explained by the capability of HSV to create latent infection in autonomic ganglia that forcefully replicate or reactivate by physical, hormonal, or emotional stress that mostly improved with the using of HRT. [13].

The mean of GI and CFU of bacterial growth was lower with group who are receiving hormonal replacement therapy in compare to control group and this finding documente d that hormonal replacement therapy during menopause has positive impact on oral health but the exact mechanism behind that yet not well understood and further researches are recommended to highlight this association.

Studies had explained that negative life occasions are more dependably in the beginning or exacerbation of diseases and the association between significant negative life events and disease was mediated by the immune system. Studies has been shown that emotional stress can modify the immune system through the neural and endocrine systems in at least three different ways;- through the autonomic nervous system path way, through the release of neuropeptides and Through the release of hypothalamic and pituitary hormones[15,16], so the suggestion of using HRT in some way could modulate the immune response to stressful conditions that mostly associated with post menopause phase and reduce the incidence of viral infection and bacterial overgrowth

The behavioral mechanism supposed that people suffering from psychological illness may exacerbate poor health behaviors, such as smoking or drinking more frequently; consuming unhealthy diet and don not their oral hygiene. This behaviors leads to increased oral biofilm burden and decreased resistance of the periodontium to inflammatory breakdown. In an early study, adult subjects under financial strain and exhibiting poor coping behaviors were reported to be at increased risk for severe periodontitis [17]. Periodontitis patients with inadequate stress behaviors strategies were proposed to be at higher risk for severe periodontal diseases [18]

According to previous finding concerning the effect of stress in exacerbating the periodontitis status so it may effect in same manner and exacerbate the gingivitis status that could be reduced with using the HRT that mostly reduced the stress

Numerous studies showed that aging of human being is characterized by increased susceptibility to age-related diseases and, consequently, by the presence of multiple pathologies and comorbidities characterized by chronic processes, such as inflammation [19].

Many studies reveal that salivary pH, buffering capacity and flow rate play important roles in oral mucosal defense. When salivary flow rate is reduced, susceptibility to various oral diseases enhanced [20]. Some studies shown lower salivary flow rates in postmenopausal women, one was carried out by Parakh D et al [21], that reduction give route to poor oral hygiene and more susceptibility to oral physiological changes. A questionnaire study by Jansson and his co-workers (2003) [22] had been stated; there was more xerostomia among postmenopausal women who did not use HRT in comparison to those used hormonal therapy. The same authors proposed that some oral symptoms might be associated with estrogen deficiency, but oral symptoms do not develop immediately after menopause but some years later. It may also be that women with the severe symptoms decided to use HT and use of HT decreased their symptoms to the same level as in premenopausal women. The using of HRT could act in some way through increasing the salivary flow rate and that in turn could take part in minimizing the risk of oral infection in post-menopausal women.

In current study, we found that the salivary bacterial growth was lower with group of subjects that on hormonal replacement therapy while a study was conducted by Leimola-Virtanen R et al [23] that calculated salivary bacteria was found the HT seemed to have no effect on the amount of the total salivary bacteria in post-menopausal women.

Conclusion

The rate, recurrence rate and severity of herpes simplex infection was lower among postmenopausal women on hormonal replacement therapy.

Acknowledgement

The authors would like to thank Mustansiriyah University (www.uomustansiriyah.edu.iq)Baghdad – Iraq for its support in the present study

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Our article has not considered for publication in another journal

REFERENCES

1. Research on the menopause in the 1990s. Report of a WHO Scientific Group. World Health Organ Tech Rep Ser 1996; 866:1-107
2. Dutt P, Chaudhary S, Kumar P. Oral health and menopause: a comprehensive review on current knowledge and associated dental management. Ann Med Health Sci Res. 2013 Jul; 3(3):320-3
3. Suri, Vanita & Suri, Varun. Menopause and oral health. Journal of mid-life health. 2014, 5. 115-20. 10.4103/0976-7800.141187.
4. usini M, Ghislanzoni M. The importance of diagnosing genital herpes. Journal of Antimicrobial Chemotherapy. 2001;47(1):9–16.
5. Smith JS, Robinson NJ. Age-specific prevalence of infection with herpes simplex virus types 2 and 1: a global review. Journal of Infectious Diseases. 2002;186(supplement 1):S3–S28.
6. uligoi B, Cusan M, Santopadre P, et al. HSV-2 specific seroprevalence among various populations in Rome, Italy. The Italian herpes management forum. Sexually Transmitted Infections. 2000; 76(3):213–214.
7. Bertulucci Lde A, Pereira FM, de Oliveira AE, Brito LM, Lopes FF.Periodontal disease in women in post-menopause and its relationship with osteoporosis. Rev Bras Ginecol Obstet.2012; 34(12): 563-567
8. Taguchi A, Sanada M, Suei Y, Ohtsuka M, Nakamoto T, et al. Effect of estrogen use on tooth retention, oral bone height, and oral bone porosity in Japanese postmenopausal women. Menopause. 2004;11(5): 556-562
9. Pizzo G, Guiglia R, Licata ME, Pizzo I, Davis JM, Giuliana G. Effect of hormone replacement therapy (HRT) on periodontal status of postmenopausal women. Med Sci Monit 2011; 17(4):23-27.
10. Brasil SC, Santos RM, Fernandes A, Alves FR, Pires FR, et al. Influence of oestrogen deficiency on the development of apical periodontitis. Int Endod J. 2017;50(2): 161-166
11. Ignasiak Z, Radwan-Oczko M, Rozek-Piechura K et al.Analysis of the relationships between edentulism, periodontal health, body composition, and bone mineral density in elderly women. Clin Interv Aging. 2016;11: 351-356
12. Grodstein F, Colditz GA, Stampfer MJ. Post-menopausal hormone use and tooth loss: a prospective study. J Am Dent Assoc 1996, 127(3): 370-377.
13. Logan HL, Lutgendorf S, Hartwig A, Lilly J, BerberichSL. Immune, stress, and mood markers related to re-current oral herpes outbreaks. Surg Oral Med OralPathol Oral Radiol Endod 1998; 86: 48–54
14. Karst, S.M. The influence of commensal bacteria on infection with enteric viruses. Nat. Rev. Microbiol. 2016; 14; 197-204.
15. Sateesh CP, Santosh Kumar R, Pushpalatha G. Relationship between stress and periodontal disease. J dent Sci Res. 2010; 1:54–61.
16. Chandna S, Bathla M. Stress and periodontium: A review of concepts. J Oral Health Comm Dent. 2010 ;(Suppl 4):1. 17-22.
17. Stabholz, A., Soskolne, W.A. and Shapira, L. Genetic and Environmental Risk Factors for Chronic Periodontitis and Aggressive Periodontitis. Periodontology. 2010, 2010; 53, 138-153
18. Leresche, L. and Dworkin, S.F. The Role of Stress in Inflammatory Disease, Including Periodontal Disease: Review of Concepts and Current Findings.Periodontology 2002; 30, 91-103.
19. S. Miwa, K. B. Beckman, and F. L. Muller, Oxidative Stress in Aging, Humana Press, Totowa, NJ, USA, 2008
20. Nair. D B. Effect of Saliva in oral health of post-menopausal women.*OSR Journal of Dental and Medical Sciences (IOSR-JDMS).*2016; *15(8);118-120*
21. Parakh D et al. Evaluation of the effect of menopause on saliva and dental health *International Journal of Oral Health Dentistry; April-June 2016;2(2):71-76*
22. Jansson C, Johansson S, Lindh-Astrand L, Hoffmann M, Hammar M. The prevalence of symptoms possibly related to the climacteric in pre- and postmenopausal women in Linköping, Sweden. Maturitas 2003;45:129-135.
23. Leimola-Virtanen R, Pennanen R, Syrjänen K, Syrjänen S.Estrogen response in buccal mucosa: A cytological and immunohistological assay. Maturitas 1997; 27:41-5.

The Relationship between Neck Pain and Hand Dexterity among Violinists in Kota Kinabalu, Sabah, Malaysia

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ABSTRACT

Background and Objective: Violinists are commonly affected by neck pain a condition commonly associated with upper limb dysfunctions and there is limited information regarding the effects of neck pain on hand dexterity in violinists. The objective is to investigate if neck pain significantly affects tapping speed and the relationship between degrees of neck pain on tapping speed in violinists with neck pain.

Materials and Method: 34 violinists with neck pain (N = 23) and without neck pain (N = 11) were recruited. Tapping speed of the index-middle, middle-ring, and ring-little fingers of both hands were measured with HLTapper V.1.0 application. Analyses were done to identify significant differences in tapping speed between two groups; and to correlate degree of neck pain and tapping speed.

Findings: Significant difference in tapping speed of right middle-ring (RMR) finger between violinists with and without neck pain (p = 0.018). Strong negative linear correlation between degree of neck pain and tapping speed of RMR finger in violinists with neck pain was found (= -0.845, p = 0.001).

Conclusion: Tapping speed of the RMR finger may be affected by neck pain in violinists.

Keywords: *Neck Pain, Tapping Speed, Fine motor skills, hand dexterity in violinists*

Introduction

Upper limb dysfunction can borne from a variety of clinical conditions, neck pain has been cited as one of the most commonly associated issue.(1) Patients with neck problems were likely to present with upper limb disability; with the most classic example being upper limb pain, motor weakness, sensory deficits, and loss of function due to cervical radiculopathy.(2) In a study 79.6% of patients with non-specific neck pain reported that upper limb activities aggravated the neck pain thereby further cementing the statement that upper limb function is often impaired in association with neck pain disorders.(3)

Manual dexterity is defined as the ability to coordinate the fingers and to manipulate objects in a timely manner.(4) It is also the ability to integrate precision and speed with finely coordinated movements of the arm, hand, and fingers.(5) For musicians, playing a musical instrument often involves highly coordinated hand movements and profound digital precision and velocity.(6) The speed, fluency, & tempo required for musical performances of elite instrumentalists crowned musical expertise as the ultimate example of elite performance in complex hand dexterity, thus marking excellent fine motor skills as an essential component for musicians to perform well on their instrument.(7)

A musician's technique pertains to the way he holds the instrument, the force applied when playing, and the frequency of awkward static or dynamic postures. Static loading involves prolonged, sustained muscle contraction and stress across a joint, the surrounding soft tissue, and bony structures. On the other hand, dynamic load is

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the force applied to the muscles, joints, and supporting structures by movements. [8] While the position of the left shoulder is relatively fixed, the left hand regulates the tone and pitch of the sounds produced by pressing the strings along the length of the finger board, in such a way that a higher pitched sound is generated when the string is pressed closer to the sound bridge, thus the position of the elbow, forearm, and wrist changes according to the required tone.[9] Here, stabilizing efforts from the neck and shoulder musculatures are needed to allow precision work in the hands and fingers when playing the violin. Thus, excessive overuse or misuse may cause fatigue of the stabilizing muscles, consequently resulting in neck pain and discomfort, possibly due to muscle spasms and nerve compression. [10] Another study found that violinists with unilateral neck pain showed less lower trapezius strength on the ipsilateral side compared to the contralateral side; likely due to the alteration of muscle usage between the upper trapezius and lower trapezius in stabilizing the violin due to pain.[11] Alteration of posture due to neck pain can be associated with difficulties in other regions, such as dexterity in the hands.[12]

Although musicians commonly report pain-associated decrease in fine motor skills, there is limited information regarding the effects of neck pain on hand dexterity in high string musicians.

Materials and Method

34 violin players (teachers, students, & performers) were recruited from University Malaysia Sabah, Sabah Institute of Art, & various music academies in Kota Kinabalu, Sabah upon approval from the relevant head of department or musical director of the aforementioned musical institutes. Inclusion criteria are, aged between 18 – 50 years old, playing the violin for at least two years and two hours per week. Has playing related non-specific neck pain (for symptomatic group) and does not have neck pain for the last 12 weeks (for control group). Whereas the participants are excluded if the, history of trauma or surgery to the neck, shoulder, arm, forearm, and hand, history of pregnancy (to avoid possible confounding factors such as pregnancy-related peripheral neuropathies e.g. carpal tunnel syndrome).

The subjects were recruited via convenience sampling from the aforementioned musical institutes. Group allocation was done according to the flow chart 1.1. Following that, the subjects answered the NPAD questionnaire. All participants provided written consent to participate in this study. Data collection was conducted over a period of six month from July 2018 to December 2018. Institutional ethical approval was obtained from the Research and Ethical Committee of INTI International University before proceeded with this study.

For the timed tapping test, the subjects were seated with their left forearm rested on a table, with the wrist neutral and relaxed. They were then asked to alternately tap each side of the rectangle with their index finger and middle finger as fast as possible for 10 seconds on the HLTapper V.1.0 application. They were then given a rest period of 30 seconds before repeating the test for two more times. The procedure is then repeated for the middle finger and ring finger; followed by the ring finger and little finger. The same test is done for the right hand as well. The number of taps performed per second are then recorded for each hand. After the above data have been recorded, group matching was performed and reassigned as depicted in the flow chart 1.1.

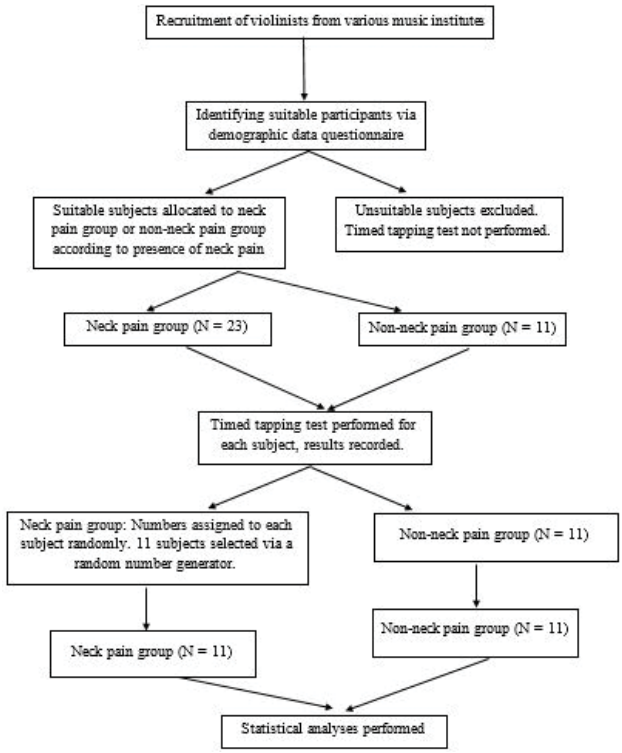


Figure 1.1 Flow chart of data collection

Findings

SPSS V.22 was used, with the alpha set at 0.05. Preliminary testing of sampling distribution showed that for tapping speed of all finger combination groups were normally distributed except for the right

middle-ring (RMR) finger combination of the neck pain group, as shown by their p-values in table 1.1. Thus, the independent T-test was performed to analyse the difference in tapping speed between violinists with neck pain and those without neck pain for all finger combination groups except for the RMR finger combination group where Mann-Whitney test instead. The Spearman's rho correlation coefficient was done to analyse the relationship between degree of neck pain and tapping speed.

Table 1.1: Tapping speed of all finger combination groups and their p-values

Groups / Finger combination	Neck pain group	Non-neck pain group
Right index-middle (RIM)	$p = 0.084$	$p = 0.200$
Right middle-ring (RMR)	$p = 0.026$	$p = 0.200$
Right ring-little (RRL)	$p = 0.200$	$p = 0.200$
Left index-middle (LIM)	$p = 0.200$	$p = 0.200$
Left middle-ring (LMR)	$p = 0.200$	$p = 0.200$
Left ring-little (LRL)	$p = 0.200$	$p = 0.200$

No significant between-group differences were found for age, gender, BMI, years of playing, total playing hours per week, and handedness ($p > 0.05$) in table 2.1.

Table 2.1: Sample characteristics and distribution of subjects

Demographics	Violinists with neck pain (N = 11)	Violinists without neck pain (N = 11)	p-value
Age (Year)	19 to 40 (Mean ± SD = 29.27 ± 7.54)	20 to 45 (Mean ± SD = 27.55 ± 8.29)	RIM: $p = 0.561$ RMR: $p = 0.294$ RRL: $p = 0.460$ LIM: $p = 0.667$ LMR: $p = 0.382$ LRL: $p = 0.540$
Gender (Male/ Female)	5/6	6/5	RIM: $p = 0.800$ RMR: $p = 0.889$ RRL: $p = 0.276$ LIM: $p = 0.519$ LMR: $p = 0.359$ LRL: $p = 0.267$
Body mass index	20.03 to 24.03 (Mean ± SD = 22.74 ± 1.34)	18.73 to 24.22 (Mean ± SD = 21.85 ± 1.92)	RIM: $p = 0.963$ RMR: $p = 0.873$ RRL: $p = 0.093$ LIM: $p = 0.251$ LMR: $p = 0.342$ LRL: $p = 0.789$
Years of playing (Years)	1 to 12 (Mean ± SD = 5.27 ± 3.36)	2 to 18 (Mean ± SD = 8.09 ± 5.00)	RIM: $p = 0.794$ RMR: $p = 0.604$ RRL: $p = 0.523$ LIM: $p = 0.190$ LMR: $p = 0.211$ LRL: $p = 0.755$
Total playing hours per week (Hours)	7 to 24.5 (Mean ± SD = 15.77 ± 6.25)	2 to 21 (Mean ± SD = 10.63 ± 6.82)	RIM: $p = 0.766$ RMR: $p = 0.493$ RRL: $p = 0.717$ LIM: $p = 0.639$ LMR: $p = 0.132$ LRL: $p = 0.366$

Conted…

Handedness (Right/ Left)	7/4	10/1	RIM: $p = 0.150$ RMR: $p = 0.285$ RRL: $p = 0.853$ LIM: $p = 0.572$ LMR: $p = 0.414$ LRL: $p = 0.076$

Analyses with the independent T-test found no significant differences in tapping speed of the RIM finger; RRL finger; LIM finger; LMR finger; and LRL finger combination groups of both hands ($p > 0.05$) between neck pain and non-neck pain groups. On the other hand, tapping speed of the RMR finger combination in neck pain group (Median = 8.20) differed significantly with a large effect size from the non-neck pain group (Median = 9.43), U = 28.5, z = -2.10, p =0.018, r = -0.633 using the Mann-Whitney test ($p < 0.05$).

Table 3.1: Mean tapping speed of both hands between neck pain and non-neck pain groups and their p-values

Groups / Finger combinations	Neck pain group	Non-neck pain group	p-value
RIM	10.70 taps/s	12.07 taps/s	$p = 0.068$
RMR	7.88 taps/s	9.29 taps/s	$p = 0.018$
RRL	6.32 taps/s	7.15 taps/s	$p = 0.211$
LIM	11.15taps/s	11.57 taps/s	$p = 0.617$
LMR	8.27 taps/s	8.95 taps/s	$p = 0.440$
LRL	6.38 taps/s	7.10 taps/s	$p = 0.282$

Spearman's rho correlation coefficient found a significant relationship between tapping speed of the RMR finger combination and the degree of neck pain, = -.845, p =. 001. This suggests a strong negative linear correlation between the two variables - indicating that as the degree of neck pain increases, the tapping speed of the RMR finger fingers decreases.

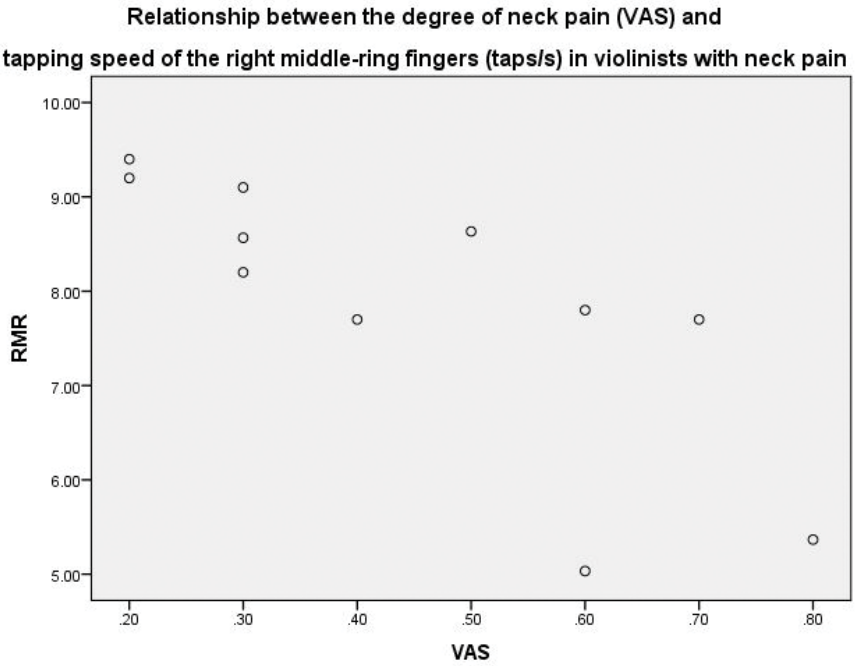


Figure 2.1: Relationship between the degree of neck pain (VAS) and tapping speed of the RMR fingers (taps/s) in violinists with neck pain

Discussion

The results of this study suggested that there were no significant differences in tapping speed in all the finger combinations between violinists with neck pain and those without neck pain except for the RMR finger combination, which demonstrated a significant difference of large effect size between the two groups. These results are in partial agreement with a study, which compared the sensorimotor function of violinists with and without neck pain to measure different motor aspects of the upper limb/hands. [7] The differences between the results of these studies may be due to the fact that the current study employs a timed alternate finger tapping method to assess the dexterity of the subjects, which is a more similar movement to those employed when playing a violin in comparison to the traditional way of assessing tapping speed by single finger tapping of the index finger; and thus may be more accurate than the latter in detecting significant differences in the tapping speed between two groups of subjects. Nonetheless, non-specific neck pain has been shown to have a significant impact on upper limb function, as indicated that 80% of patients with non-specific neck pain reported difficulties with upper limb tasks due to the pain.[3] The difference between this study and the current study is evident in the type of upper limb function studied – where Osborn and Jull examined gross movements such as lifting objects, gardening, and household chores; the present study examined fine and precision-oriented motor tasks of the hand and fingers. A similar interpretation can be drawn from results of a study by [13], which found that chronic mechanical neck pain populations had less accurate proprioception in the shoulder and wrist. Altered input from neck muscles secondary to pain and fatigue may affect sensory input to the central nervous system, consequently impairing upper limb proprioception and limit the performance of precision tasks. Furthermore, the results of the current study may also be explained by the fact that the structures of the right upper extremity is often placed under high levels of dynamic loading during playing. Here, the right upper extremity is used to produce larger range of motions compared to the left upper extremity during bowing movements, with the right shoulder placed in an increasingly abducted and internally rotated position depending on which strings are played. When musicians are required to play quickly and frequently under these conditions, accumulation of physical stress from dynamic loading can cause fatigue and micro-damage to the musculotendinous structures of the proximal stabilizing muscles and upper limb, ultimately resulting in pain, discomfort, and dysfunction.[9]

The current study also found that there was a significant, strong negative linear correlation between the degree of neck pain and tapping speed of the RMR finger among violinists with neck pain. These findings are in agreement with that of Osborn and Jull, which found a moderate to high correlation between the severity of neck disorder and level of upper limb disability – in that patients with more severe neck pain presented with more limitations in their upper limb function. However, the type of upper limb functions examined by Osborn and Jull differs from the current study, in the sense that Osborn and Jull studied recreational movements which involved gross motor function; whereas the current study examined fine motor tasks.

The first potential limitation of the current study is the selection of the measurement tool. As of now, there is no consensus regarding the most suitable outcome measure tool for assessment of hand dexterity in musicians. It future studies, perhaps an outcome measure tool that allows the musician to assume the exact basic position adopted during their musical performances may allow better analysis of the data, as this may minimize any carry-over effect from their experience with playing other instruments.

Conclusion

The study concludes that there is significant difference in tapping speed of the RMR finger combination between violinists with neck pain and violinists without neck pain. However, it also identified that no significant differences in tapping speed of the RIM finger; RRL finger; LIM finger; LMR finger; and LRL finger combinations between violinists with neck pain and violinists without neck pain. Furthermore, the current study also found that there is a significant and strong negative linear relationship between degrees of neck pain and tapping speed of the RMR finger in violinists with neck pain, in which tapping speed of the RMR fingers decreases as the degree of neck pain increases.

Acknowledgements

The author would like to thank University Malaysia Sabah, Allegrow Music School, Prelude Music School, Concept Music School Kota Kinabalu, Harmony Music School, Musical studies department from Sabah Institute of Art, Joan's Music Centre for their generous support in enabling the completion of this research.

Source of Funding: Self-funding

Conflict of Interest: Nil

REFERENCES

1. Alreni et. al. Measures of upper limb function for people with neck pain: a systematic review of measurement and practical properties. Syst Rev. 2015; 4:43
2. McLean et.al. An investigation to determine the association between neck pain and upper limb disability for patients with non-specific neck pain: a secondary analysis. Man Ther. 2011; Oct;16(5):434-9
3. Osborn, W. & Jull, G. Patients with non-specific neck disorders commonly report upper limb disability. Man Ther. 2013; Dec; 18(6):492-7.
4. Wang et.al. Assessing Dexterity Function: A Comparison of Two Alternatives for the NIH Toolbox. Retrieved from: J Hand Ther. 2011; Oct-Dec;24(4):313-20
5. Özcan, et.al. Comparison of Pressure Pain Threshold, Grip Strength, Dexterity and Touch Pressure of Dominant and Non-Dominant Hands within and Between Right- and Left-Handed Subjects. J Korean Med Sci. 2004 Dec; 19(6):874-8.
6. Sims et.al. Hand Sensibility, Strength, and Laxity of High-Level Musicians Compared to Non-Musicians. J Hand Surg Am. 2015 Oct; 40(10)
7. Steinmetz, A. & Jull, G. Sensory and Sensorimotor Features in Violinists and Violists with Neck Pain. Arch Phys Med Rehabil. 2013 Dec; 94(12):2523-8
8. Foxman, I. & Burgel, B. Musician health and safety: Preventing playing-related musculoskeletal disorders. AAOHN J. 2006 Jul; 54(7):309-16.
9. Lee et. al. Musicians› Medicine: Musculoskeletal Problems in String Players. Clin Orthop Surg. 2013 Sep; 5(3): 155–160
10. Morales, G. & Antunes, A. Musculoskeletal disorders in professional violinists and violists. Acta Ortop Bras. 2012; 20(1):43-7
11. Kim, S. H. & Park, K. N. The Strength of the Lower Trapezius in Violinists with Unilateral Neck Pain. Phys Ther Korea 2014; 21(4): 9-14.
12. Watson, A. The Biology of Musical Performance and Performance-related Injury. Scarecrow Press; 2009.
13. Abuchandani, D. & Parkar, B. Comparison of Upper Limb Proprioception in Chronic Mechanical Neck Pain Patients with Age-Sex Matched Healthy Normals. International Journal of Science and Research 2017 Vol 6: 3, 1423-1428

Antibiotics Usage and Their Cost in the Pediatric Wards of Salah Aldin Teaching Hospital

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ABSTRACT

Background: Antimicrobials are among the most commonly used and misused of all drugs. The inevitable results of their common and widespread use has been the emergence of antibiotic-resistant pathogens, fueling an ever-increasing need for new drugs at a time when the velocity of antimicrobial drug development has slowed significantly, therefore aim of this study is reducing inappropriate antibiotic use which thought to be the best way to control resistance and reserve money spent for buying.

Material and Method: This descriptive study was held in the wards of Salah Aldin Teaching Hospital (STH), from (1-31) January 2017, the total number of collected sample is 1700 cases of inpatient were treated with antibiotics from a total of 2150 inpatient and only 647 cases in the pediatric wards who treated with antibiotics were included in the study. The study involved with determining the definite diagnosis, cause of admission, rational cost for using antibiotics and the duration of the treatment.

Results: Total numbers of cases who treated with antibiotics were 647 cases in pediatric wards only and the number of antibiotics which had been spent during that month as follow: 482 cephalosporins vials, 199 penicillins vials, 235 metronidazole bottols, 54 amino-glycosides, 35 glycopeptide, 31 Flouroquinolone, and 17 macrolides vials respectively as registered in the pharmacy books and wards (more than one antibiotic might be prescribed to one case). The total cost was 6194$ only in pediatric wards from a total 23929$ cost of antibiotics used in the whole wards of Salahaldin Teaching Hospital (STH).

Conclusion: The antibacterial agents are used in the wards of the hospital roughly, without differential tests and without any respect to the guidelines of judicious AB use to decrease the resistant. Cephalosporins are the most commonly used AB in all the five wards of STH, As well as the total cost of using AB in STH for only one month is about 23929 $, 6194$ in pediatrics. enormous amounts of AB used in STH can easily lead to serious problems of resistant infections, also huge amounts of AB dispensed for chest infections and GE (usually are viral in nature).

Keywords: *Antibiotics usage; Cost; Pediatric wads; Salahaldin Teaching Hospital.*

Introduction

An antibacterial are compounds or substances that kill or decelerate the bacterial growth. The discovery of antimicrobials is one of the most great and best medical achievements of the 20th century. Before the antimicrobial time, patients who contracted common infectious diseases developed significant morbidity or mortality. The discovery of penicillin in 1927, after that; the subsequent discovery of other antimicrobials, contributed to a considerable decline in mortality related to infectious disease during the next five decades. However, since 1980, the mortality caused by infectious diseases in the United States have begun to increase, to some extent due to increases in antimicrobial resistance[1,2]. So antimicrobial agents are among the most commonly used and misused of all drugs. The inevitable result of their common and wide spread use has been the emergence of antibiotic-resistant pathogens, fueling an ever-increasing need for new drugs at a time when the velocity of antimicrobial drug development has slowed significantly. Reducing inappropriate antibiotic use is thought to be the best way in resistance control [3].

Antibiotics have three principal uses: empirical therapy, definitive therapy, and prophylactic therapy.

When used as empirical therapy, the antibiotic(s) should cover all the possible pathogens, because the infecting organism has not been identified. Either combination therapy or, treatment with a single broad-spectrum agent may be employed. Once the infecting microorganism is identified, the course is completed with a narrow-spectrum, low-toxicity drug. Failures to identify the causative microorganism and to narrow the antibiotic spectrum thereafter are common misuses of antibiotics. The first consideration in selecting an antibiotic is whether it is even indicated, Diagnosis may be masked if therapy is started before appropriate cultures are obtained. Antibiotics are potentially toxic, and may encourage selection of resistant microorganisms. Of course, definitive identification of a bacterial infection before treatment is initiated often is not possible. In the absence of a clear indication, antibiotics often may be used if disease is severe and it seems likely that withholding therapy will cause failure to manage a severe or life-threatening infection[2,6].For definitive therapy, the course of therapy should be altered to a more specific and narrow-spectrum antibiotic once an organism and susceptibility have been identified [2,7].

Prolonged usage of empirical broad-spectrum coverage or multiple antibiotics should be avoided because it often is unnecessary, is costly, may select for antibiotic resistance against multiple agents, and may cause additional unfavorable effects due to the multiple agents. Inappropriately broad coverage often is continued because satisfactory cultures were not obtained before the initiation of therapy or because of the misconception that a broad-spectrum regimen is better than a narrow-spectrum regimen. Although reluctance to narrow therapy after a favorable initial response has occurred is comprehensible, the goal should be to use the most selectively active drug that produces the least unfavorable effects, which includes unfavorable effects on normal host flora[8]. The Centers for Disease Control and Prevention (CDC) has outlined a series of steps to reduce antibiotic resistance, including proper use of vaccination, thoughtful and proper use of indwelling catheters, early involvement of infectious disease experts, antibiotic choice based on local patterns of susceptibility, proper antiseptic technique to ensure infection rather than contamination, right use of prophylactic antibiotics in surgical procedures, infection control procedures to isolate the pathogen, and strict compliance to hand hygiene[2,9].Most viral diseases are self-limited and neither need nor respond to any of the currently available anti-infective compounds. Thus, antibiotic therapy of at least 90% of infections of the upper respiratory tract and many GI infections is ineffective[10].Antibiotic therapy too often is given in the absence of supporting microbiological data. Bacterial cultures and Gram stains of infected material are obtained too infrequently, and, when available, the results often are overlooked in the selection and application of drug therapy. Frequent use of drug combinations or drugs with broadest spectra is a cover for diagnostic imprecision[11].

Material and Method

The work is done in Salah aldin Teaching Hospital, cases are collected during January 2017, the samples are 1700 cases of inpatient treated with antibiotics from a total of 2150 inpatient case.

The cases are collected from the patients that are found in the hospital and from the files of the patients that still found in the hospital. The study involved with determining the definite diagnosis, cause of admission, rational cause for using antibiotics and the duration of the treatment.In this study, some parameters are involved such as: age, duration of treatment, type of the antibiotics and their dosage forms and changes in the treatment regimen.

Results and Discussion

We have seven major types of antibiotics (AB) that are always used in the wards of Salah Aldin Teaching Hospital (STH), these are Cephalosporins, penicillins, Metronidazole, amino-glycosides, quinolones, glycopeptides and macrolides respectively, and other antibiotics are used rarely. In this study, the type of antibiotics used can be shown by table (1).

Table 1: the use of antibiotics (AB)in the investigated cases

Types of antibiotics	In the whole wards of STH	in Pediatric Wards	Percentage % (total 1700 cases)
Penicillins	524	199	30.8%
Cephalosporins	1267	482	74.5%
Amino-Glycosides	137	54	8%

Conted…

Metronidazole	618	235	36.3%
Glycopeptide antibiotics	90	35	5.2%
Quinolones	78	31	4.6%
Macrolides	47	17	2.7%

Note: some patients received more than one antibiotic.

We found that from 2150 inpatient cases in the 5 wards of STH, 1700 cases were treated with AB and as shown by the table above; the most commonly used AB is cephalosporins and exactly the 3rd generation cephalosporin. Which is important to say that between these 1700 cases, we did not find any test for culture and sensitivity neither we find a gram stain or any differential tests for microbial growth. Also about 99% of the used AB in STH are of low quality which increases the duration of treatment, risks on the patient, and the risk of AB resistant.The total cost was 23929$ for the all antibiotics had been spent as registered in the pharmacy books and case sheets of the hospital,6194$ from the total cost for antibiotics were used by pediatric ward only.

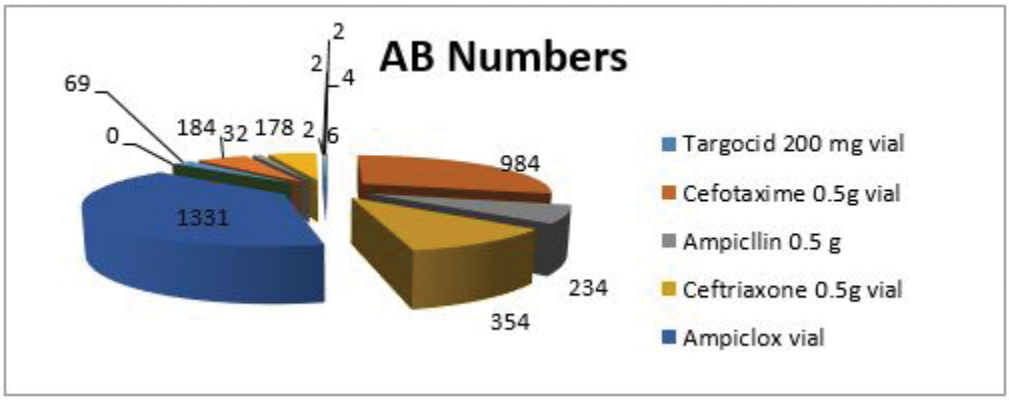


Figure 1: The use of AB for chest infections in the pediatric ward

Two- hundred seventy one cases in the pediatric ward were treated with AB for chest infection. As we can see from the figure (1), 1331 ampiclox vials had been dispensed for those case, 984 cefotaxime 0.5g vials, 234 ampicillin 0.5g vials, 354 ceftriaxone vials, 184 gentamicin 20 mg amp, and 178 vials of vancomycin vials. This enormous amounts from AB dispensed for 271 cases to treat chest infections and the duration ranges from 2 days to 7 days and we already know that 90% of these infections are viral in nature as documented in many clinical references(11,12,13)

The cost of this irrational use is about 3066$.

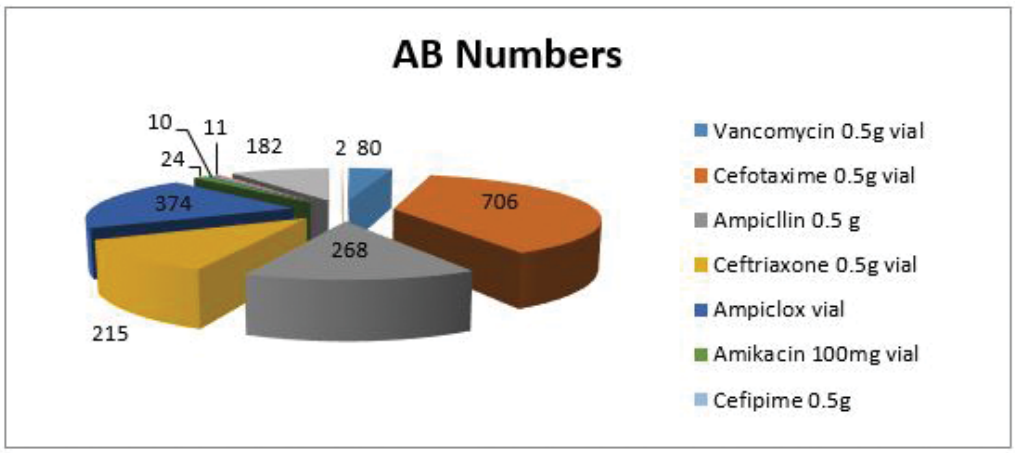


Figure 2: The use of AB for treating GE in the pediatric ward

Cases in the pediatric ward were treated with AB for Gastroenteritis (GE). Figure (2) reveals the total no. AB used for these cases.As we can see from the figure above, 706 cefotaxime 0.5g vial, 268 ampicillin vials, 215 ceftriaxone 0.5g vials, 374 ampiclox vials, 182 metronidazole bottles, and 80 vancomycin 0.5g vials were used in patients with GE. While almost references of medicine and clinical pharmacology document the fact that AB in GE will decrease the course of healing by not more than 1 day also that most of cases are viral in nature[8] (this agreed with Davidson's principles & practice 20th edition). The cost of this irrational use is about 1635 $.

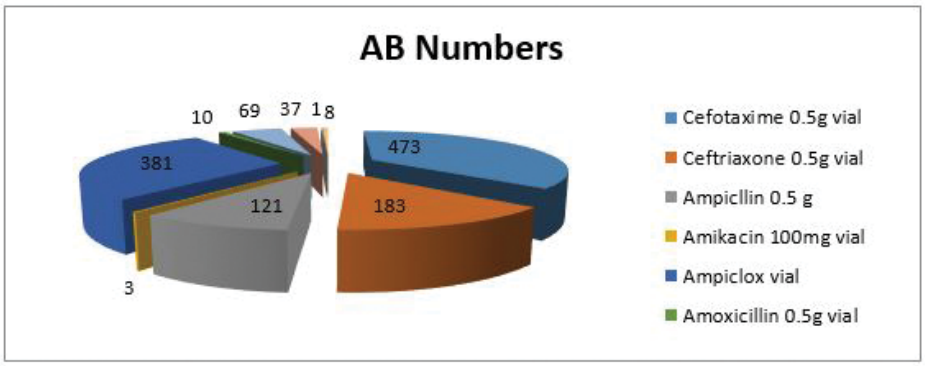


Figure 3: The use of AB for nosocomial prophylaxis in the pediatric ward

In the pediatric ward about 3.71 cases were received AB for nosocomial prophylaxis as shown in fig.(3), 473 cefotaxime vials, 183 ceftriaxone 0.5g vials, 121 ampicillin 0.5 g vials, 381 ampiclox vials, 37 gentamicin 20 mg amp, and 8 vancomycin vials were used for patients to prevent nosocomial infection.The chief complaints of these cases were anemia, blood transfusion, bone marrow aspiration, poor feeding, etc…..

Nosocomial AB prophylaxis should be used more cautiously with regarding culture and sensitivity tests.The cost of this use was about 821$

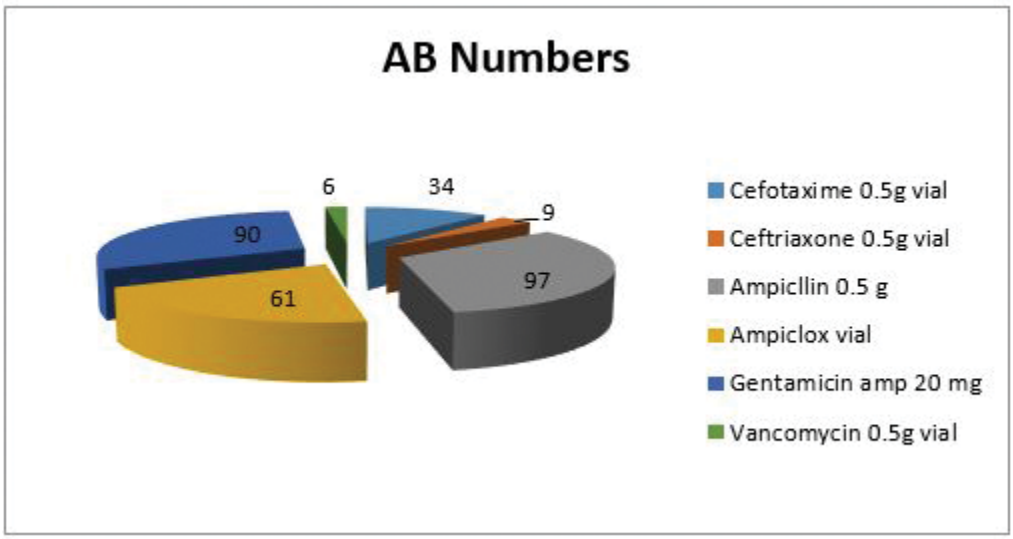


Figure 4: The use of AB in the pediatric ward for neonatal jaundice and post neonatal jaundice

Thirty -six cases in the pediatric ward were complaining from neonatal jaundice and post neonatal jaundice and received AB. Figure 4 reveals the total no. of AB used for these cases, As we can see from this figure, for only 36 cases, 97 ampicillin vials, 34 cefotaxime vials, 9 ceftriaxone vials (contra-indicated in neonatal jaundice[6] and this agreed with the British National formulary BNF), 61 ampiclox vials, 90 gentamicin 20 mg amp and 6 vancomycin 0.5g vials were used for this group of patients. While no specific indications were found for these cases and no support from the references for this use. Most of these cases not need AB therapy just phototherapy and we recommend that the patients who need AB should be selected. The cost was about 169$.

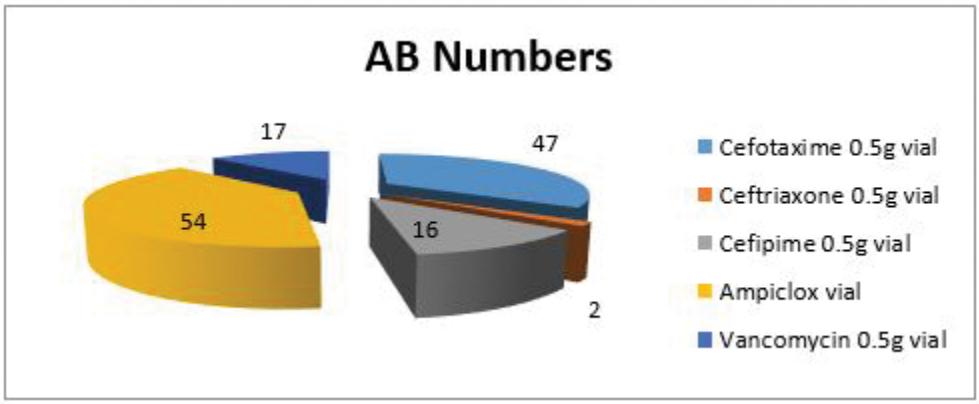


Figure 5: The use of AB for patients with febrile convulsion

Fourteen cases of febrile convulsions were treated with AB in the pediatric ward for the underlying cause. Figure -5 show reveals the total no. AB used for this group.As we can see from this figure, cefotaxime and ampiclox vials are the most commonly used also vancomycin vial found a place in these groups. Most of febrile illnesses caused by viral infections [6] (this agreed with reference 7,14) and the cost of this use is about 148$.

16 cases were treated with AB for croup(acute viral infection of the upper airway [1]).

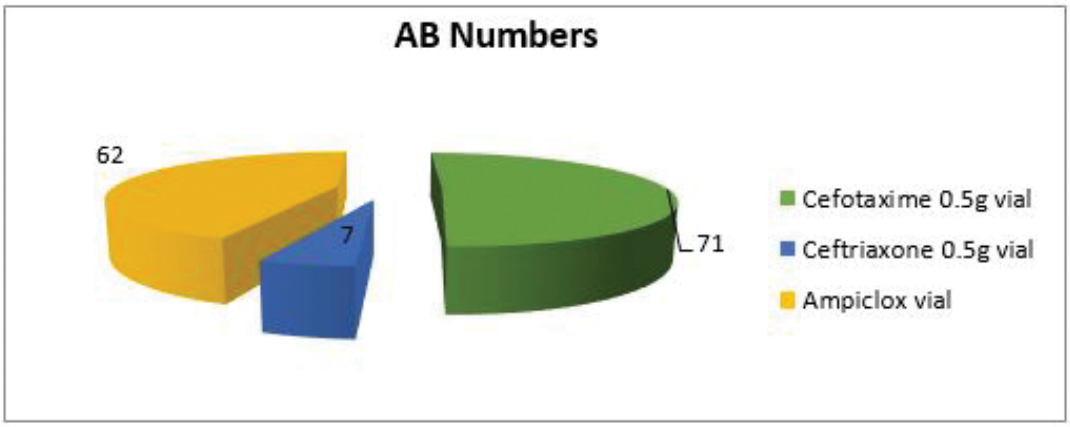


Figure 6: The use of AB for patients with croup in the pediatric ward

Figure 6 reveals the total no. AB used for these cases.As we can see from the figure below, for 16 cases with croup, 71 cefotaxime 0.5g vials, and 62 ceftriaxone 0.5g vial were used for these cases which most of them do not need AB treatment. The total cost for this use is about 45$.

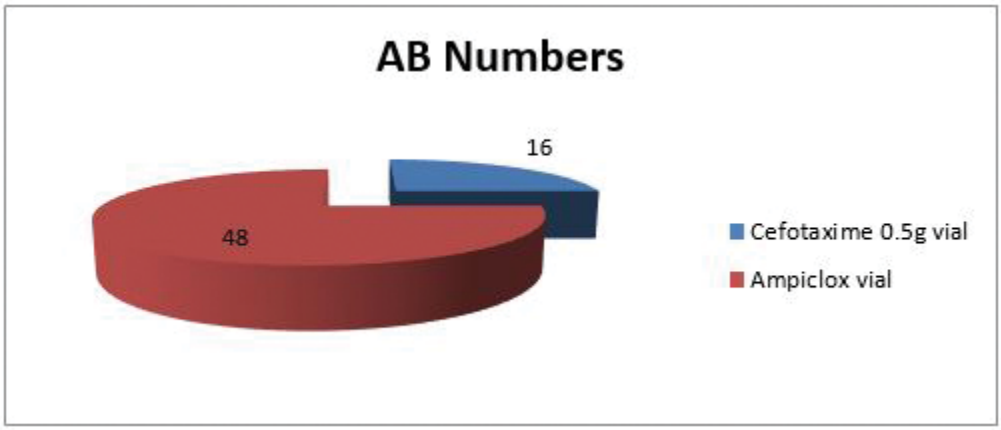


Figure 7: The use of AB for patients with kerosene poisoning

Five cases of kerosene poisoning in the pediatric group were treated with AB from the 1st day of admission. Figure 7 reveals the total no. AB used for these cases.AB in kerosene poisoning should not be used only if secondary bacterial infection occurs (this agreed with Karen etal.,2007)[6] The cost of this use is about 33$.

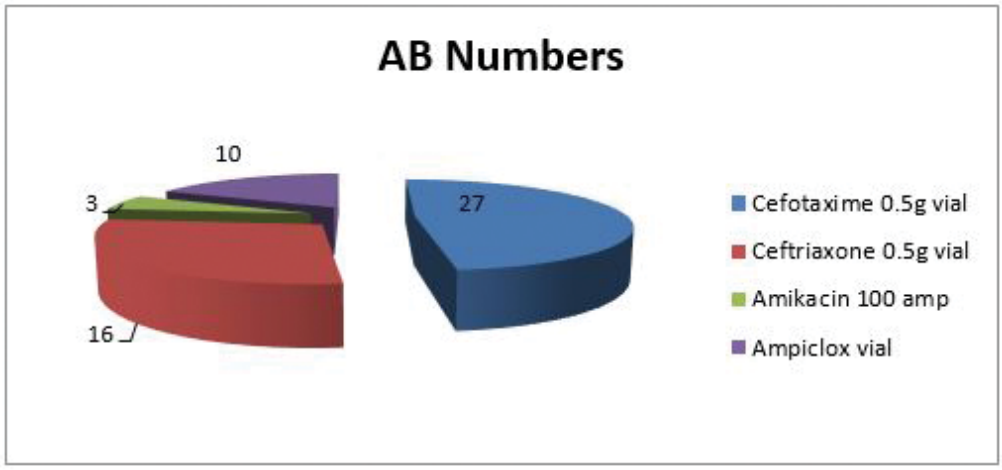


Figure 8: The use of AB in the pediatric for UTI

Nine cases were treated with AB for UTI in the pediatric ward. Figure 8 reveals the total no. AB used for this group. The total cost for this use is about 40$

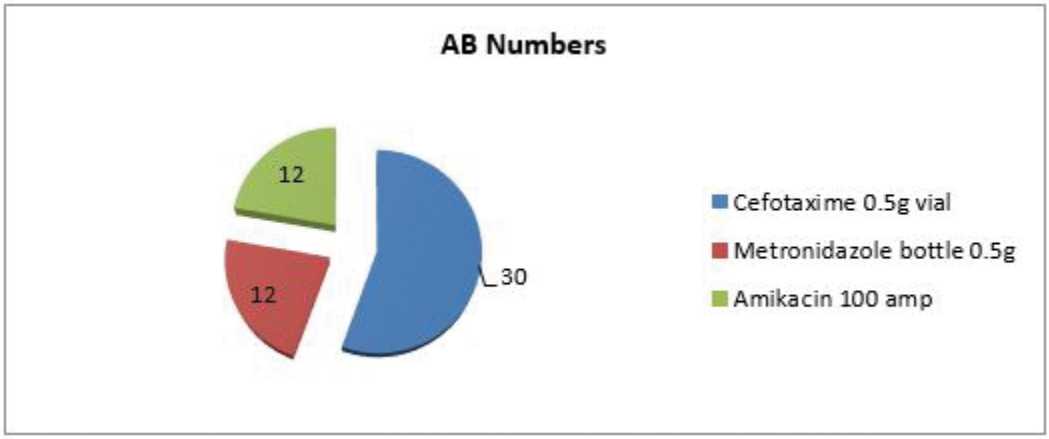


Figure 9: The use of AB for patients with septicemia in the pediatric ward

Two cases of septicemia were treated with AB. Also without test of culture and sensitivity. Total cost 42$

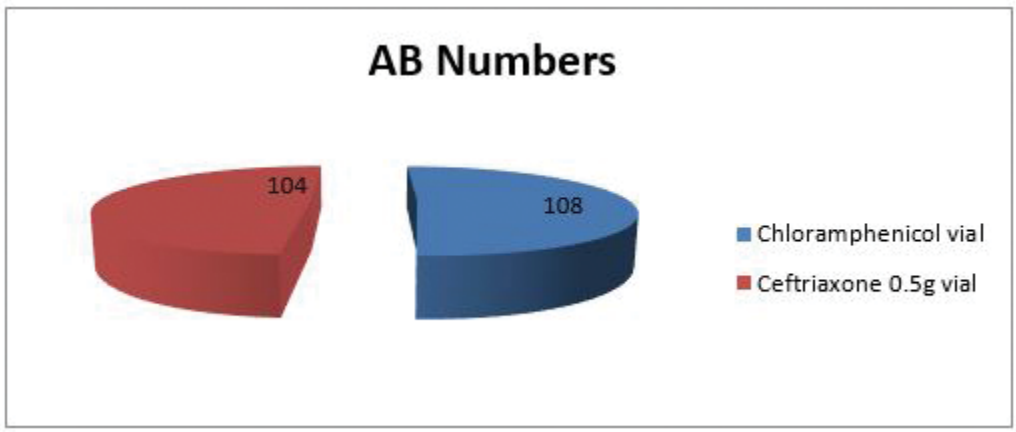


Figure 10: Chart about the use of AB for meningitis in the pediatric ward

Four cases were treated with AB for meningitis in the pediatric ward. Figure 10, reveals the total no. AB used for this group. The cost of this use is about 195$.

As we can see from this chart, 104 ceftriaxone 0.5 g vials with 108 chloramphenicl (1 g) vials were used for 4 patients and the duration were not less than 10 days. This reveals also how bad is the quality of these AB used in the hospital, while the use of top quality AB will decrease the cost, risk on the patient and risks of AB resistant (10,15,16).

Conclusions

1. The antibacterial agents are used in the wards of the hospital roughly, without differential tests and without any respect to the guidelines of judicious AB use to decrease the resistant.
2. Cephalosporins are the most commonly used AB in all the five wards of STH and namely the 3rd generation cefotaxime and ceftriaxone.
3. The total cost of using AB in STH for only one month is about 23929 $, 6194$ in pediatrics.
4. The enormous amounts of AB used in STH can easily lead to serious problems of resistant infections
5. Huge amounts of AB dispensed for chest infections and GE (usually are viral in nature), also many patients with jaundice, and CRF received AB may be contraindicated to their cases.

Acknowledgments

We would like to express our great appreciation to Salah aldin Teaching Hospital, for help me in collecting the cases of this search.

Ethical Clearance: From research ethic committee in Tikrit university/college of medicine

Source of Funding: self

Conflict of Interest: None

REFERENCES

1. Philip Thomas Reeves.Antibiotics groups & properties. Puplished by John Wiley&Sons: 2012. P1-60.
2. Laurence L.Brunton, PhD and Keith L.Parker, MD,PHD. Goodmans & Gilmans:manual of pharmacology and therapeutics. 12th ed. Newyork: 2011. P1365-1383.
3. Mary A.K Pharm D, Lioyd Y.Y Pharm D, Brian K.Alldredge pharmD, Robin L. Corelli PharmD, B.Joseph Guglielmo PharmD, Wayne A.Kradjan PharmD, BCPS. Applied Therapeutics:the clinical use of drugs. 9th ed. United states: 2009. P8-24.
4. Maie A.C, PHARMD, FCCP, FASHP, BARBARA G.W, PHARMD, FASHP, FCCP, BCPP, TERRY L.S, PHARMD, FCCP, FASHP, BCPS. Pharmacotherapy principles & practice. 1st ed. Newyork :2008. P1019-1030.
5. Sweetman S C, Martinadale. The complete Drug Reference. Journal of the medical library association. 2007(2):75-76.
6. Karen Baxter, Kate Towers, Jssica A.Forrest, Kristina fowlie, Heenaben patel, Angela M, GMC Fariane. BNF(British National Formulary). Britain:2007.P438.
7. Richard E.Behrman, Robert M.Kliegman, Hal B.Jenson. Nelson Textbook of Pediatrics. 17th ed. United state:2004. P903.
8. Nicholas A.B, Nicki R.C, Brain R.W, John A.A. Davidsons Principles &Practice of medicine. 20th ed. China:2006.P75.
9. Borg M, Cookson B, Zarb P, Scicluna E. Antibiotic resistance surveillance and control in the Mediterranean. Region. 2009, 3(9):654-659.
10. Canon Mac Dougall, Jason Gallagher. Antibiotic Simplified. 2nd ed. 2011:P15-17.
11. van de Sande-Bruinsma N, Grundmann H, Verloo D, Tiemersma E, Monen J. Antimicrobial drug use and resistance in Europe. Emerg Infect Dis. 2008;14:1722–1730.
12. Sabuncu E, David J, Bernède-Bauduin C, Pépin S, Leroy M, Boëlle PY,et al. "Significant reduction of antibiotic use in the community after a nationwide campaign in France, 2002-2007". 2009: P1-5.
13. Cassir N, Rolain JM, Brouqui P. A new strategy to fight antimicrobial resistance: the revival of old antibiotics.2014; 5: 551.
14. Zhanel GG, Lam A, Schweizer F, Thomson K, Walkty A, Rubinstein E, et al."Ceftobiprole: a review of a broad-spectrum and anti-MRSA cephalosporin". American Journal of Clinical Dermatology.2008; 9 (4): 245–54.
15. Berger, Dr. Stephen. GIDEON Guide to Antimicrobial Agents. 2014. p 221.
16. Dr. Peter M. Wright, Dr. Ian B. Seiple, and Prof. Dr. Andrew G. Myers. The Evolving Role of Chemical Synthesis in Antibacterial Drug Discovery. 2014. p2-7.

Education Conducted By Pharmacist in Improving Hyperlipidemic Patient Adhearance

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ABSTRACT

The adhearance is one of the keys for successfulness of drug therapy. Low adherence is often found in long time drug use, one of them is hyperlipidemic patients. This study aimed to investigate the effect of pharmacist education intervention on patient compliance and their lipid plasma level. The research design was quasi-experimental nonequivalent group control and perspective. The study was conducted on hyperlipidemic at Port of Jakarta hospital. The number of samples was determined by using Krejcie and Morgan tables which yielded 44 respondents/patients. Compliance is measured by an MMAS questionnaire. The control and intervention groups were given leaflet containing drug information and gave the patient the opportunity to ask questions. The results showed that there was no significant difference in patient characteristics in terms of gender, age, education and dependent ($p < 0.05$) except on the distance characteristics ($p > 0.05$). Patient compliance increase in the intervention group differs significantly from the control group in the second and third periods of measurement ($p < 0.05$) while the compliance improvement in the control group occurred in the third period of measurement ($p < 0.05$). The plasma cholesterol level decreases significantly differences between intervention from the control group at the third measurement ($p<0,05$). It can be concluded that pharmacists' education either in the form of leaflets with verbal explanations or in leaflet alone can improve patient compliance with their medications where the improvement is faster achieved by pharmacist intervention in the form of a leaflet with a verbal explanation. Pharmacist education is also able to decrease patient plasma cholesterol level.

Keywords: *compliance, pharmacist education, hyperlipidemic*

Introduction

Based on basic health research data 2013 showed 35.9% of Indonesia's population aged ≥ 15 years with abnormal cholesterol levels (based on NCEP ATP III, with cholesterol levels ≥ 200 mg/dl), where women were more than men, and cities were more a lot compared to the countryside. Some provinces in Indonesia such as Nangroe Aceh, West Sumatra, Bangka Belitung, and Riau Islands have a prevalence of hyperlipidemia ≥ 50% [1]. Data from the Double Study of the Faculty of Medicine, University of Indonesia (2009) showed that the results of the measurement of lipid profiles in 490 study respondents obtained 290 people (59.2%) among them in a state of hyperlipidemia[2].

World Health Organization (WHO) 2013 reported that the highest prevalence of total blood cholesterol in Europe (54% for both sexes), followed by America (48% for both sexes). Africa and Southeast Asia have a low percentage of 22.6% and 29.0% respectively. High cholesterol is estimated to cause 2.6 million deaths (4.5%) and 29.7 million disabilities each year [3]. Hyperlipidemic patients include patients who need long-term therapy, which usually correlates with low levels of adherence to drug use as reported in several publications[4]. One study found that after nine months of statin therapy, only 56% of patients continued to take treatment and this percentage continued to decline after the first year[5]. The level of adherence of patients who use lipid-lowering drugs on average is 50%, with about 2/3 of patients remaining obedient on the first year of treatment[6].

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These patients need special attention by pharmacists in accordance with pharmaceutical service standards. The provision of education or drug information services is the obligation of pharmaceutical staff regulated in the decision of the health minister of the Republic of Indonesia number 72MENKES/SK/X/2016.

Compliance is one of the keys to success in achieving an optimal therapeutic outcome. It is hoped that education and counseling by pharmacists can improve patient compliance[8–9].

Method

The method used in this study is a quasi-experimental non-equivalent control on hyperlipidemic patients who were outpatient at Jakarta Port Hospital on the period of August - October 2017. Sample were all populations that met the inclusion criteria: Patients who came to the pharmacy installation during August - October 2017; diagnosed with hyperlipidemia in their medical records and received treatment with antihyperlipidemic drugs, patients with complete and clearly legible medical records.

The technique of getting samples is by consecutive sampling. The number of samples was determined by Krejcie and Morgan[11]. Samples were divided into 2 groups of 44 people each; the first group was the control group, while the second group was the intervention group. To enter the sample into the control or intervention group was determined by multiples of 5, ie the first 5 patients were included in the control group while the next 5 patients were included in the intervention group, and so on until the number of the two sample groups was sufficient. The research instrument is a compliance questionnaire refers to the MMAS [12] method.

Result and Discusion

A. Sosio-Demographic Respondent Characteristics:

The socio-demographic characteristics of the respondents in the control group and the intervention group included gender, age, education, the distance of house (residence) and dependents (costs) as shown in table 1. It can be seen that based on sex category, the majority of respondents in the control group and the intervention group were female respondents, that is as many as 25 (56.81%) for the control group and 30 (68.18%) for the intervention group. The results of the statistical test showed that there were differences in the distribution of the sex group of the control group and the intervention but the difference was not significant ($p = 0.271 > 0.05$). Basal metabolic rates for men are 10 percent higher than women. Therefore, women tend to convert food into fat more, whereas men tend to convert food into muscle and reserve energy ready to use. Muscles burn more fat than other cells. Because women have fewer muscles, women have a smaller chance to burn fat.[13]

Based on the age category, most respondents in the control group and intervention group were 35 (79.55%) for the control group and 29 (65.91%) for the intervention group. The results of the statistical test showed that there were differences in the distribution of the control group and intervention age categories but these differences were not significant ($p = 0.151 > 0.05$). The number of hyperlipidemic patients at >55 years is far greater than the age group below. The risk of hyperlipidemia increases with age. The weakness of the body is known to increase with age and predominantly accumulates in the area around the abdomen. LDL levels decrease with age and conversely LDL levels increase[14].

Based on the education category, the majority of respondents in the control group and intervention group were respondents with high school education, which were 25 (56.82%) for the control group and 24 (54.55%) for the intervention group. The statistical test results showed that there was a difference in the distribution of the control group and intervention education categories but the difference was not significant ($p = 0.612 > 0.05$). The higher the level of education of a person, the higher his awareness of efforts to maintain his health. This may be the cause of the highest number of patients at the high school level.

Based on the category of distance house (residence) with the hospital, the majority of respondents in the control group were long distance as much as 8 (18.18%) and the most intervention group was close distance as many as 36 (81.82%).

Table 1 : Distribution of Socio-Demographic Characteristics of Respondents in the Control Group

Variable		Group				p
		Control	Percentage (%)	Intervention	Percentage (%)	
Gender						
a.	Male	19	43,18	14	31,82	0,271
b.	Female	25	56,82	30	68,18	
	total	44	100,00	44	100,00	
Age						
a.	· 36 - 45 tahun	3	6,81	4	9,09	0,151
b.	· 46 - 55 tahun	6	13,63	11	25,00	
c.	· 56 - 65 tahun	19	43,18	19	43,18	
d.	· > 65 tahun	16	36,36	10	27,72	
	total	44	100,00	44	100,00	
Education						
a.	Elementary school/ Junior high school	15	34,09	13	29,55	0,612
b.	Senior high school	25	56,82	24	54,55	
c.	PT	4	9,09	7	15,91	
	total	44	100,00	44	100,00	
Distance						
a.	Near (1 - 10 km)	31	70,45	36	81,82	0,02
b.	Medium (11 - 20 km)	5	11,36	4	9,09	
c.	Far (21 - 30 km)	8	18,18	4	9,09	
	Total	44	100,00	44	100,00	
Insurance						
a.	Insurance	40	90,91	39	88,64	0,725
b.	Cash	4	9,09	5	11,36	
	Total	44	100,00	44	100,00	

The results of the statistical test showed that there were differences in the distribution of dependents in the control group and intervention respondents, but these differences were not significant (p = 0.725> 0.05).

B. Description of Respondent's Compliance

Table 2: Percentage of patients based on the level of compliance per period between two

No.	Level of compliance	Period 1		p	Period 2		p	Period 3		p
		Control	Intervention		Control	Intervention		Control	Intervention	
1.	Low	90,91	81,82	0.188	84,09	63,64	0,023	52,27	0,00	0,000
2.	Medium	9,09	11,36		15,91	29,55		47,73	34,09	
3.	High	0,00	6,82		0,00	6,82		0,00	65,91	

The question of the respondent's compliance as many as eight questions. Table 2 shows the level of compliance of the respondents of the two groups for each period. The highest level of compliance of the respondents in the two groups was respondents with a low level of adherence of 90.91% for the control group and 81.82% for the intervention group. The percentage of high adherence level categories is 0% for the control group and 6.82% for the intervention group. Differences in compliance between two groups of respondents were statistically

tested with the Mann Whitney test and the results as shown in table 2. It can be seen that in the first period there were no significant differences in adherence between the two groups of respondents indicated by the significance value of 0.188 (p value> 0, 05). In the second and third periods of measurement, statistical analysis showed that there were significant differences in adherence between the two groups as indicated by a significance value smaller than 0.05. This means that in the second and third period, verbal education conducted by pharmacists has been able to have an effect on respondents' compliance in using drugs prescribed by doctors.

Low compliance is a problem in the long-term treatment of patients for chronic non-infectious diseases and for long-term infectious diseases such as tuberculosis and HIV-AIDs. Patients of this group need to get priority for health workers including pharmacists in the form of counseling [15].

The results of this research indicate that pharmacist education affects the compliance of hyperlipidemic patients in taking cholesterol drugs. Interventions carried out by pharmacists in the form of consultations with patients where the pharmacist discusses the management of medication that will be undertaken by the patient including lifestyle changes. Pharmacists also provide patients with some material related to the treatment of patients [21].

The pharmacist's intervention in the form of education carried out at the beginning of the patient came to the pharmacy to redeem their medication, then performed again when the patient came back. At two repeated measurements, there was an increase in compliance in intervention patients [23]

Effects of interventions carried out by pharmacists as outlined previously are summarized in the following table:

Table 3: Percentage of patients based on changes in the level of compliance per period Intervention group

No.	Level of compliance	Intervention (2-1)		p	Intervention (3-2)		p
		Period 1	Period 2		Period 2	Period 3	
1.	low	81,82	63,64	0,003	63,64	0,00	0,000
2.	medium	11,36	29,55		29,55	34,09	
3.	high	6,82	6,82		6,82	65,91	

Table 3 shows changes in adherence and statistical test results to see the differences in the intervention group. Total of patients with high levels of adherence is greatly increased.

The statistical test used is a paired sample t-test. The results of this statistical test are presented in table 5.6. It can be seen in table 5.6 that for the pharmacist education intervention group it has shown the effect of the second period of measurement indicated by p <0.05.

From the statistical test as seen in table 4, the change in adherence in the second period of measurement was not significant which was indicated by a significance value of 0.083 (> 0.05). Changes in adherence in the third period of measurement were seen to be significant in the third period of measurement marked by a p-value <0.05 (0,000). This finding is in line with the report in a literature review which explains that the intervention provided is only in the form of written information that is not very efficient if given to patients who receive treatment for the long term[25].

Table 4 : Percentage of patients based on changes in the period of meeting rates Control group

No.	Level of compliance	Control (2-1)		p	Control (3-2)		p
		Period 1	Period 2		Period 2	Period 3	
1.	Low	90,91	84,09	0,083	84,09	52,27	0,000
2.	Medium	9,09	15,91		15,91	47,73	
3.	High	0,00	0,00		0,00	0,00	

Conclusion

Pharmacist education (leaflet and verbal) can improve patient adherence in using the drug in the first and second months after the intervention, which was indicated by a significant difference between the intervention groups to the control group (p <0.05). Giving leaflets that contain drug information requires a longer time to improve patient compliance with drug

use, which is indicated by a significant difference in the compliance of the control group in the second month of measurement ($p < 0.05$).

Suggestions

Education for hyperlipidemic patients should be continued and even intensified. It is necessary to measure plasma lipid levels in addition to total cholesterol levels with the consequence of increasing research costs.

Grateful Greeting

Thank you to those who have helped this research

Conflict of Interest: None

Ethical Clearance: From ethical committee at UIN Syarif Hidayatullah

Source of Funding: Self

REFERENCES

1. Health Research and Development Agency. Basic Health Research (RISKESDAS) 2013; 2013. doi: 1 December 2013.
2. Perkeni P. Guide to Managing Dyslipidemia in Indonesia. I. PB. Perkeni; 2015
3. World Health Organization. Global Health Observatory (GHO) Overweight. http://www.who.int/gho/ncd/risk_factors/overweight_text/en/index.html 1 sur.
4. Deichmann RE, Morledge MD, Ulep R, Shaffer JP, Davies P, van Driel ML. A Metaanalysis of Interventions to Improve Adherence to Lipid-Lowering Medication. Ochsner J. 2016;16(3):230-237. http://www.ncbi.nlm.nih.gov/pubmed/27660570%5Cnhttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5024803.
5. Huser MA, Evans TS, Berger V. Medication adherence trends with statins. Adv Ther. 2005;22(2):163-171. doi:10.1007/BF02849887.
6. Cramer JA, Benedict A, Muszbek N, Keskinaslan A, Khan ZM. The significance of compliance and persistence in the treatment of diabetes, hypertension and dyslipidaemia: A review. Int J Clin Pract. 2008;62(1):76-87. doi:10.1111/j.1742-1241.2007.01630.x.
7. The Republic of Indonesia. Minister of Health Regulation Number 72 of 2016 concerning Standard of Pharmaceutical Services at Hospitals; 2016: 1-73.
8. Anggraini R, Wahyono D, Rahmawati F, Gunawan C. EFFECT OF APPLICATION EDUCATION ON THE COMPLIANCE OF ANTIRETROVIRAL MEDICINE (ARV) IN HIV/AIDS PATIENTS. 5th Urecol Proceeding. 2017; (February): 1450-1456.
9. Yosi Febrianti; Satibi; Rina Handayani. The Influence of Pharmacist Counseling on Compliance Levels and Therapeutic Results of Outpatient Hypertension Patients in the Internal Medicine Polyclinic. J Manaj and Farm Services. 2013; 3 (4): 311-317
10. Dewanti SW, Andrajati R, Supardi S. Effect of counseling and leaflets on self-efficacy, medication adherence, and blood pressure in hypertensive patients in two health centers in Depok. J Pharmaceutical Indonesia. 2015; 5 (1): 33-40. doi: 10.22435/jki.v5i1.4088.33-40.
11. ROBERT V. KREJCIE; DARYLE W. MORGAN. Determining Sample Size for Research Activities. Educ Psychol Meas. 1970;30:607-610.
12. Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive validity of a medication adherence measure in an outpatient setting. J Clin Hypertens. 2008;10(5):348-354. doi:10.1111/j.1751-7176.2008.07572.x.
13. Ferraro R, Lillioja S, Fontvieille AM, Rising R, Bogardus C, Ravussin E. Lower sedentary metabolic rate in women compared with men. J Clin Invest. 1992;90(3):780-784. doi:10.1172/JCI115951.
14. Shanmugasundaram M, Rough SJ, Alpert JS. Dyslipidemia in the elderly: Should it be treated? Clin Cardiol. 2010;33(1):4-9. doi:10.1002/clc.20702.
15. De Geest S, Sabaté E. Adherence to long-term therapies: Evidence for action. Eur J Cardiovasc Nurs. 2003;2(4):323. doi:10.1016/S1474-5151(03)00091-4.

16. Singleton J, Veach S, Catney C, Witry M. Analysis of a Community Pharmacy Intervention to Improve Low Adherence Rates to Oral Diabetes Medications. Pharmacy. 2017;5(4):58. doi:10.3390/pharmacy5040058.

17. Ndefo UA, Moultry AM, Davis PN, Askew R. Provision of medication therapy management by pharmacists to patients with type-2 diabetes mellitus in a federally qualified health center. P T. 2017;42(10):632-637.

18. Erku DA, Ayele AA, Mekuria AB, Belachew SA, Hailemeskel B, Tegegn HG. The impact of pharmacist-led medication therapy management on medication adherence in patients with type 2 diabetes mellitus: A randomized controlled study. Pharm Pract (Granada). 2017;15(3):1-7. doi:10.18549/PharmPract.2017.03.1026.

19. Molino CGRC, Carnevale RC, Rodrigues AT, Moriel P, Mazzola PG. HIV pharmaceutical care in primary healthcare: Improvement in CD4 count and reduction in drug-related problems. Saudi Pharm J. 2017;25(5):724-733. doi:10.1016/j.jsps.2016.11.004.

20. Haramiova Z, Stasko M, Hulin M, Tesar T, Kuzelova M, Morisky DM. The effectiveness of daily SMS reminders in pharmaceutical care of older adults on improving patients' adherence to antihypertensive medication (SPPA): Study protocol for a randomized controlled trial. Trials. 2017;18(1):1-15. doi:10.1186/s13063-017-2063-8.

21. Carrie S. Oser, Crystelle C. Fogle JAB. A Project to Promote Adherence to Blood Pressure Medication Among People Who. Public Helath Res Pract Policy. 2017;14(E52):1-8. doi:10.5888/pcd14.160409.

22. Alajmi R, Al-Aqeel S, Baz S. The impact of a pharmacist-led educational interview on medication adherence of Saudi patients with epilepsy. Patient Prefer Adherence. 2017;11:959-964. doi:10.2147/PPA.S124028.

23. Boskovic J, Mestrovic A, Leppée M, Bago M, Sostar Z, Naletilic D. Pharmacist competences and impact of pharmacist intervention on medication adherence: An observational study. Psychiatr Danub. 2016;28(4):420-427.

24. Shao H, Chen G, Zhu C, et al. Effect of pharmaceutical care on clinical outcomes of outpatients with type 2 diabetes mellitus. Patient Prefer adherence. 2017;11:897-903.

25. Morris LA, Halperin JA. Effects of written drug information on patient knowledge and compliance: A literature review. Am J Public Health. 1979;69(1):47-52. doi:10.2105/AJPH.69.1.47

The Effect of Exercise Technique Altering with Use Heavyweight Rackets in the Development of Concentration (Sodium, Potassium) in the Blood and Smash Skill for Player's Badminton

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ABSTRACT

The skill of beating is one of the most important offensive skills in the game of badminton, through which the player can decide the point in his favor, and given the diversity of the use of skills at one point and the speed of the large brush requires us as researchers to find the best technique to develop this skill, so researchers used The method of exercise altering dimensions and trends and different altitudes in addition to the use of different weights and weights of some of them are heavy and some of them are lighter, and researchers try to know this method on the concentration of functional alterings in blood and whether there was a burden and effort on the muscle.

The aim of the research was to prepare a special exercise in the style of the altering exercise and using burdens loaded with badminton. To study the effect of the altering exercise method using the weight-laden binders in the concentration of sodium (potassium) in the blood and to develop the skill of smash of the player's badminton. The search for the altering exercise method in the overloaded bats has a positive effect on the concentration of sodium (potassium) badminton. The researchers used the experimental approach to design a single group with pre and post testing in order to suit the nature of the problem and achieve the research objectives. The sample of the research represented the entire research community and they are players of the province of Babylon for the season 2018 - 2019 and the number of (4) players, which means researchers used the method of comprehensive inventory of all members of the community.

The most important conclusion was that the altering exercise technique helped to develop the crushing skill of the feather. There was a marked improvement in the concentration of salts of blood (sodium and potassium), but within the natural information in the upper direction due to the use of exercise loads in the experimental group. The most important recommendations are the need to pay attention to the training altering during the educational units because it is best to deal with the skills of badminton, which falls within the open circuit system. And the need to use different and varied exercise technique commensurate with the skills required to perform.

Keywords: *exercise technique altering, sodium, potassium and blood.*

Introduction

The expansion of the technique of learning motor skills invites researchers to carefully choose the appropriate method for the conditions of the learning environment, such as the type of effectiveness, age, level of scientific and educational sample, and their physical and skill preparation, and that developing the abilities of the players depends heavily on how they interact with and respond to the educational method followed. The need to know the teacher and the trainer for more than one of the technique of exercise because otherwise it remains in the ability to deal with players is very limited so the use of more than a method of learning gives the opportunity for the coach and player to upgrade the educational process.[1]

We have been able to develop our concepts of the training process as a competitive trend in the field of sports and to take strides towards the construction of

valuable scientific concepts to impose Scientific Interest.[1] Since badminton is an individual game practiced by both sexes and most of its skills fall under the open circuit system, during which the development of the skill level of the learner.[2]

The skill of smash is one of the most important offensive skills in the game of badminton, through which the player can decide the point in his favor, and given the diversity of the use of skills at one point and the speed of the large brush requires us as researchers to find the best technique to develop this skill, so researchers used The method of the altering exercise dimensions and trends and heights of various and different in addition to the use of different weights and weights of some of them are heavy and some of them are lighter, and researchers try to know the effect of this method on the concentration of functional altering in blood and was there burden and effort on the muscle.[3]

Therefore, the importance of research is to benefit from the technique of altering exercise using different weights and their effect on the concentration of salts (sodium - potassium) in the blood and skill smash for the players badminton.

Research Aims:

1. Prepare exercises in a modified exercise method and using burdock burdens.
2. To identify the effect of the method of the altering exercise using burdens in the concentration (sodium - potassium) in the blood and develop the skill of smash of the players badminton.

Hypothesis:

1. The method of exercise altering with use heavyweight rackets concentration (sodium, potassium) in the blood and develop the skill of smash of the players badminton.

Research Methodology and Field Procedures

Research Methodology: The researchers used the experimental approach to design a single group with pre and post testing in order to suit the nature of the problem and achieve the research objectives.

Search Community and Sample: The sample of the research represented the entire research community and they are players of the province of Babylon for the season 2018 - 2019 and the number of (4) players, which means researchers used the method of comprehensive inventory of all members of the community.

Means, Tools and Devices Used:

- A terrace at the height of 1 m (2) homemade
- Badminton court number (2) - Number of (10) homemade
- Electronic Stopwatch (2) Chinese Made
- Badminton Rackets No. (14) type (Yonex)
- Badminton balls (40) Plastic and natural feathers (Yonex)
- String Number (15) Type (impact) - Jumping ropes Number (10) Type (Yonex)
- Plastic columns at heights (cm -170 - 180 cm - 2 m) Number (2) for each measurement
- Homemade cords with length (10 m) - Loaded rackets - Complete laboratory tools for the purpose of drawing blood from the sample - Loaded rackets

Tests used and their descriptions:

Test the crushing skill of the front crushing: [4]

Purpose of the test: measure the accuracy of the crushing skill of the front crushing

Required tools: feather benders, natural feathers, additional lists (213cm) height, rubber rope, data registration form, feather court designed with test design. As in Figure (1).

Performance Description: The player stands in the designated place (X) and sends the badminton sent to him from an interview area ( ) With a strong crushing blow trying to drop it in the top-level area provided that the feather passes over the net and from under the rope behind the grid at a distance of 60 cm and the height of (213cm) and the player performs (10) attempts with the observation of the force of the strike.

Performance Evaluation:

1. The degree is given according to the place of fall of the feather.
2. If the feathers do not cross over the net and under the rope or fall outside the designated areas, they shall be given zero.

3. Feather that lies on the line between the two regions given the highest degree
4. Degrees Divided by Regions (1-2-3-4-5).
5. The final grade is the total of the degrees of attempts (10) which is (50) degree.

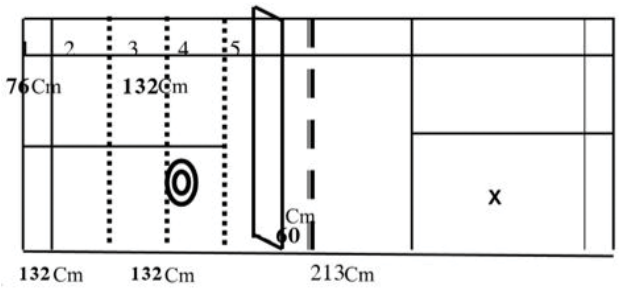


Figure 1: Shows the layout of the badminton court to test the overwhelming frontal impact

Test of sodium and potassium: It was agreed with a scientific laboratory licensed health to take a sample of blood for the players of the province for the purpose of conducting the necessary analysis to know the ratios of sodium and potassium.

Pre Tests: The researchers conducted the pretests on 1/2/2019 in the closed hall in the district of Mahaweel - Governor of Babel, and blood samples were taken for the players and the test of the overwhelming beating of the feather.

Special exercises used in research: Through the experience of field researchers in the field of badminton and relying on Arab and foreign sources, I performed various exercises (Appendix 1). These exercises were organized to suit the members of the sample and the level of training. Based on the principle of changing the parameters of one skill, and height and distances using a racket different from the weight of the real racket, and took part of the main section and the rate of (20) minutes and two units per week. The course was divided into (9) training units.

Posttests: The researchers carried out the post tests on 1/3/2019 in the closed hall in the district of Mahaweel, the province of Babel. Blood samples were taken for the players and the test was carried out by the crushing blow. Under the same circumstances as the pretest.

Results

Presenting the results of the pre and post-test tests of the sodium and potassium test group and the crushing batting skill.

Table 1: Show calculate the values of the mean, the standard deviation, and the calculated Wilcoxon values for the tests pre and post and experimental group

Skill	Units	Pretest		Posttest		Wilcoxon values	Level of significance	Type of significance
		Mean	SD	Mean	SD			
Sodium test	Mall	140	2.3	149	3.11	2.21	0.02	Sig.
Potassium test	Mall	4.5	0.41	5	2.70	2.22	0.03	Sig.
Front smash	Grade	21	3.11	29.4	4.99	2.21	0.01	Sig.

Sample size = 4 below the level of significance (0.05).

Table (1) shows that there are statistically significant differences, since the values of the significance level were less than the value of the significance level (0.05). This indicates that there are differences and for the benefit of the post-test. This is due to the exercise method used by the researchers.

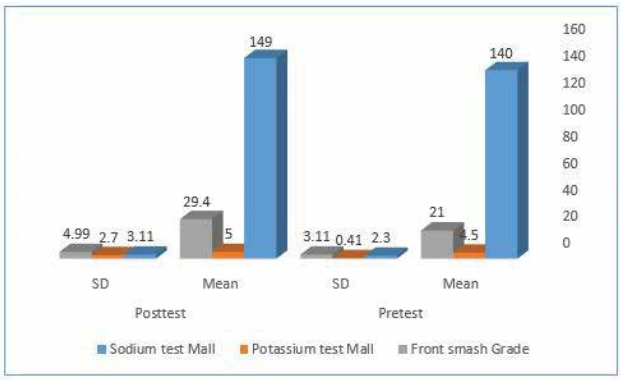


Figure 2: Show the differences between the computational circles and the post deviations of the pre and post tests

Discussions

The researchers attribute the difference between the pre-test and the post-test of the experimental group to the exercises used in the training modules and the use of training technique in accordance with the learned skill type. The use of the exercises prepared for the skills studied and applied in the altering exercise method. The explanation, presentation, guidance, instructions and feedback were The great effect on the development of the experimental group in the post-test, where the correct organization of the exercises used, which took all the skill forms and different parameters and different (power-speed-distance-time) Experimental group members have developed a variety of mobility programs for one skill, increasing the chances of success of the skill when performing on the field. The teacher or trainer is designed for the learning environment, which creates educational systems, achieves the goals of the educational unit and prepares educational situations.[5]

Wrisberg (2000) points out that the use of motor forms for one skill develops the generalized motor program and improves the player's performance despite different measures for the program itself. The development of the locomotor program is enhanced when the player exercises wide variations of movements and the same class of movement.[6]

The increase in the sodium and potassium altering due to their direct association with the increase of muscular and nervous activity due to physical exertion (effort of the game), and the increase in the concentration of mineral salts (sodium, potassium) due to the impact of physical exertion, which was characterized by the extreme intensity that the player during the game and work Functional devices lead to the balance of mineral salts in the body so this is an increase within normal limits. [7] "The permeability of metal ions leads to an imbalance in the distribution of mineral salts on both sides of the fibroblast membrane causing muscle contractions ". [8]

Conclusions

1. The technique of the altering exercise helped to develop the skill of beating overwhelming feather.
2. The use of heavy speculators helped increase the accuracy and strength for the overwhelming blow to the plane
3. There is a marked improvement in the concentration of salts of the blood (sodium and potassium), but within the natural information in the upper direction as a result of the use of heavy weights in the exercise of the experimental group.

Ethical Clearance: Taken from University of Kerbala

Source of Funding: Self

Conflict of Interest: None

REFERENCES

1. Zakia I. A. Et al.: Methods of Teaching in Physical Education, C1, Edit.1, Alexandria, Library of Artistic Radiation, 2000.
2. Samar K. N.:Effect of the use of certain weights in the development of muscle strength and some functional alterings in blood in tennis, Master Thesis, University of Diyala, 2005, p. 2.
3. Mazen H. K.: Effect of presentation and direct and deferred implementation in learning some badminton skills and moving its impact to some tennis skills, PhD thesis, University of Babylon, Faculty of Physical Education, 2008.
4. Mohamed N. R.: The Foundational Statistics in the Sciences of Physical Education and Sports, 1, Cairo: Arab Thought House, 2003.
5. Moqdad Z.: the relationship of the concentration of the most important mineral salts and the speed of motor response accurately some of the skills of badminton for young players, Master Thesis, University of Qadisiyah, 2013, p. 58.
6. Mohamed H. A. and Abuela A. F.: physiology of sports training, Cairo, Dar al-Fikr al-Arabi, 1988, p. 413.
7. Sam S. A.: Badminton between practice and competition, Amman, Dar Radwan for printing and publishing, 2013.
8. Richard A. S.: Craig A. Weisberg. Motor Learning and Performance, Second edition, Human Kinetics, 2008.
9. Alsayigh HA, Athab NA, Firas M. Journal of Global Pharma Technology The Study of Electrical Activity of the Triceps Brachia Muscle

according to the Chemical Changes of Water Loss during Spike in Volleyball. 2017;57–62.

10. Al-mashhadi RAA. The Impact of the Plan and PDEODE Strategies in Developing Awareness of Cognitive Processes and Reducing Psychological Pollution Among Students of the Faculty of Physical Education and Sports Sciences. 2018;928–35.
11. Alsayigh HA, Athab NA. The Study of Rectus Femoris Activity after Knee Joint Rehabilitation. 2016;9(9):360–5.

Evaluate the Level of Application of Sports Marketing Practices for the First Iraqi Football Clubs

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ABSTRACT

The present paper aims to identify the role of sports marketing in developing the performance of the administrative corporations of the Iraqi football Premier League clubs. A survey descriptive method has been used due to its relevance to the research problem and aims. The sample is composed of members of the administrative corporations of the Iraqi football Premier League clubs for the 2017 - 2018 season. The total sample consisted of (101) members elicited from 19 sports clubs; it was selected in a deliberate manner, as it is representative for the whole sample according to three variables (job status, academic qualification, and years of experience in administrative work). It was found that the measure of sports marketing was accepted and expressed in terms of sports marketing practices from the point of view of employees in the football Premier League clubs, and that all staff members have a positive attitude towards sports marketing. It was recommended that it is needful to benefit from the scale of sports marketing and apply it to different samples and raise the grants offered to sports clubs to carry out their various activities and achieve their marketing objectives and to conduct studies and research in the field of marketing sports in Iraq and its novelty and modernity of this field in Iraqi sports sector.

Keywords: *Evaluation, sports marketing and practices.*

Introduction

Sports marketing has been considered as one of the main areas on which sports institutions in the world rely. Hence, it is considered as the most successful option able to ensure the sustainability of the economic recovery that can cover sports activities as well as the financial profit that contributing to the growth and development of these institutions in line with the goal. Therefore, this field has witnessed a gradual development and became more widespread and diversified in the present time as it included various methods, such as marketing of advertising rights, television marketing and marketing of tournaments and players and as well as the provision of internal and external services to the consumer represented by the public. This area has become an administrative and economic system that has imposed itself through positive financial returns. Therefore, 'marketing is an art of successful management process, which affects the society in general and the sports community in particular'.[1]

The significance of the research stems from its role in highlighting the reality of the process of marketing sports from the point of view of the members of the governing corporations of the Iraqi football Premier League clubs via evaluating the application of sports marketing practices to reflect the reality in the field of marketing and the need to develop and identify the imbalances to increase the administrative awareness within the sports institutions to ensure the development of sources of financial financing facilities for the marketing process. There is lack of sports marketing plans within the sports institutions due to the difficulties and financial crises that affect sports marketing plans within the sports institutions. They prevent most of the Premier League clubs in Iraqi football from implementing their programs and activities planned in the required form. Due to the lack of significant financial resources in this area because sports marketing is still new in Iraq, such institutions do not depend on sports marketing to improve their resources and annual financial plans and do not move consistently. In addition, sports clubs rely directly on government grants offered by the Ministry of Youth and Sports and the Iraqi Olympic Committee to cover the annual activities, which call to the level of ambition, in addition to some donations from businessmen.

Research Aims: To know the role of sports marketing and its importance in developing the performance of the governing bodies of the Premier League football clubs in Iraq.

Research Methodology and Fieldwork Procedures

Research methodology: The researchers used descriptive method of survey to suit the nature of the problem and achieve the research objective.

Sample and its design: The sample included 101 members of the administrative corporations from 19 Premier League football clubs for the 2017-2018 season, which was divided into and the sample was selected by the deliberate search as in Table (1) as they represent all categories of the sample according to the variable (job status, qualification, years of experience in administrative work).

Table 1: Total research community

S. No.	Iraqi Football Premier league	No.
1.	Al-Quwa Al-Jawiya	6
2.	Al-Quwa Al-Jawiya	6
3.	Al-Talaba	6
4.	Al-Shorta	6
5.	Al-Kahrabaa	6
6.	Al-Naft	6
7.	Amanat Baghdad	5
8.	Al-Hussein	5
9.	Al-Hudood	5
10.	Al-Sinaat Al-Kahrabaiya	5
11.	Al-Naft	5
12.	Al-Minaa	5
13.	Naft Al-Junoob	5
14.	Naft Al-Wasat	5
15.	Naft Maysan	5
16.	Al-Bahri	5
17.	Al-Samawa	5
18.	Al-Diwaniya	5
19.	Karbala'a	5
	Total	101

Measuring Tool: In order to identify the status of sports marketing in the Iraqi football Premier League for the (2017 - 2018) season, the researchers used the Sports Marketing Scale (Yaseen Ali Khalaf 2018) applied to the Iraqi environment consisting of seven areas and 62 statements. The correcting process of this scale is based on the five-way Likert method of alternatives (fully agree, agree, neutral, disagree, do not agree).[2]

Applying the Scale: The scale was applied to the research sample composed of 101 participants of the administrative corporations; the scale was distributed for the period from 1/7/2018 to 2/8/2018. After completing the implementation steps, the researchers collected the data and arranged it in tables pending statistical processes to complete the research aim.

Data Analysis and Discussion

The researchers relied on the percentages shown in table (2) to interpret the results of participants' responses.

Table 2: Percentages and levels of the scale fields

S. No.	Category	Level
1.	80 % and above	Very high
2.	70% - 79%	High
3.	60% - 69%	Medium
4.	50% - 59%	Low
5.	Below 50%	Very low

Participants' responses for all fields of the scale by functional variable:

Table 3: Show the mean, standard deviations and percentages of the scale Variabless by function variable

Variables	Chair			Vice President			Secretary			Member		
	Mean	SD	Percentage	Mean	SD	Percentage	Mean	SD	Percentage	Mean	SD	Percentage
Laws and Regulations (Legal Dimension	42.19	2.43	84.37	40.18	3.25	80.35	41.25	4.25	82.49	42.19	4.69	84.37

Conted…

Administrative dimension	35.93	2.47	79.85	34.57	2.35	76.81	33.56	2.34	74.58	34.57	3.48	76.81
The economic dimension of sports marketing	33.24	2.34	83.09	32.46	4.32	81.14	32.15	3.15	80.36	32.15	2.01	80.36
The technical dimension of sports marketing	36.29	2.77	80.64	34.69	2.34	77.08	33.65	5.42	74.78	36.29	4.354	80.64
Technical (technological) dimension of sports marketing	26.58	1.44	75.92	24.36	2.45	69.58	25.35	4.21	69.56	22.48	1.234	64.22
The Social) dimension of sports marketing	37.44	2.34	83.2	36.57	4.24	81.26	35.65	3.21	79.21	36.25	4.356	80.54
The media dimension of sports marketing	40.61	2.13	80.12	38.36	3.37	76.71	38.78	3.48	77.56	44.36	5.31	88.71
Total	251.7	15.92	81.20	241.2	22.32	77.79	240.4	26.06	77.54	248.3	25.44	80.08
Level	Very high			High			High			Very high		

Participants' responses to all areas of the scale by function variable: The results of the tables (3) show that the total score of the responses of the sample members for all the fields of the scale according to the variable of the functional status were close despite the differences in their positions. The variable (head) was in the lead with (81.20%) categorised as very high. The variable (member) came in the second position with a percentage of (80.08%) and a very high rating. The variable (vice president) occupied the third position with (77.79%) and a high rate. Finally, the variable (secretary) came in the last position by percentage (77.54%) with a high rating.

These results indicate that all participants of the application sample in the functional variable had a positive attitude and full awareness towards sports marketing and its importance, because of the material and moral support that help in developing the sports movement of the Premier League football clubs in Iraq. They go in line with Mohamed Sherif's (2004) study, which has been one of the most important findings of the study, in that the concept and importance of sports marketing for the council members of the boards of sports clubs was a positive concept, as they all understand this concept and important role in the development of sports.[3]

Huda Hassan Al-Khaja's (2000) study showed that the weakness of the level of sports marketing can be ascribed to the fact that the sponsor companies do not provide adequate financial support for sports clubs as well as fear of most businessmen to invest in sports.[4]

Participants' responses on all fields of the scale according to the variable of the scientific qualification

Table 4: Show the mean, standard deviations and percentages of the scale fields by scientific qualification

Variables	Diploma and below			Bachelor			Master and Phd		
	Mean	SD	Percentage	Mean	SD	Percentage	Mean	SD	Percentage
Laws and Regulations (Legal Dimension	39.56	2.35	79.13	39.25	2.3	78.50	43.55	5.32	87.09
Administrative dimension	33.37	3.65	74.14	33.45	2.31	74.33	33.37	3.37	74.14
The economic dimension of sports marketing	30.32	1.23	75.80	31.25	1.25	78.11	32.65	2.310	81.62

Conted…

The technical dimension of sports marketing	40.26	4.32	89.47	37.36	5.34	83.01	37.36	2.021	83.01
Technical (technological) dimension of sports marketing	29.33	2.35	83.78	26.58	2.35	75.92	28.35	1.004	81.01
The Social) dimension of sports marketing	39.35	3.21	87.45	36.25	3.001	80.54	33.24	3.47	73.85
The media dimension of sports marketing	41.12	2.31	82.24	41.12	4.31	82.24	42.21	5.321	84.42
Total	253.32	19.43	81.71	245.25	20.88	79.11	250.72	22.812	80.87
Level	Very high			High			Very high		

Participants' responses on all fields of the scale according to scientific qualification: The results in table (4) show that the total score of the responses of the sample members on all fields of the scale according to scientific qualification were close despite differences in scientific qualifications. This may be due to the laws of elections in federations and clubs, which require the availability of scientific qualifications for members of the Union and the club regardless of the positions they will occupy. The (High diploma) variable occupied the first position (81.71%) and at a very high level of education, followed by a (MS + PhD) variable with a (80.17%) percentage and at a very high rate. The (Bachelor) variable came in the last position with a percentage of (79.11%) and a high level of appreciation.

These results indicate that the strategies towards marketing sports of all members of the application sample in are not influenced by their scientific qualifications. This can be attributed to the fact that they were interested in developing the sports movement in Iraq by activating the sports marketing practices within sports clubs. Deficiency in facilities, such as sports halls prevented these clubs from achieving positive financial returns, which are considered one of the most important aspects of investment in sports institutions. Hassan Ahmed Al Shafei (2006), who claimed that one of the main axes of investment in sports institutions is the infrastructure and the need to have the necessary facilities and tools and devices to promote sports investment in sports institutions, confirmed this. This encourage sports investment in sports institutions.[5]

Samir Abdelhamid (1999) emphasized that the importance of using the concept of marketing in sports institutions is the high contribution rates of businessmen and the increase of financial support plays a significant role in achieving the objectives of the administrative body of the union and the club.[6]

Participants' responses according to variable years of experience in administrative work

Table 5: Show the mean, standard deviations and percentage percentages of the scale fields according to variable years of experience in administrative work

Variables	(1-5) years			(6-10) years			(11-15) years			16 years and above		
	Mean	SD	Percentage	Mean	SD	Percentage	Mean	SD	Percentage	Mean	SD	Percentage
Laws and Regulations (Legal Dimension)	39.25	2.314	78.50	43.26	4.325	86.51	39.5	4.017	79.00	40.01	1.03	80.02
Administrative dimension	34.57	2.354	76.81	36.35	3.540	80.78	33.22	4.108	73.81	36.01	2.34	80.00

Conted…

The economic dimension of sports marketing	32.46	5.204	81.14	33.504	4.210	83.37	32.57	3.580	81.42	32.65	3.147	81.62
The technical dimension of sports marketing	36.29	3.356	80.64	38.20	3.014	84.89	37.89	4.001	84.2	33.36	2.01	74.12
Technical (technological) dimension of sports marketing	29.33	3.585	83.78	25.31	1.205	72.305	28.61	2.321	81.734	27.59	2.35	78.82
The Social dimension of sports marketing	33.24	4.236	73.85	37.01	5.002	82.22	36.01	4.199	80.01	38.25	3.08	85.00
The media dimension of sports marketing	38.78	2.145	77.56	43.08	3.899	86.15	42.31	2.350	84.62	41.01	4.01	82.01
Total	243.91	23.194	78.68	256.7	25.195	82.80	250.1	24.576	80.67	248.87	17.96	80.28
Level	High			Very high			Very high			Very high		

Participants' responses on all fields of the scale according to variable years of experience in administrative work: The results in table (5) show the total score of the responses of the sample members on all the fields of the scale according to the variance of the years of experience in the administrative work. The (1-5 years) variable showed 78.68%, the (6-10 years) variable had 80.87%, and the (16 years and over) variable had a percentage of 80.28%. After comparing these percentages against the percentages adopted by the researchers in order to interpret the results Responses of the sample to the scale As in Table (2) above, it was found that a variable (6-10) years obtained first place at a very high level of estimation, followed by a second variable (11-15 years) at a very high level, followed by the third rank variable (16 years and over) at a very high level, while ranked fourth and last variable (1-5) years at a high level.

These results indicate that the experience in administrative work was not significantly affected by sports marketing practices for the employees of the Premier League football clubs in Iraq. However, the orientations of the experts who occupied the three highest positions were fairly close to each other and relatively less difference from the results of the fourth and final variables (1-5) years. The researchers attribute these results to the fact that the experienced centers of the three advanced centers are able to develop solutions, proposals and future perspectives on sports marketing as a result of their success and failure experience gained through participation in local and international sports competitions, and watching the sports marketing practices in those countries, especially the developed countries in this field. This means that all employees of sports clubs of different years of experience in the administrative work emphasize the need to exploit sports marketing by their various institutions to promote the sports movement in Iraq and keep pace with the development in developed countries. This is consistent with one of the most important findings of Jamal Mustafa Zuhairi's (2010) study that "The marketing process must be carried out in accordance with plans developed in advance by persons with high levels of experience to suit the developments and developments and the global situation in the field of sports marketing.[7]

Conclusions

1. The scale of sports marketing has been accepted and reflected sports marketing in terms of sports marketing practices from the viewpoint of the employees of the Premier League football clubs in Iraq.
2. All employees of the Iraqi football Premier League clubs have a positive attitude towards

sports marketing, but the grants allocated by the Ministry of Youth and Sports and the Iraqi National Olympic Committee do not cover their needs and affect the implementation of planned activities.

3. The 'Years of experience in administrative work' variable (1-5 years, 6-10 years, 11-15 years, 16 years and over) had the highest high results for all fields of the scale.
4. The 'scientific qualification' variable (diploma and less, bachelor's, master's degree, and doctorate) has achieved very high results for all fields of the scale and less than variable years of experience in administrative work.
5. The 'functional' variable (head, vice president, secretary, member) has good results for all fields of the scale and less than the variable of scientific qualification and years of experience in administrative work.

Ethical Clearance: Taken from University of Anbar

Source of Funding: Self

Conflict of Interest: None

References

1. Shilbury D, Quick S, Westerbeek H. Strategic sport marketing. Allen & Unwin; 2003.
2. Bee CC, Kahie LR. Relationship marketing in sports: A functional approach. Sport Mark Q. 2006;15(2).
3. Schaaf P. Sports marketing: it's not just a game anymore. Prometheus Books; 1995.
4. Burnett J, Menon A, Smart DT. Sports marketing: A new ball game with new rules. J Advert Res. 1993;33(5):21–36.
5. Kahle LR, Riley C. Sports marketing and the psychology of marketing communication. Psychology Press; 2004.
6. Tomlinson M, Buttle F, Moores B. The fan as customer: Customer service in sports marketing. J Hosp Leis Mark. 1995;3(1):19–36.
7. Davis JA. The Olympic Games effect: How sports marketing builds strong brands. John Wiley & Sons; 2012.
8. Shank MD, Lyberger MR. Sports marketing: A strategic perspective. Routledge; 2014.
9. Alsayigh HA, Athab NA, Firas M. Journal of Global Pharma Technology The Study of Electrical Activity of the Triceps Brachia Muscle according to the Chemical Changes of Water Loss during Spike in Volleyball. 2017;57–62.
10. Al-mashhadi RAA. The Impact of the Plan and PDEODE Strategies in Developing Awareness of Cognitive Processes and Reducing Psychological Pollution Among Students of the Faculty of Physical Education and Sports Sciences. 2018;928–35.
11. Alsayigh HA, Athab NA. The Study of Rectus Femoris Activity after Knee Joint Rehabilitation. 2016;9(9):360–5.

Knowledge, Attitudes, and Behavior of Pregnant Women in Preventing of Pregnacy Complication and Childbirth: Application Study of Yudhia Model

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ABSTRACT

The high of maternal mortality rate (AKI) largely caused by a lack of knowledge and bad behavior of pregnant women on high risk pregnancy treatment.This condition had impact the high maternal mortality while childbirth.

The purpose of this study was to apply model participatory asset community development research in action for pregnant women through mentoring on prevention of pregnancy complication and childbirth. The study was done by using approach quasi experiment approach with the pre-post test design was 83 respondents. The application of this model at community done by YUDHA model.

The result showed that knowledge score before applying model was 41.20 after applying 70,55, the attitude score before applying was 20.62 after applying model was 40.56, while the behavior score before applying model was 30.50 and after applying was 70.48. YUDHIA model statistically could improve knowledge (p= 0.000), attitude (p=0.000) and behavior of pregnant women (p=0.000) compared before getting mentoring.

The research conclusions that YUDHIA model could increase knowledge, attitudes and behavior of pregnant women on prevention of pregnancy complication and childbirth.

Keyword: *pregnant women, pregnancy, chlidbirth*

Introduction

Maternal Mortality Rate (MMR) is one of the important indicators of the level of public health and able to be used in the monitoring of pregnancy-related deaths. This indicator is affected by general health status, education, and services during pregnancy and childbirth[1]. The direct causes of maternal mortality for more than 90% were a result of obstetric complications, mainly of childbirth complications. Pregnancy complications were obstetric emergencies that cause the death of the mother and fetus. Pregnancy complications included hypertension and pre-eclampsia, anemia, placenta previa, and diabetes[2]. While childbirth complication is difficult childbirth (dystocia) that causes a disease. Childbirth complications include premature rupture of membranes, premature childbirth, abnormal fetal position.

Based on the Indonesian Demographic and Health Survey (IDHS) in 2012, MMR in Indonesia was high, at 359 of 100,000 live childbirths. This figure increased compared to MMR in 2007 which was at 228 (MOH RI, 2010). Meanwhile, the 5th global target of the MDGs (Millennium Development Goals) is reducing MMR to 102 in 2015. Based on reports from the Provincial Health Office of Banten, the highest MMR was in Pandeglang. Complications of pregnancy and childbirth in Pandeglang district caused 34 cases of maternal mortality in 2013, 14 cases for bleeding, 8 for hypertension during pregnancy, 4 for infection, and 9 for prolonged childbirths and other cases[3].

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One strategic move is improving the knowledge, awareness, and motivation toward improved behavior for the prevention of complications of pregnancy and childbirth. It is able to be conducted through the empowerment and participation of family or community. Empowerment goal is to increase the capacity and capability of society to be able to recognize the encountered problems, explore and exploit the available resources, as well as show their existence clearly[4]. One of the efforts to improve maternal health status and reduce maternal mortality rate (AKI) in Pandeglang district is through improving knowledge, attitude, and behavior of pregnant women in prevention of pregnancy and delivery complication, through application of Participatory Asset Model of Community Development Research In Action (YUDHIA) model which involves the community in solving the problem.

YUDHIA models are expected to address issues related to the incidence of complications of pregnancy and childbirth in the community in the prevention of pregnancy and childbirth complication. This study was conducted in order to identify the aspects of Model Participatory Asset Community Development Research in Action (YUDHIA).

Method

This study was a quasi experimental research with pre- post test design. Place and time of study in District Cimanuk in July-November 2016 (5 months). The population was all pregnant women of trimester II and III in Cimanuk sub-district, Pandeglang Regency, Banten Province. The population of pregnant women was 800 person. The sample was taken using simple random sampling method in pregnant mother of trimester II and III around the work area of Puskesmas (Public Health) in Cimanuk Sub-district, Pandeglang Regency, Banten Province, fulfilling inclusion and exclusion criteria, 83 respondents. Questionnaires are used as a means of collecting data. Before the quesioner is used the reliability test and the validity of the questionnaire are used. Data obtained in the form of knowledge, attitude and behavior of pregnant women. Statistical analysis using chi square.

Result and Discussion

Knowledge of pregnant women: Scores of respondents's knowledge variable about the prevention behavior of pregnancy and childbirth complications were presented in Table 1.

Table 1: Knowledge of Pregnant Women Before and After Assisting YUDHIA Model

Variable	N	Mean	Median	SD	Min-Max	P
Pre	83	41.20	50	7.22	30-60	0.001
Post	83	70.55	60	6.30	54-80	
Value of difference: 29.35						

Source : Primary data, 2016

Knowledge analysis of pregnant women who followed the assistance of YUDHIA Model resulted the average knowledge of pregnant women at first measurement 41.20 with deviation standard 7.22, minimum value 30 and maximum 60. While at second measurement gived the average knowledge of pregnant women was 70.55 with a standard deviation was 6.30, a minimum value was 54 and a maximum was 80. There was an increase of respondents's knowledge score before and after assistancing YUDHIA model was 29.35. Statistical analysis indicated that YUDHIA assistance had a significant effect (p=0.001) on the change of pregnant women's knowledge in the job area of Pandeglang Regency. This study showed that the implementation of the YUDHIA model significantly changed the level of knowledge of pregnancy and childbirth complication. These results were in line with studies conducted in the UK, that the midwives knowledge increased significantly after receiving obstetric training[5].

In the pretest, the average score of respondents knowledge was only 41.20 (SD 7.22). It got into the category of low knowledge, meaning less than 50% of knowledge about pregnancy and childbirth complications which was known by the respondents. Knowledge of bleeding was the most familiar to the respondents. Studies which conducted in Uganda showed results that were not much different. Only one third of respondents knew at least three danger signs in the phases of pregnancy, childbirth, and postpartum. Among them most respondents said that bleeding during

pregnancy and swelling of the hands and face were signs of danger during pregnancy[6].

Knowing the signs and symptoms of pregnancy and delivery complications will make responders more anticipated and prevented for mitigating the impact of pregnancy and childbirth complications by reducing the first two and late three if the health facility was ready to treath the complications[6]. The socialization about obstetric danger was key to finding health services for obstetric emergencies and in find prevention or promotion efforts during pregnancy and childbirth. So the lack of awareness of dangerous signs will be related to the lack of preparation to conduct childbirth normally as well as preparedness to face complications[7]. Assuming that all pregnancies were at risk, the mother should be aware of the signs of dangerous complications of pregnancy, childbirth, and postpartum.

Efforts to increase this knowledge was able be conducted with health promotion, both orally, in writing and audio. One of the latest approaches in improving knowledge and outcome of birth is Centering Parenting. Centering Parenting was a model that involving groups of 6-7 mother-babies together to get treatment for the first year. Through nine sessions, medical officers provided care and also provided information on health, infant development and baby-mother safety issues. The program integrated three major components of care, namely health, education, and support in-group assessment[8].

Attitude of Pregnant Woman: Changes in attitude of respondents before and after assisting YUDHIA model were shown as follows.

Table 2: Attitude of Pregnant Women before and After Assisting YUDHIA model

Variable	N	Mean	Median	SD	Min-Max
Pre	83	20.62	20	5,85	11 – 33
Post	83	40.56	40	6,23	34 – 55
Value of difference		19.94			

Source : Primary data, 2016

The average attitudes of pregnant women in the first measurement was 40.56 with a standard deviation of 5.85, the minimum value was 11 and maximum was 33. While in the second measurement obtained the average attitude of pregnant women was 40.56 with a standard deviation was 6.23, the value minimum was 34 and maximum was 55. There was an increase in attitude scores of respondents before and after assisting YUDHIA Model, the point was 19.94. The statistical analysis showed that YUDHIA assistance had a significant effect (p = 0,001) on the change of attitude of pregnant woman in work area of Pandeglang Regency.

This study showed that assisting YUDHIA Model significantly improved pregnancy attitudinal score on pregnancy and childbirthcomplications. Changes in attitudes was observed in this study were more prevalent on items about pregnancy screening. Research in Jordan showed there were as many as 91% of respondents who had a positive attitude to perform pregnancy checks during the emergence of alarm signs of pregnancy [14]. Unfortunately this study did not observe respondents's attitudes toward the danger of pregnancy. A study in Argentina showed that only 30% of pregnant women had a positive attitude associated with mild bleeding, dizziness, and vomiting- gag. The rest assumed that these signs were normal (negative attitudes), as delivered by the family and the environment around pregnant women. With a positive attitude toward pregnancy alert will trigger positive behavior in pregnancy examination and prevention of complications[9].

One that influences respondents's attitudes toward pregnancy and childbirth complications was maternal education, husband education, and education from health workers[10]. All three factors were able to increase awareness about the danger signs of pregnancy more than twice. It suggested that more exposure to information about complications, will enhance attitudes so it gave an effect on decision making during pregnancy and childbirth[11]. While information/promotion about pregnancy complications and delivery informations to pregnant women which was provided by health workers will greatly affect the attitude of the mother. Furthermore, these attitudes will affect the behavior of pregnancy examination. It will be very important in detecting pregnancy complications and providing advice to pregnant women and families on timely follow-up examinations[12].

Behaviour of Pregnant Women: An overview of scores changes in pregnant women's behavioral associated with the prevention of pregnancy and childbirth complications is shown in the following table.3

Table 3: Behaviour of Pregnant Women Before and After Assisting YUDHIA Model

Variabel	N	Mean	Median	SD	Min-Max
Pre	83	30.50	32	8.52	18-54
Post	83	70.48	70	8.32	55-80
Value of Difference		39.98			

Source : Primary data, 2016

The analysis result of pregnant women's behaviour who followed YUDHIA Model assisting got the average of pregnant women's behavior on first measurement (before, assistance) 30.50 with standard deviation 8.52, minimum value 18 and maximum 54. While in second measurement got the average behavior of pregnant mother (after assistance) was 70.48 with standard deviation of 8.32, minimum score 55 and maximum 80. There was an increase in score of respondent behavior before and after assistance YUDHIA model of 39.98. The statistical analysis showed that YUDHIA mentoring had significant effect (p=0,001) on the change of pregnant women's behavior in Pandeglang Regency. After YUDHIA Model was conducted, there was a significant change in the prevention behavior of pregnancy and childbirth complications. The results of this study were in line with study in Garut, West Java, that after receiving P4K training, the behavior of childbirth was led in health personnel.

Assisting YUDHIA Model was conducted intensively for 3-6 months until the mother maternity. In this assistance process, pregnant women received continuous education and strengthening from cadres about the signs of pregnancy complications. In addition, the promotion of childbirth in health personnel continues to be done. It is able to increase the knowledge of the respondents about the complications and ultimately changed their behavior, one of which is performing birth in midwife. By access, the community in Cimanuk Sub-district had the financial ability to deliver to health personnel. Although there were some who could not afford, but it could be overcome by the existence of saving maternity. In addition, with the availability of waiting homes, pregnant women who were in the village furthest from the health center able to wait in the waiting house that had been provided.

The pretest-postest presentation was conducted to determine whether or not the influence of assisting YUDHIA Model toward knowledge, attitudes, and behaviors prevention of pregnancy and delivery complications. So that assisting YUDHIA Model on prevention of pregnancy and childbirth complications able to be used by pregnant women as a guideline to prevent pregnancy and childbirth complications. The YUDHIA model was conducted by involving health workers (midwives), families, cadres, and the community. All the elements that played a role need to get assistance to better understand the concept and role in implementing this YUDHIA model. In addition,assistancewas also provided to equate common goals, it is to form behaviour pregnancy and childbirth complications that finally able to be prevent complications of pregnancy and childbirth.

The involvement of cadres and communities in this model was very appropriate. Based on the results of systematic review, cadres proved able to deliver the message of preventive intervention of maternal and child health problems in developing countries and poor countries. Because the cadres was able to deliver the message directly to the target audience ie mother, using the cultural and habitual approaches that apply in the community[13].

Conclusion

YUDHIA model was implemented through the process of assisting pregnant women by cadres. This assisting wasconducted from the second or third trimester of pregnancy to the maternity. As a tool in assisting pregnant women, the cadre was equipped with YUDHIA Model module. Assisting YUDHIA model significantly improved knowledge, attitude, and behavior to prevent pregnancy and childbirth complications.

Some recommendations that able to be delivered related to pregnancy and childbirth complications, for example in overcoming the limitations of human resources in the field of health and limited health facilities in Assisting YUDHIA model with empowerment approach and full participation of local asset-based communities is an intervention strategy in an effort to reduce maternal mortality. Assisting YUDHIA model able to be used in assisting village midwife duties in the early detection and prevention of complications of pregnancy and childbirth

Conflict of Interest: The authors declare that there is no conflict of interest.

Source of Funding: We are very grateful for the funding from health polytechnic of health ministry Jakarta III which was very supported us in doing this research.

Ethical Clearance: Health Research Ethics Committee, Faculty of Medicine Andalas University of Padang

REFERNCES

1. Ministry of Health Republic Indonesia, Indonesian Health Profile 2013. Ministry of Health Republic Indonesia.2013. Jakarta.
2. Gong J, Savitz DA, Stein CR, Engel SM. Maternal ethnicity and pre-eclampsia in New York City, 1995–2003. Paediatric and Perinatal Epidemiology. 2012; 26:45–52.
3. Wallis A.B, Saftlas AF, Hsiaand J, Atrash HK. Secular trends in the rates of preeclampsia, eclampsia, and gestational hypertension, United States, 1987–2004. Am.J. Hypertens. 2008; 21:521–526.
4. Brikci N, Green J. A Guide to Using Qualitative Research Methodology: Medecins sans Frontieres. 2007.
5. Crofts J, Ellis D, Draycott T, Winter C, Hunt L, Akande V. Change in knowledge of midwives and obstetricians following obstetric emergency training: a randomised controlled trial of local hospital, simulation centre and teamwork training. BJOG: An International Journal of Obstetrics & Gynaecology. 2007;114(12):1534-1541.
6. Mbalinda SN, Nakimuli A, Kakaire O, Osinde MO, Kakande N, Kaye DK. Does knowledge of danger signs of pregnancy predict birth preparedness? A critique of the evidence from women admitted with pregnancy complications. Health Research Policy and Systems. 2014;12(1), 1.
7. Graham W, Themmen E, Bassane B, Meda N, Brouwere DV. Evaluating skilled care at delivery in Burkina Faso: principles and practice. Tropical Medicine & International Health. 2008;13(s1):6-13
8. Bloomfield J, Rising SS, Centering Parenting: An Innovative Dyad Model for Group Mother-Infant Care. Journal of Midwifery & Women's Health. 2013;58(6):683-689.
9. Rosenstein MG, Romero M, Ramos S. Maternal mortality in Argentina: a closer look at women who die outside of the health system. Maternal and child health journal. 2008;12(4):519-524.
10. Okour A, Alkhateeb M, Amarin Z. Awareness of danger signs and symptoms of pregnancy complication among women in Jordan. International Journal of Gynecology & Obstetrics. 2012; 118(1): 11-14.
11. Nikiema B, Beninguisse G, Haggerty JL. Providing information on pregnancy complications during antenatal visits: unmet educational needs in sub-Saharan Africa. Health policy and planning. 2009; 24(5); 367-376
12. Pembe AB, Carlstedt A., Urassa DP, Lindmark, G., Nyström L, Darj E. Quality of antenatal care in rural Tanzania: counselling on pregnancy danger signs. BMC Pregnancy and Childbirth. 2010; 10(1).
13. Gilmore B, Auliffe ME. Effectiveness of community health workers delivering preventive interventions for maternal and child health in low-and middle-income countries: a systematic review. BMC Public Health. 2013; 13(1); 1.

Intra and Inter-Rater Reliability of Web Plot Digitizer Software in Quantifying Head Posture Angles

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ABSTRACT

Background: It is important to quantify postural misalignment to provide effective treatment. Web-plot digitizer software (WPDS) was developed for analysis of posture angles. However, the reliability of this software in quantifying head posture angles is not known.

Study Design: Repeated-measure study.

Method: A total of 31 participants were recruited. Head posture angles were measured using Photogrammetry method and analyzed using WPDS. Intra-rater evaluations were performed twice by a rater with a period of three weeks' interval. Three raters reanalyzed all the photographic data for inter-rater reliability.

Results: High level of reliability was demonstrated for intra-rater analysis in participants with and without neck pain with ICCs ranging from 0.92 to 0.99 (SEMs: 0.10 to 0.88; CV: 1.65 to 10.77). The inter-rater reliability between three raters was also high (ICCs: 0.98 to 0.99).

Conclusions: Excellent intra and inter-rater reliability was demonstrated using WPDS. WPDS can be used in clinical setting for head posture assessment.

Keywords: *Reliability; head posture angles; Web plot digitizer software.*

Introduction

Forward head posture (FHP) is one of the most common abnormal posture associated with neck pain[1,2]. FHP can be characterized as an excessive anterior translation of the head in a sagittal plane[1]. These postural malalignments can lead to an imbalance between cervical and shoulder synergists, predisposing musculoskeletal injuries[2].

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Therefore, correction of abnormal posture is crucial. Effective management includes postural assessments which can inform the intervention selection[3]. Clinically, FHP assessment is mostly performed by observation in which it is widely dependent on clinical experience and subjective interpretation of the examiner[4,5]. Moreover, studies have shown that existing method of postural assessment have poor accuracy and low reproducibility between observers[6].

Objective measures to assess FHP includes 3D motion analysis, electromagnetic, optical devices and surface topography are known to be more precise and reliable[8]. However, these techniques are mostly laboratory based, costly and time consuming[4,7]. There is a need for a feasible and reliable tool to measure FHP.

Digital photographs has been used to measure FHP[4,7,9,10]. This method has been reported to be relatively cheap, easy and fast[6,8,10]. Photograph method has also

been demonstrated to have good intra rater reliability in measuring neck postural angles with interclass correlation coefficients (ICCs) of 0.56 to 0.89 and 0.93 to 0.99 respectively[11].

Accordingly, postural assessment software has been developed to determine postural angles[7]. There are several FHP assessment software's which are available such as Alcimage, All Body Scan 3D, Biotonix, Corporis Pro, Fisiometer Posturogram, Physical Fisio, and Software of Posture Assessment[12]. One of the limitation of these software's are it requires special technical skills to operate, operating instructions are not in English and the software's need to be purchased[12].

In addition, the reliability of these software's are not reported[12]. Thus, there is a need to have a reliable FHP software to measure postural malalignment.

A software that will be useful is probably Web-Plot Digitizer Software (WPDS). WPDS is a window based, open resource application distributed under the General Public License Version 3 that has a scientific tutorial which can work with a variety of plots and images[13]. Nevertheless, the reliability of the WPDS has not been studied.

Therefore, the aim of our study is to assess reliability of WPDS in measuring head postural angles in adults with and without Non Specific Neck Pain (NSNP).

Method

Participants: A repeated measure study design was adopted. A total of 31 participants were recruited by convenience sampling method. The inclusion criteria for participants without neck pain were those who have not experienced neck pain for the past six months. The exclusion criteria include congenital diseases with musculoskeletal impairments and balance disorders.

The inclusion criteria for participants with neck pain were those present with complain of neck pain for the past 3 months or more. Whereas, the exclusion criteria for neck pain participant includes presence of any neurological symptoms, congenital diseases which could modify the musculoskeletal systems and balance disorder. Prior to data collection, all participants were given explanation about the study purpose, and informed consent was obtained.

Equipment: Photographs were taken from lateral view using a computer web-camera (Logitech C310, HD, 1280 X 720). The camera was supported on a tripod and placed at a distance of 1.5 meters away from the line marking the position of a participant. Landmarks were placed on the floor to ensure the same positioning[9]. The camera lens axis was placed perpendicular to the sagittal plane of the participant at the height that corresponded with seventh cervical[14]. The C_7 markers was placed in the center of the lens to reduce parallax error [14]. The captured images were imported to WPDS to calculate the FHP. The FHP angle was calculated by constructing the lines from one landmark to the other. The following variables were analyzed for measuring FHP angle as in the Figure 1:

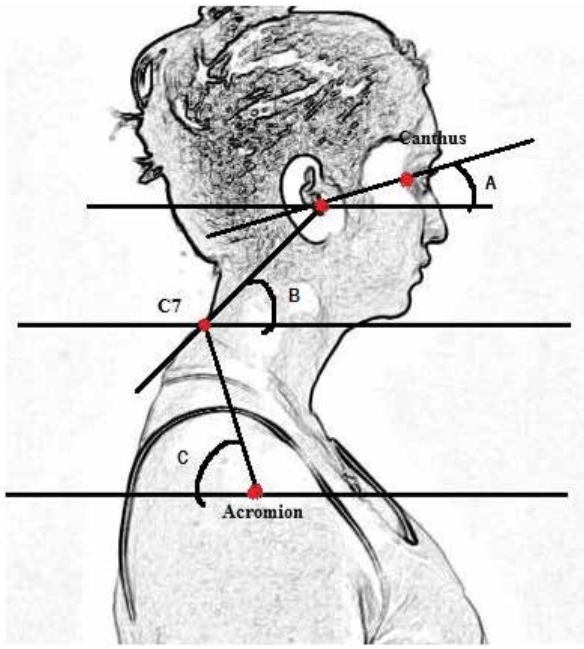


Figure 1: Sagittal head tilt (A),Craniocervical angle (B), and Shoulder angle (C).

Procedure

All the participants were instructed to stand comfortably in an upright position and to look straight ahead to a distant point at eye level before each photograph was taken[16]. Two reference frames for feet placement were placed on the floor to limit the variability associated with participants' positions. Before taking the photographs, the anatomical landmarks of the participants were palpated and marked by the same experienced physiotherapist using colored adhesive tape [15]. With these landmarks, the FHP angle were calculated[15].

Three physiotherapist who were not regular users of WPDS were invited for inter-rater reliability analysis. Prior to the analysis, the raters were orientated about how to use the software.

Data Analysis

Data was analyzed using statistical software package SPSS (Version 22.0). The primary rater analyzed all the photograph images twice with a period of three weeks' interval. Intra-rater reliability was examined using intraclass correlation coefficients (ICC), standard error of measurements (SEMs) and coefficient of variation (CV). For inter-rater evaluation of WPDS, three raters analyzed the photograph images by calculating the postural angles independently.

The results of ICC values were classified as poor for 0 to 0.40; moderate for 0.40 to 0.75; and excellent for 0.75 to 1.00[17]. The SEMs was used to investigate different sources of variation in test scores[18]. The measure is considered reliable if the SEMs is less than 5%[18].

The CV is described as the estimation error of measurement when usually the repeated measures are performed. The measure is considered reliable if the CV is lesser than 15%[18]. CV is calculated based on the formula in which, CV = (SD/X) 100

The Bland – Altman plot was calculated to evaluate the agreement between two trials of measurement. The trial measures should lie between the probabilities of 95% for a good, reliable measure[18].

Results

All participants completed the trials and the data was normally distributed. The mean and standard deviations of participants' characteristics are as depicted in Table 1. The ICC, SEMs and CV of the postural angles of participants are shown in Table 2. The intra-rater reliability were excellent with ICCs ranging from 0.92 to 0.99 (Table 2). The SEMs and CV were between 0.10 to 0.88 and 1.65 to 10.7 respectively. These results suggest a high level of intra-rater reliability in the postural angle measurements.

Table 1: Descriptive characteristics of participants

Participants	Without neck pain (n = 15) Mean (SD)	With neck pain (n = 16) Mean (SD)
Age	24.6 (6.36)	24.5 (13.4)
BMI	22.5 (8.50)	24.9 (8.12)

Table 2: Intra-rater reliability analysis of postural angles

Posture Angles	Without neck pain			With neck pain		
	CV	SEMs	ICC(95% CI)	CV	SEMs	ICC (95% CI)
SHA	10.12	0.36	0.97 (0.93 – 0.99)	10.77	0.76	0.92 (0.79 – 0.97)
CCA	2.42	0.20	0.98 (0.96 – 0.99)	1.65	0.10	0.99 (0.98 – 0.99)
SA	6.35	0.88	0.96 (0.90 – 0.98)	3.46	0.30	0.98 (0.96- 0.99)

SHA: Sagittal Head Tilt angle; CCA: Craniocervical angle; SA: Shoulder angle.

The Bland-Altman plot for measurement of first trial and second trial in participant without neck pain for sagittal head angles shows the mean difference of -0.2 with a confidence interval (CI) of upper limit 4.3 and lower limit -4.0 respectively (Figure 2). Cervical angles had a mean difference of 0.17 with CI of upper limit 3.4 and lower limit -3.0 respectively and shoulder angle revealed the mean difference of 1.4 with a CI of upper limit 10.5 and lower limit -7.6 respectively. The Bland-Altman plot for measurement of trial 1 and trial 2 in participants with neck pain for sagittal head angle revealed the mean difference of 0.3 with CI of upper limit 6.0 and lower limit -5.4 respectively, cervical angle with the mean difference of 0.3 with CI of upper limit 2.0 and lower limit -1.5 respectively, and shoulder angle with the mean of 0.9 with CI of upper limit 5.5 and lower limit -3.5 respectively. Visual analysis of all the plots showed that all the measurement differences were in between the ± 2SD, indicating that the scores of both the measures had acceptable agreements.

The inter-rater reliability between three raters demonstrated high level of reliability (Table 3). The ICCs for inter-rater ranged from 0.98 to 0.99 demonstrate

excellent reliability between raters. The SEMs ranged from 0.08 to 0.40 and CV ranged from 0.02 to 0.06 which demonstrated high inter-rater reliability. Therefore, the results suggest that the WPDS is reliable in measuring postural angle.

Table 3: Inter-rater reliability analysis of postural angles

	Angle	Rater 1 Mean (SD)	Rater 2 Mean (SD)	Rater 3 Mean (SD)	CV	SEMs	ICC (95% CI)
Without neck pain	SHA	15.94 (8.13)	16.57 (7.98)	16.57 (7.98)	0.06	0.10	0.99 (0.98- 0.99)
	CCA	47.02 (7.49)	47.77 (7.65)	48.18 (7.70)	0.02	0.08	0.99 (0.98 - 0.99)
	SA	52.43 (13.06)	51.73 (13.01)	53.95 (15.00)	0.05	0.40	0.98 (0.96 - 0.99)
With neck pain	SHA	18.89 (5.46)	19.21 (5.28)	19.10 (5.69)	0.05	0.09	0.99 (0.97 - 0.99)
	CCA	43.26 (6.54)	43.29 (6.57)	43.70 (6.53)	0.02	0.08	0.99 (0.98 - 0.99)
	SA	50.08 (10.56)	48.34 (9.77)	49.66 (11.06)	0.05	0.32	0.98 (0.96 - 0.94)

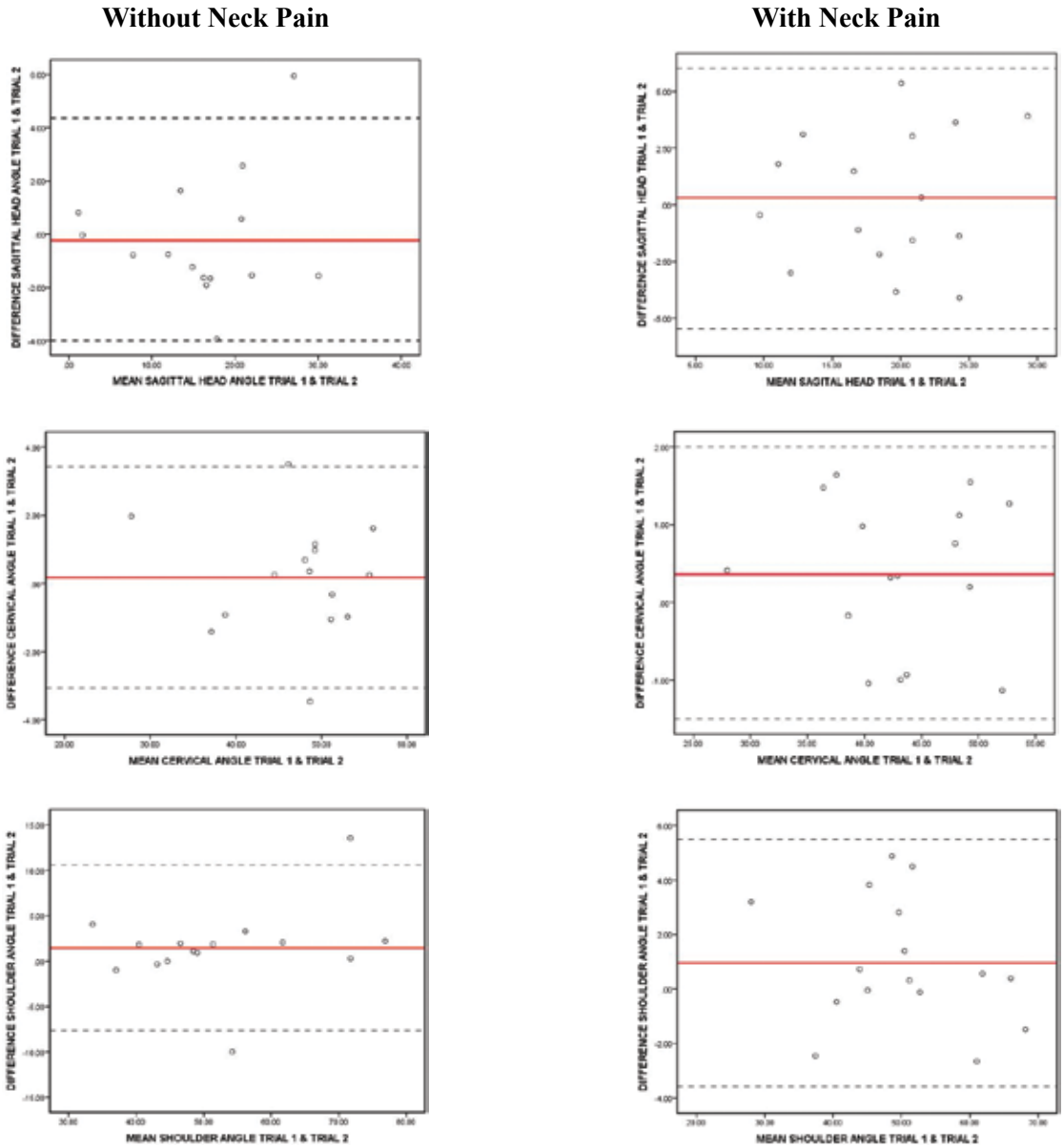


Figure 2: Bland-Altman plot of two different trials

Discussion

In our present study we examined the intra and inter rater reliability of WPDS in measuring head posture angles. The results demonstrated that the intra and inter rater of WPDS in measuring head posture was excellent.

Inter-rater reliability of WPDS was found to be excellent. These results were further supported with the findings of Bland-Altman plots, indicating that the two trials in both participants with and without neck pain had acceptable agreements. Inter-rater reliability results of posture assessment using another similar software, postural assessment software (PAS) showed that the values of 44.8% and 34.5 % respectively between rater 2 and 3 were non acceptable whereas the other raters had showed an acceptable reliability values[7].

Inter-rater agreement in using such techniques could have been influenced by many factors, including experience and training of the raters on the usage of software. It is noteworthy, that usage of WPDS does not require an experience computer user as it's easy to operate. Similarly, inter-rater reliability of fibre angles from ultrasound images were found to be excellent (ICCs: 0.94 and 0.97)[19]. These results could have been influenced by recall bias in identifying the points on the images.

An excellent intra-rater reliability of WPDS was also demonstrated in our present study. The results of SEM and CV were small and in the acceptable ranges suggesting good measurement precision. These results are consistent when compared to a previous study reporting sagittal photographic spinal posture assessment which demonstrated excellent reliability [10].

One of the factors that could have influenced the reliability of postural angles using WPDS is the accuracy of palpations. Marker placements can result in errors leading to high variability in measurements[10]. However, error from difference in palpations were controlled by getting only one experienced physiotherapist to do so throughout the study.

The anatomical landmarks were marked using colored tape to reduce the variability of measures. The quality of the photographs were also assured by using same trained person to capture the image for the analysis by the raters. We deduced that the inter-rater variability in our study would have been mainly from the selection of the points in constructing the lines from one landmark to the other for measuring the angles.

Another factor that could affect the reliability of the study is perspective error[20]. In the present study perspective error was controlled by minimizing the rotational angle of neck by keeping the optical axis perpendicular to the postural angle.

Positioning of the head and the use of instruction to a participant is also known to affect the measurements[7]. Alteration in neck positioning may cause incorrect visualization of the markings. Whereas, the use of instruction to a participant can highly influence the human movements and position. In regard to this, the error related to positioning of head and instructions to participants was minimized in our study by ensuring standardized positioning of the participants by providing a clear and detailed instructions.

Results from previous studies have supported the usage of software as an accurate method in the measurements postural angles for clinical use[5,10,21]. The reliability of a measurement system used clinically or in research must be established in order to ensure that the error involved in measurement is small enough to detect actual changes in what is being measured[12]. Our study results showed excellent reliability as we used stringent methods and was based on the guidelines for reporting reliability and agreement studies (GRASS).

The limitation of the present study is that for the inter-rater reliability of measuring head postural angles using WPDS, we limited the analyzing to the photographic images. However, from the results of the intra-rater reliability we speculate that the reliability will remain to be excellent. Another limitation is that the validity of measuring postural angles using WPDS was not performed as it was beyond the scope of this study. Future studies should explore examining intra and inter day intra-reliability of measuring using WPDS and its concurrent validity.

Conclusion

Excellent reliability of WPDS in measurements of FHP was demonstrated in our study. Hence, we recommend the use of WPDS for prevention of FHP as a screening tool and management in clinical practice as it is reliable, easy and simple to be used.

Acknowledgements

The authors like to thank Dr. Leonard Joseph for his guidance in the early stages of the study and all the participants for their participations.

Conflict of Interest: No conflict of interest.

Source of Funding: No funding.

Ethical Clearance: The Ethics committee of University Kebangsaan Malaysia (UKM 1.5.3.5/244/JEP-2016-042).

REFERENCES

1. Silva AG, Punt TD, Sharples P, Vilas-Boas JP, Johnson MI. Head posture and neck pain of chronic nontraumatic origin: a comparison between patients and pain-free persons. Archives of physical medicine and rehabilitation. 2009 Apr 1;90(4):669-74.
2. Lewis JS, Green A, Wright C. Subacromial impingement syndrome: the role of posture and muscle imbalance. Journal of shoulder and elbow surgery. 2005 Jul 1;14(4):385-92.
3. Braun BL, Amundson LR. Quantitative assessment of head and shoulder posture. Archives of physical medicine and rehabilitation. 1989 Apr 1;70(4):322-9.
4. Van Schaik P, Bettany-Saltikov JA, Warren JG. Clinical acceptance of a low-cost portable system for postural assessment. Behaviour & Information Technology. 2002 Jan 1;21(1):47-57.
5. Davidson J, dos Santos AM, Garcia KM, Liu CY, João PC, Miyoshi MH, Goulart AL. Photogrammetry: an accurate and reliable tool to detect thoracic musculoskeletal abnormalities in preterm infants. Physiotherapy. 2012 Sep 1;98(3):243-9.
6. Aitken AW. *Reliability of visual assessment of forward head posture in standing* (Master›s thesis).
7. Ferreira EA, Duarte M, Maldonado EP, Burke TN, Marques AP. Postural assessment software (PAS/SAPO): validation and reliabiliy. Clinics. 2010;65(7):675-81.
8. Fortin C, Ehrmann Feldman D, Cheriet F, Labelle H. Clinical methods for quantifying body segment posture: a literature review. Disability and rehabilitation. 2011 Jan 1;33(5):367-83.
9. Fortin C, Feldman DE, Cheriet F, Gravel D, Gauthier F, Labelle H. Reliability of a quantitative clinical posture assessment tool among persons with idiopathic scoliosis. Physiotherapy. 2012 Mar 1;98(1):64-75.
10. Perry M, Smith A, Straker L, Coleman J, O'Sullivan P. Reliability of sagittal photographic spinal posture assessment in adolescents. Advances in Physiotherapy. 2008 Jan 1;10(2):66-75.
11. Dunk NM, Chung YY, Compton DS, Callaghan JP. The reliability of quantifying upright standing postures as a baseline diagnostic clinical tool. Journal of manipulative and physiological therapeutics. 2004 Feb 1;27(2):91-6.
12. Camelo EM, Uchôa DM, Uchoa Santos-Junior FF, Vasconcelos TB, Macena RH. Use of softwares for posture assessment: integrative review. Coluna/ Columna. 2015 Sep;14(3):230-5.
13. Rohatgi A. WebPlotDigitizer- Extract data from plots, images, and maps.
14. Muniandy Y, Omar B, Joseph LH. Posture correction exercises and posture measurement in adolescents. Manual therapy. 2016 Apr;22:e1-.
15. Ruivo RM, Pezarat-Correia P, Carita AI. Cervical and shoulder postural assessment of adolescents between 15 and 17 years old and association with upper quadrant pain. Brazilian journal of physical therapy. 2014 Aug;18(4):364-71.
16. Aksu M, Kaya D, Kocadereli I. Reliability of reference distances used in photogrammetry. The Angle Orthodontist. 2010 Jul;80(4):670-7.
17. Armitage P, Berry G, Matthews JN. Statistical methods in medical research. John Wiley & Sons; 2008 Apr 15.
18. Atkinson G, Nevill AM. Statistical methods for assessing measurement error (reliability) in variables relevant to sports medicine. Sports medicine. 1998 Oct 1;26(4):217-38.
19. Singh DK, Bailey M, Lee RY. Ageing modifies the fibre angle and biomechanical function of the lumbar extensor muscles. Clinical Biomechanics. 2011 Jul 1;26(6):543-7.
20. Paul JA, Douwes M. Two-dimensional photographic posture recording and description: a validity study. Applied ergonomics. 1993 Apr 1;24(2):83-90.
21. Singh DK, Bailey M, Lee R. Biplanar measurement of thoracolumbar curvature in older adults using an electromagnetic tracking device. Archives of Physical Medicine and Rehabilitation. 2010 Jan 1;91(1):137-42.

Proton Pump Inhibitor to the Hepatic Cirrhosis Patients with Hematemesis Melena: A Retrospective Study

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ABSTRACT

Background: The Proton Pump Inhibitor (PPI) can be given as supportive therapy in hepatic cirrhosis patients with hematemesis melena during treatment at the hospital. However, the use of proton pump inhibitor therapy as a supportive therapy for hepatic cirrhosis patients with hematemesis melena has not been widely used in hospitals.

Objective: This study aims to determine the pattern of use of proton pump inhibitor (PPI) in patients with hepatic cirrhosis with hematemesis melena in the hospital.

Method: This study is a retrospective descriptive non-experimental. Sampling was obtained from secondary data medical records of patients that diagnosed hepatic cirrhosis with hematemesis melena. The variables observed were patients with hepatic cirrhosis with hematemesis melena such as age, gender, type of drug, dose, route of use, the frequency of administration, duration of drug administration, and clinical symptoms.

Results: The most widely used PPI was omeprazole with intravenous route with a dose of 1x40mg and 2x40mg (61.54%), oral omeprazole route with a dose of 2x20mg (7.69%), intravenous route pantoprazole with a dose of 1x40mg and 2x40mg (5.13%), and intravenous lansoprazole route with a dose of 1x30mg and 2x30mg (48.72%).

Conclusion: The pattern of using proton pump inhibitor therapy in hepatic cirrhosis patients with hematemesis melena is different in each patient.

Keywords: *proton pump inhibitor, hepatic cirrhosis, hematemesis melena, treatment pattern*

Introduction

Cirrhosis is ranked twelfth as the cause of death in adults worldwide with a prevalence of 1.8% [1]. According to a report by a government hospital in Indonesia, the mean prevalence of liver cirrhosis is 3.5% of all patients treated in the Internal Medicine ward, or a mean of 47.4% of all liver disease patients treated. Comparison of the prevalence of cirrhosis in male: female is 2.1: 1 and the average age is 44 years [2]. Cirrhosis is a diffusion process characterized by fibrosis and changes in normal liver structure to abnormal nodules. Hepatic cirrhosis can be caused by many conditions, including; consumption of alcohol, hepatitis B and C viruses, immunological disorders, hepatotoxic substances [3]. Hepatic cirrhosis can result in complications of hematemesis melena caused by an aneurysm of the veins that leads to upper gastrointestinal bleeding [4].

Proton Pump Inhibitor (PPI) is a supportive therapy given to patients with hepatic cirrhosis with hematemesis melena [5]. PPI works to suppress stomach acid by the mechanism of inhibiting proton pumps which prioritize the resistance of H +/K + -ATPase to the gastric mucosa [6]. Some research data shows that PPI-class drugs are better than H2-receptor antagonists in acid suppression [7]. The advantage of using PPI is due to its superiority

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in maintaining gastric acidity. Research data show that stomach acid disrupts clotting formation, increases platelet disaggregation and fibrinolysis. Therefore, inhibition of gastric acid and increased gastric acid pH will improve clotting stability and reduce the incidence of bleeding [8,9]Fleming TR. A multiple testing procedure for clinical trials. ... (2010. Commonly used PPI class drugs are esomeprazole, lansoprazole, omeprazole, rabeprazole, and pantoprazole [10].

The use of PPI in the long term has the potential to cause hypergastrinemia by 50-100% and will increase gastric acid secretion after long-term use of PPI. The results of a systematic review of the evaluation of acid hypersecretion showed that there was a rebound after the use of PPI for 8 weeks [11]. Other side effects that occur in PPI use include diarrhea, abdominal pain, constipation, nausea, vomiting, and bloating [12]. Based on the description above, the use of PPI in patients with hepatic cirrhosis with hematemesis melena still needs to be studied further because it is possible for DRP (Drug Related Problems).

Materials and Method

This study uses a non-experimental or observational with the descriptive retrospective design. Subjects in this study were patients diagnosed with hepatic cirrhosis with hematemesis melena who received PPI therapy in the inpatient room of Airlangga University Hospital Surabaya city for the period of January 2014 to December 2016. Where the subject was determined by the Time-Limited Sampling method by means of each patient who fulfilled Research criteria were included in the study during a certain period of January 2014 to January 2015. Data collection for this study was carried out retrospectively. Where research data is obtained from medical records of patients treated with the diagnosis of hepatic cirrhosis with hematemesis melena from January 2014 to January 2017 which is then put together into the collecting sheet. Data observed includes; patient profile (medical record number, patient identity, hospital entry and date of discharge, complaints and final diagnosis, disease history and treatment history, and laboratory data and clinical data) and profile of therapy data (type of drug, dose, frequency of administration, route of administration, and duration of therapy). Data analysis was based on data obtained from the Medical Health Record (RMK) of hepatic cirrhosis patients with hematemesis melena. Data obtained from data collection sheets are put together into the main table and then processed statistically and analyzed descriptively in the form of tables, diagrams, graphs or narratives.

Results

PPI Treatment Profile: From the results of the study, hepatic cirrhosis patients with hematemesis melena who received therapy shown in Table 1.

Table 1: PPI therapy profiles based on PPI Types

PPI Drugs	Amount	Percentage (%)
Omeprazole	24	61,54
Lansoprazole	13	33,33
Pantoprazole	2	5,13
Total	39	100,00

Profile of route of use, dose, and frequency of PPI therapy used can be seen in Table 2.

Table 2: Routes, dosages, and frequency of PPI therapy

PPI Drugs	Route	Frequency & Dose	Amount	Percentage (%)
Omeprazole	i.v	2.dd.40 mg	23	58,97
	i.v	1.dd.40 mg	1	2,56
	p.o	2.dd.20 mg	3	7,69
Pantoprazole	i.v	2.dd.40 mg	1	2,56
	i.v	1.dd.40 mg	1	2,56
Lansoprazole	i.v	2.dd.30 mg	13	33,33
	i.v	1.dd.30 mg	6	15,38

Note: *) One patient can receive more than one medication for treatment

In the use of PPIs, each patient gets a different duration of treatment depending on the clinical effects caused by each patient can be seen in Table 3.

Table 3: Duration of PPI usage

PPI Drugs	Duration	Amount	Percentage (%)
Omeprazole	< 4 weeks	27	69,23%
Lansoprazole	< 4 weeks	19	48,72%
Pantoprazole	< 4 weeks	2	5,13%

The profile of the substitution of type, dose, and route of PPI in hepatic cirrhosis patients with hematemesis melena can be seen in table 4.

Table 4: Profile of PPI type, dosage and route replacement

Substitution Profile		Amount	Persentase (%)
Drugs Substitution			
Pantoprazole (2x40 mg)/iv	Lansoprazole (1x30 mg)/iv	1	2,56
Omeprazole (2x40 mg)/iv	Lansoprazole (2x30 mg)/iv	3	7,69
Lansoprazole (2x30 mg)/iv	Omeprazole (2x40 mg)/iv	1	2,56
Doses Substitution			
Omeprazole (2x40 mg)/iv	Omeprazole (1x40 mg)/iv	1	2,56
Lansoprazole (2x30 mg)/iv	Lansoprazole (1x30 mg)/iv	2	5,13
Route Substitution			
Omeprazole (2x40 mg)/iv	Omeprazole (2x20 mg)/po	3	7,69

The list of other drug therapies given to patients with hepatic cirrhosis with hematemesis melena can be seen in table 5.

Table 5: Other drug therapies received by patients

No.	Therapy Group	Drugs type	Amount	Percentage (%)
1.	Antibiotic	Cefotaxime	23	58,97
		Ceftriaxone	4	10,26
		Ciprofloxacin	3	7,69
		Levofloxacin	1	2,56
2.	Antiemetic	Metoclopramide	2	5,13
		Ondansentron	9	23,08
		Primperan	7	17,95
		Domperidone	1	2,56
3.	Antifibrinolytic	Tranexamic Acid	22	56,41
4.	Antireflux & Antiulcer	Sucrafate	21	53,85
5.	B-blocker	Propanolol	3	7,69
6.	Coagulation *agent*	Vitamin K	23	58,97
7.	Loop Diuretics	Furosemide	4	10,26
8.	Potassium-sparing Diuretics	Spironolacton	7	17,95
9.	Laxative	Lactulose	23	58,97
10.	*Splanchnic* vasoconstrictor	Octreotide	2	5,13

Identification of *Drug Related Problem* (DRP): Potential interactions can be seen in Table 6.

Table 6: Potential drug interactions

PPI Drug	Other Drug	Drug Interactions	Amount	Percentage (%)
Omeprazole	Furosemide	Furosemide can increases hypomagnesia effect from omeprazole	4	10,26

Patients with hepatic cirrhosis with hematemesis melena potential interactions between PPI therapy and other drugs occur in the interaction of omeprazole with furosemide which can increase hypomagnesia.

Discussion

In the results of this study, the types of PPIs used were omeprazole, lansoprazole, and pantoprazole. Omeprazole is the most therapy used by patients with hepatic cirrhosis with hematemesis melena in hospitals because omeprazole has a more cost-effective price because it is registered with the Social Security Organizing Agency (BPJS), so many patients use omeprazole. There was no significant difference in effectiveness between omeprazole and lansoprazole at standard doses. When the frequency of administration added to twice a day, omeprazole is better for inhibiting gastric acid at night than lansoprazole [13]omeprazole and lansoprazole provide effective acid suppression and equal healing and symptom relief in patients with GERD. Despite this, controversy exists as to the efficacy of available proton pump inhibitors in the control of gastric acidity. AIM: To assess the efficacy of omeprazole 20 mg vs. lansoprazole 30 mg and omeprazole 40 mg vs. lansoprazole 30 mg in intragastric pH control. METHODS: Study I: 12 Helicobacter pylori-negative volunteers (mean age 33 years. Pantoprazole in standard doses has the same effectiveness as omeprazole in inhibiting proton pumps [14]. Omeprazole is most frequently used by the intravenous route because the oral route of omeprazole has acid degradation in the digestive tract [15]. In this study, omeprazole was administered at a dose of 2x40 mg daily and 1x40 mg daily intravenously and given a dose of 2x20 mg per oral. daily. Lansoprazole is given at a dose of 1x30 mg daily and 2x30 mg daily, for pantoprazole given at a dose of 1x40 mg daily and 2x40 mg daily. Standard dose was omeprazole 1x40 mg daily, lansoprazole 2x30 mg daily and pantoprazole 1x40 mg daily omeprazole 2x40 mg daily [16]arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The application of the recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian. Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties. Gastro-oesophageal reflux disease and dyspepsia in adults: investigation and management (CG184.

The type of PPI given in less than 4 weeks, namely omeprazole, lansoprazole, and pantoprazole, provided that patients can get more than one type of PPI. The use of long-term PPI with a potential of hypergastrinemia increases gastric acid secretion by 50-100% after long-term use of PPI [11]. The results show that there were patients receiving PPI substitution from pantoprazole 2x40 mg iv. daily to lansoprazole 1x30 mg iv. daily. Pantoprazole has a t½ that is longer than lansoprazole (t ½ = 1 hour) which is 2 hours [17]Helicobacter pylori infection, gastrooesophageal reflux disease, nonsteroidal anti-inflammatory drug (NSAID. Therefore, the substitution is appropriate because it reduces the time to suppress stomach acid due to the development of clinical symptoms. In addition, there was one patient who received PPI substitution from omeprazole 2x40 mg iv. daily and one of the patients that received lansoprazole 2x30 mg iv. also get dose substitutions to lansoprazole 1x30 mg iv. daily, this dose substitution was also appropriate due to the development of Clinical symptom, so there is no need for high doses or intravenous use. For route substitution, namely omeprazole iv. to omeprazole 2.dd.20 mg PO, daily. This replacement can be caused because the patient's condition has begun to improve because oral administration is not always possible in critically ill patients or with decreased awareness [18].

PPI substitution of omeprazole 2.dd.40 mg iv. daily to lansoprazole 2.dd.30 mg iv. daily, this substitution caused by the ability of lansoprazole in binding to protein by 98%, that leads to longer suppression effect of gastric acid [19]. The substitution is expected to compensate for the clinical symptom with longer gastric acid suppression effect from lansoprazole. After that, the substitution of lansoprazole 2.dd.30 mg iv. daily to omeprazole 2.dd.40 mg daily, this substitution is based

on omeprazole ability as the fastest PPI group that reach peak serum concentration [20].

Other therapies given for hepatic cirrhosis patients with hematemesis melena which are most widely given in this study are antibiotics including cefotaxime, antifibrinolytics namely tranexamic acid, sucralfate, vitamin K, and laxatives including lactulose. There is an ulcer in the upper gastrointestinal tract and also caused damage to the Kupfer cells of the liver and if accompanied by ascites it could trigger SBP. Therefore hepatic cirrhosis patients with hematemesis melena are given antibiotics as infection prophylaxis. Cefotaxime is the most widely administered antibiotic because cefotaxime is the third generation of a cefolosporin class which has a very broad working spectrum, stronger antibacterial activity and relatively lower side effects [21].

Administration of tranexamic acid which is an antifibrinolytic group aims to reduce or stop active bleeding [22]. Tranexamic acid can reduce upper gastrointestinal bleeding and stabilize the patient before endoscopic treatment [23]we found that tranexamic acid may reduce mortality. The present review includes updated searches of randomised trials on tranexamic acid versus placebo, cimetidine or lansoprazole. To assess the effects of tranexamic acid for upper gastrointestinal bleeding. Electronic searches (The Cochrane Library, MEDLINE, EMBASE, Science Citation Index. In this study patients were also given Vitamin K, this is intended to help the blood clotting process. Lactulose is given to prevent constipation in these patients and to prevent the chance of toxic substances to pass from the intestine to the liver which in turn can cause hepatic encephalopathy [24]. Patients also are given sucralfate, this therapy aims to cure esophageal ulcers. This drug has a protective effect on mucosa including stimulation of mucous prostaglandins. In addition, sucralfate can directly absorb bile salts [25].

Identification of drug-related problems is carried out on several things such as dose suitability, route of administration, and risk of drug interaction. The selection of route, dose, and type of PPI is based on several factors including the sensitivity of each individual patient in reducing the clinical symptoms, pharmacoeconomics, and consideration of clinical symptoms. PPI therapy in hepatic cirrhosis patients with hematemesis melena can lead to Drug-Related Problems. The DRP observed at RMK is DRP related to drug interactions. In this study, it was possible to interact between omeprazole and furosemide. Drug interactions occur with moderate severity. Long-term PPI use can cause hypomagnesia, and furosemide can cause an increased effect of hypomagnesia from omeprazole [20]. In this study, plasma magnesium levels were not tested to determine the incidence of hypomagnesia.

Conclusion

The most frequently used of PPI Drugs in hepatic cirrhosis patients with hematemesis melena is omeprazole in intravenous route. Drug Related Problems (DRP) that occur in PPI treatment and other drug therapies in patients with hepatic cirrhosis with hematemesis melena have found potential interactions between the PPI such as omeprazole with furosemide.

Acknowledgments

The author would like to express gratitude to all members of the Department of Fisheries and Marine, Faculty of Fisheries and Marine Universitas Airlangga, Indonesia.

Ethical Clearance: This research has gone through ethical testing in the Ethics and Law Committee of Universitas Airlangga Hospital No. 103/KEH in 2017.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: This research was carried out by a team and funded independently

REFERENCES

1. McCracken K, Phillips DR. Global health: An introduction to current and future trends: Second edition [Internet]. Global Health: An Introduction to Current and Future Trends: Second Edition. 2nd edition. | Abingdon, Oxon ; New York, NY : Routledge, 2017.: Routledge; 2017. 1-437 p. Available from: https://www.taylorfrancis.com/books/9781317431220
2. INA-ASL. General Article: Hepatic Cirrhosis | Indonesia Association for The Study of The Liver(INA-ASL) [Internet]. 2013 [cited 2019 Jan 22]. Available from: http://pphi-online.org/alpha/?p=570

3. Wells BG, DiPiro JT, Schwinghammer TL, DiPiro C V. Pharmacotherapy handbook. Appleton & Lange; 2000.

4. Klahan Y, Alkaff FF. Hematemesis on Hepatic Cirrhosis Patients in Area with Limited Facilities. Biomolecular and Health Science Journal. 2018;1(1):58–60.

5. Djumhana A. Upper Gastrointestinal Acute Bleeding [Internet]. Pustaka Universitas Padjajaran. Bandung; 2011. Available from: http://pustaka.unpad.ac.id/wp-content/uploads/2011/03/pendarahan_akut_saluran_cerna_bagian_atas.pdf

6. Doble S. Management of patients with post-herpetic neuralgia. Nursing Standard [Internet]. 2013 Jun 4;22(39):49–56. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18578133

7. Guimaraes E, Penna F. Management of gastroesophageal reflux disease and erosive esophagitis in pediatric patients: Focus on delayed-release esomeprazole. Therapeutics and Clinical Risk Management. 2016;Volume 6:531–7.

8. Chan FKL, Chung SCS, Suen BY, Lee YT, Leung WK, Leung VKS, et al. Preventing Recurrent Upper Gastrointestinal Bleeding in Patients with Helicobacter pylori Infection Who Are Taking Low-Dose Aspirin or Naproxen. New England Journal of Medicine. 2002;344(13):967–73.

9. Miftahussurur M, Doohan D, Nusi IA, Adi P, Rezkitha YAA, Waskito LA, et al. Gastroesophageal reflux disease in an area with low Helicobacter pylori infection prevalence. PLOS ONE [Internet]. 2018 Nov 14;13(11):e0205644. Available from: https://doi.org/10.1371/journal.pone.0205644

10. Brahm N, Kelly-Rehm M. Antidepressant-mediated gastroesophageal reflux disease. The Consultant Pharmacist®. 2011;26(4):274–8.

11. Heidelbaugh JJ, Metz DC, Yang YX. Proton pump inhibitors: Are they overutilised in clinical practice and do they pose significant risk? International Journal of Clinical Practice. 2012;66(6):582–91.

12. Wallace JL, Sharkey KA. Pharmacotherapy of gastric acidity, peptic ulcers and gastroesophageal reflux disease. Goodman & Gilman's The pharmacological basis of therapeutics 12th ed San Diego: McGraw-Hill Companies. 2011;1309–22.

13. Katz PO, Xue S, Castell DO. Control of intragastric pH with omeprazole 20 mg, omeprazole 40 mg and lansoprazole 30 mg. Alimentary Pharmacology and Therapeutics. 2001;15(5):647–52.

14. Shin JM, Munson K, Vagin O, Sachs G. The gastric HK-ATPase: structure, function, and inhibition. Pflügers Archiv-European Journal of Physiology. 2009;457(3):609–22.

15. Hunfeld NGM. Clinical effects of proton pump inhibitors: Focus on pharmacogenetics, kinetics and dynamics. 2010;

16. National Institute for Clinical Excellence. Gastro-oesophageal reflux disease and Gastro-oesophageal reflux disease and dyspepsia in adults: in dyspepsia in adults: inv vestigation and estigation and management management. 2014;(September).

17. Shi S, Klotz U. Proton pump inhibitors: An update of their clinical use and pharmacokinetics. European Journal of Clinical Pharmacology. 2008;64(10):935–51.

18. Collins D, Worthley LIG, Al ET. Acute Gastrointestinal Bleeding : Part I. Critical Care and resuscitation. 2001;3(2001):105–16.

19. Rostami-Hodjegan A, Paris BL, Toren P, Yerino P, Buckley DB, Kazmi F, et al. The Proton Pump Inhibitor, Omeprazole, but Not Lansoprazole or Pantoprazole, Is a Metabolism-Dependent Inhibitor of CYP2C19: Implications for Coadministration with Clopidogrel. Drug Metabolism and Disposition. 2011;39(11):2020–33.

20. Corley DA, Kubo A, Zhao W, Quesenberry C. Proton Pump Inhibitors and Histamine-2 Receptor Antagonists Are Associated With Hip Fractures Among At-Risk Patients. Gastroenterology. 2010;139(1):93–101.

21. Tjay TH, Rhardja K. Essential Medications Fifth Edition. Jakarta: Elex Media Komputindo Gramedia Group; 2002. 693-713 p.

22. Cheung J, Wong W, Zandieh I, Leung Y, Lee SS, Ramji A, et al. Acute management and secondary

prophylaxis of esophageal variceal bleeding: A western Canadian survey. Canadian Journal of Gastroenterology. 2006;20(8):531–4.

23. Gluud LL, Klingenberg SL, Langholz E. Tranexamic acid for upper gastrointestinal bleeding. Cochrane database of systematic reviews (Online). 2012;1(9):CD006640.

24. Putri AD. Study of the Use of Antibiotics in Patients with Hepatic Cirrhosis with Hematemesis Melena and/or Spontaneous Bacterial Peritonitis (Research conducted at IRNA Pandan 1, Pandan 2 and Pandan Wangi Hospital Dr. Soetomo Surabaya) [Internet]. Universitas Airlangga; 2016. Available from: http://repository.unair.ac.id/54545/

25. Sumampow EH. The Influence of Pentoxifylline on Fibroindex in Patients with Hepatitis Chronic B in Clinical Trial Research in the Department of Internal Medicine USU/Adam Malik Hospital Medan [Internet]. Universitas Sumatera Utara; 2008. Available from: http://repository.usu.ac.id/handle/123456789/6342

Acceleration of Socket Healing by Using Placental Collagen with BDNF: Radiological and Histological Studies

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ABSTRACT

Background: Alveolar bone regeneration can be guided by the application of a collagen protein coupled with neuroinductive protein, following tooth extraction.

Aim of the study: The present study was designed to evaluate the radiologic, histologic and histomorphometric aspects of socket healing in extraction site received placental collagen with brain-derived neurotrophic factor(BDNF), compared with control site that healed spontaneously.

Materials and Method: Twelfth *Sprague-Dawley* male rats were subjected for a surgical tooth extraction of upper central teeth of both sides. The right side be the control one as the socket healed spontaneously. while left side be the experimental site, as tooth socket treated with 1µL of placental collagen with 1µL of BDNF. The rats were scarified at 2 and 4 weeks post extraction. Socket healing was examined radiographically and histologically.

Results: Experimental site illustrates trabecular bones formation between the peripheral and central regions of the sockets at 2 weeks and increment of bone formation was observed, filled most of socket at 4 weeks with reepithelization recognized at the surface. Radiographical view shows radiopaque that comprising 50% to 74% of the overall area of the socket and was assigned a score of 3 with a high p value in comparisum to control.

Conclusion: The present study, high lighted on osseo-inductive effect of the local application of placental collagen with BDNF in socket healing.

Keywords: *alveolar bone,bone regeneration,socket healing,BDNF,collagen protein,tooth extraction*

Introduction

The alveolar socket walls undergo a physiological changes and remodeling process with a variable molecular interaction events after tooth extraction. Different socket preservation techniques and materials have been proposed to facilitate healing.[1,2]Most of techniques consist to fill the alveolar socket with different enhancing materials that act as stimulants or scaffolds for bone growth and initiate epithelization of the braked mucosa.[3,4,5]

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The use of the collagen matrix could be a clinical option to preserve post-extraction ridges especially when an improvement in soft tissue quality is desired.[6] Many experiment were done to analyze processes involved in the incorporation of Bio- Collagen in host tissue during healing following tooth extraction.[7,8,9]

Brain-derived neurotrophic factor reported to be involved in differentiation and proliferation of non-neuronal cells, such as endothelial cells, osteoblasts that have been recognized to be also involved in regulating tissue formation and healing in skeletal tissues. [10]Also, this neurotrophin can enhance expression of osteogenic factor, BMP-2, as well as the major angiogenic factor,vascular endothelial growth factor VEGF that promote bone formation and enhance vascularization, and healing of the injury site. [11,12]Therefore, the present study is the first report on the application of placental

collagen coupled with brain-derived neurotrophic factor as enhancing material for bone regeneration and socket healing.

Materials and Method

Animals: Twelfth *Sprague-Dawley* male rats aged (10–12-week) and weight (250–300 g) were kept in the animal department of (National Center of Drug Control and Research/Iraq) at a constant humidity and temperature of 23°C according to the National Council's guide for the care of laboratory animals.The rats were subjected for a surgical tooth extraction of upper central incisors (right side was considered as control site, that tooth socket healed spontaneously,while left side(experimental site) received 1µL of placental collagen with 1µL of BDNF

Materials

- Placental Collagen protein (N0. C-7521,SIGMA P).

  A lyophilised powder that can be reconstituted in sterile water at 1 mg/ml.

- Lyophilised BDNF protein 10µg (ab9794)/ Abcam,the protein was reconstitute in water to a concentration of 0.01mg/ml.

Method

Surgical Procedure: After anesthetizing the animal by general anesthesia the upper left and right central incisors extracted by simple extraction without trauma. The left socket treated with a combination of 1µL placental collagen and 1µL of BDNF as experimental site, while the right one left without treatment (control). The two sockets were sutured with black silk suture.Rats were sacrificed at 2 and 4wk post-extraction for the analysis of the extraction sites. (n=6 in each group at different sacrificed time point)

Radiographic Examination and Grading: Clinical radiographic examination was used to evaluate the degree of bone mineralization (DBM) in the extraction sockets during healing.The semiqualitative grading system used for radiographically examining DBM was based on the following parameters at 10× magnification: (a) sections with no evidence of radiopacity were assigned a score of zero; (b) a radiopaque area comprising less than 25% of the overall area of the socket was assigned a score of one; (c) a radiopaque area comprising 25% to 49% of the overall area of the socket was assigned a score of 2; (d) a radiopaque area comprising 50% to 74% of the overall area of the socket was assigned a score of 3; and (e) a radiopaque area comprising 75% or more of the overall area of the socket was assigned a score of 4. Each section was scored by 2 independent examiners.[13]

Histological Examination and Assessment: The premaxilla were resected cutting till the end of dental canal, fixed in 10% buffered formalin, decalcified in 10% formic acid, dehydrated and embedding in paraffin wax then serial cut 5µm cross section and stained with Hematoxylin and Eosin.

All these sections were examined under light microscope to evaluate the healing of extraction wounds.

In addition, histomorphometry was used to assess the amount of new bone formation, by estimation of trabecular separation (Tb.Sp, in microns) in different portions of socket healing(coronal,middle and apical), each section was evaluated by 2 independent examiners at 10x.

Results

Histologic examinations revealed an absence of inflammatory cells in all studied sites, whereas bone formation and epithelization varied in the experimental compared to control and according to different periods.

At 2 week post extraction period, histological feature for control site shows bone trabeculae coalesce peripherally with bone socket. Radiographical view shows radiolucent in the socket with some radiopacity present along the wall of the extraction sockets. While experimental site illustrates trabecular bones formation between the peripheral and central regions of the sockets. Radiographical view shows mixed of radiolucent and radiopaque filled the middle portion with substantial amount of detectable calcification that present in the extraction sockets, lamina dura still intact and visible. Figures(1,2,3)

At 4 week healing period, histologic description for control site shows trabecular bone at central and peripheral portions of the socket that confirmed by radiographic film that illustrates mixed view of radioopacity and radiolucent with detectable calcification. Epithelization was not recognized for control.

For experimental site, histologically, shows new bone filled most of socket with fibrous tissue over it. Reepithelization appears at the surface. Radiographical view shows radiopacity filled most of apical, middle and coronal portions of the socket with lamina dura disappeared partially. Figures(4,5,6)

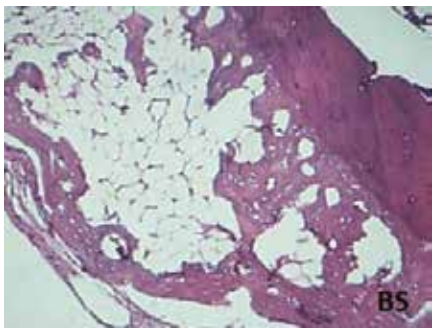


Figure 1: Alveolar socket for control at 2 week duration shows bone trabeculae coalesce peripherally with bone socket.H&Ex10

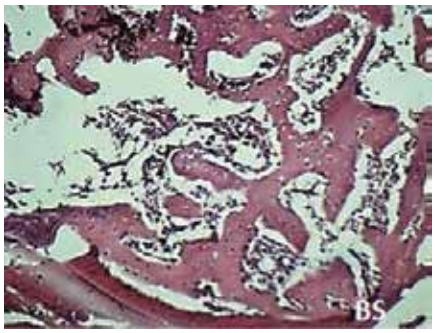


Figure 2: Alveolar socket for experimental at 2 week duration shows trabecular bones formed between the peripheral and central regions of the sockets. H&E x10



Figure 3: Conventional radiographic view after 2 week illustrates Control (right)side with some radiographically detectable calcification was present along the wall of the extraction sockets,while exp.(left) side shows a substantial amount of radiographically detectable calcification was present in the extraction sockets
Note: lamina dura still intact and visible.

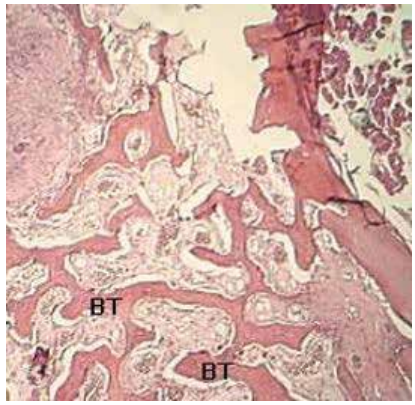


Figure 4: Alveolar socket for control at 4 week duration shows trabecular bone(BT) at central and peripheral of the socket.H&Ex10

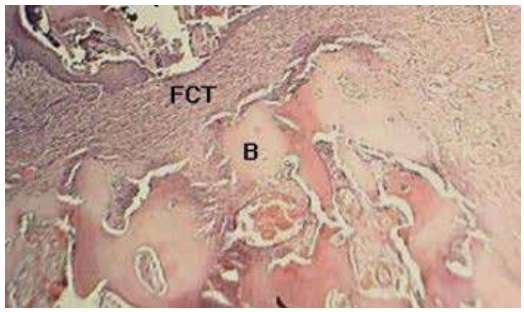


Figure 5: Alveolar socket for exp. at 4 week duration shows new bone(B) filled most of socket with fibrous tissue(FCT) over it.H&Ex4



Figure 6: Conventional radiographic view for both sides control and experimental of socket 4weeks duration shows radioopacity and radiolucent . In experimental side shows more radiopacity and include most of apical, middle and coronal portion of socket.
Note: partial disappear of lamina dura internally in experimental side

Statistic Analysis

Results show less record for trabecular separation measurement in experimental site in comparisum to control.And in the apical portion for both studied sites

in comparisum to other portions.Moreover, trabecular separation measurement decreased as the period proceed in both control and experimental sites with a high significant P≤0.01Value.Tables(1,2)

Radiographic Grading Score: Radiopaque area comprising 25% to 49% of the overall area of the socket and assigned score, 2 that recorded in 4th week of control and in 2nd week for experimental site. Whereas, radiopaque that comprising 50% to 74% of the overall area of the socket, assigned a score 3, was recognized in experimental site at 4th week post operatively with a high p value in comparisum to control. Table(3)

Table 1: Trabecular separation in different portions of socket healing

	Experimental				Control			
Portions	**2wks**		**4wks**		**2wks**		**4wks**	
Coronal	**Mean**	**S.E**	**Mean**	**S.E**	**Mean**	**S.E**	**Mean**	**S.E**
	15.25	2.5	11.5	.29	26.4	2.7	16.75	.62
Middle	17	0.41	9.75	.25	22.5	2.1	14.25	.63
Apical	15	.72	8.25	.62	18.5	1.3	13	.92

Table 2: ANOVA for trabeculae separation

Source of variance	df	MS	F	P
Groups (Exp, Control)	1	442.43	216.879	P≤0.01*
Portions (Coronal,Middle,apical)	2	312.53	76.601	P≤0.01
Weeks (2,4)	2	286.79	140.581	P≤0.01

*P≤0.01 : high significant

Table 3: Radiographic grading score

Periods	**Radiographic grading score**		**F**	**P**
2 Weeks	Control	0.8	26.601	P≤0.01*
	Exp.	1.3		
4 weeks	Control	2.4	11.581	P≤0.01
	Exp.	3.6		

*P≤0.01 : high significant

Discussion

Socket healing is a complex physiological process involving a coordinated interaction of hematopoietic cells, immune cells within the clot plug, in conjunction with development of new vascular bud and bone cell precursors. Multiple factors regulate healing at molecular events, which affects different stages in the osteoblast, endothelial,epithelial lineages during multiple processes such as migration, proliferation, chemotaxis, differentiation and protein synthesis.[14,15]

In present findings the experimental site illustrates trabecular bones formation in the peripheral and central regions of the sockets and bone formation was observed, filled most of socket at 4 weeks with reepithelization of braked mucosa,these results may related to the use of placental collagen which is a protein that's an important building block for bone and made the scaffold of the bone. Moreover,collagen also, promote a regenerative response including its effectiveness for acceleration of osteoblasts growth, [16] its potential role in preserving osteogenic potential of mesenchymal stem cells[17], and its ability to enhance angiogenesis.[18]

Mesenchymal stem cells MSCs differentiate directly into osteoblasts, which secrete an osteoid matrix to form bone, [19]as illustrates in 2 week duration of socket healing. Furthermore, application of neurotrophin (BDNF) effects on vascular endothelial growth factor VEGF that promote bone formation and enhance vascularization, therefore,the present study records score 3 for radiographic grading of experimental site which indicated for the enhancement of newly bone formation and accelerate of socket healing. [20,21] Thus, bone formation and reepithelization process that detected in experimental site depend, in part, on the presence of placental collagen and in part to the role of the combined BDNF.

Conclusion

Our preliminary results suggest that the association placental collagen plus BDNF may be a valuable method for socket healing.

Acknowledgment

This work was supported by Prof. Dr. Hasan Majdi Dean of Al-Mustaqbal University College, Babel, Iraq

Ethical Clearance: All work of this study had done according to the National Council's guide for the care of laboratory animals.

Source of Funding: By ours

Conflict of Interest: Nil

REFERENCES

1. Crespi R, Capparè P, Gherlone E. Comparison of magnesium-enriched hydroxyapatite and porcine bone in human extraction socket healing: a histologic and histomorphometric evaluation. Int J Oral Maxillofac Implants. 2011 Sep-Oct; 26(5):1057-62.
2. Guarnieri R, Stefanelli L, De Angelis F, Mencio F, Pompa G, Di Carlo S. Extraction Socket Preservation Using Porcine-Derived Collagen Membrane Alone or Associated with Porcine-Derived Bone. Clinical Results of Randomized Controlled Study.J Oral Maxillofac Res. 2017 Jul-Sep; 8(3): e5.Published online 2017 Sep 30. doi: 10.5037/jomr.2017.8305
3. Jambhekar S, Kernen F, Bidra AS.Clinical and histologic outcomes of socket grafting after flapless tooth extraction: a systematic review of randomized controlled clinical trials.J Prosthet Dent. 2015 May; 113(5):371-82.
4. Alfonsi F, Borgia V, Iezzi G, Piattelli A, Covani U, Tonelli P, Barone A.Molecular, Cellular and Pharmaceutical Aspects of Filling Biomaterials During the Management of Extraction Sockets. Curr Pharm Biotechnol. 2017; 18(1):64-75.
5. Guarnieri R, Testarelli L, Stefanelli L, De Angelis F, Mencio F, Pompa G, Di Carlo S.Bone Healing in Extraction Sockets Covered With Collagen Membrane Alone or Associated With Porcine-Derived Bone Graft: a Comparative Histological and Histomorphometric Analysis.J Oral Maxillofac Res. 2017 Dec 31;8(4):e4. doi: 10.5037/jomr
6. Cioban C, Zăgănescu R, Roman A, Muste A, Beteg F, Câmpian RS, Boşca B. Early healing after ridge preservation with a new collagen matrix in dog extraction sockets: preliminary observations.Rom J Morphol Embryol. 2013;54(1):125-30.
7. Araújo MG, Lindhe J.Ridge preservation with the use of Bio-Oss collagen: A 6-month study in the dog.Clin Oral Implants Res. 2009 May; 20(5):433-40.
8. Sun Y, Wang CY, Wang ZY, Cui Y, Qiu ZY, Song TX, Cui FZ. Test in canine extraction site preservations by using mineralized collagen plug with or without membrane. J Biomater Appl. 2016 Apr;30(9):1285-99.
9. Tomasi C, Donati M, Cecchinato D, Szathvary I, Corrà E, Lindhe J.Effect of socket grafting with deproteinized bone mineral: An RCT on dimensional alterations after 6 months.Clin Oral Implants Res. 2018 May;29(5):435-442.
10. Skaper SD1. The biology of neurotrophins, signalling pathways, and functional peptide mimetics of neurotrophins and their receptors. CNS Neurol Disord Drug Targets. 2008 Feb;7(1):46-62.
11. Su YW, Chung R, Ruan CS, Chim SM, Kuek V, Dwivedi PP, Hassanshahi M, Chen KM, Xie Y, Chen L, Foster BK, Rosen V, Zhou XF, Xu J, Xian CJNeurotrophin-3 Induces BMP-2 and VEGF Activities and Promotes the Bony Repair of Injured Growth Plate Cartilage and Bone in Rats.J Bone Miner Res.2016 Jun;31(6):1258-74.
12. Su YW, Zhou XF, Foster BK, Grills BL, Xu J, Xian CJ. Roles of neurotrophins in skeletal tissue formation and healing.J Cell Physiol. 2018 Mar;233(3):2133-2145.
13. Hao-Hueng Chang, Yin-Lin Wang, Yu-Chih Chiang, Yen-Liang Chen, Yu-Horng Chuang, Shang-Jye Tsai et al. A Novel Chitosan-γPGA Polyelectrolyte Complex Hydrogel Promotes Early New Bone Formation in the Alveolar Socket Following Tooth Extraction.PLoS One. 2014; 9(3): e92362.

14. Araújo M, Linder E, Wennström J, LindheThe influence of Bio-Oss Collagen on healing of an extraction socket: an experimental study in the dog. J.Int J Periodontics Restorative Dent. 2008 Apr; 28(2):123-35.

15. Cioban CV, Ză gănescu R, Roman A, Petruţiu ŞA, Beteg FI, Muste MM, Rusu D, Mihu CM.RomThe impact of two-socket preservation approaches on the soft and hard tissue healing: a short-term study in dogs. J Morphol Embryol. 2015; 56(4):1285-94

16. Maehata Y, Takamizawa S, Ozawa S, et al. Type III collagen is essential for growth acceleration of human osteoblastic cells by ascorbic acid 2-phosphate, a long-acting vitamin C derivative. Matrix Biology. 2007;26:371–381.

17. Araújo MG, Liljenberg B, Lindhe J.Dynamics of Bio-Oss Collagen incorporation in fresh extraction wounds: an experimental study in the dog.Clin Oral Implants Res. 2010 Jan; 21(1):55-64.

18. Chen XD, Dusevich V, Feng JQ, et al. Extracellular matrix made by bone marrow cells facilitates expansion of marrow-derived mesenchymal progenitor cells and prevents their differentiation into osteoblasts. J Bone Miner Res. 2007;22:1943–1956.

19. Olsen BR, Reginato AM, Wang W. Bone development. Annual Review of Cell and Developmental Biology. 2000;16:191–220.

20. Harada S, Rodan GA. Control of osteoblast function and regulation of bone mass. Nature. 2003;423:349–355.

21. Ralston SH, de Crombrugghe B. Genetic regulation of bone mass and susceptibility to osteoporosis. Genes & Development. 2006;20:2492–2506.

Study the Effect of *Lycium barbarum* Polysaccharide on Bone and Thyroid Gland in Hyperlipidemic Healthy Male Albino Rats

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ABSTRACT

The aim of the study was to determine the protective role of *Lycium barbarum* Polysaccharide against the development of osteoporosis and hypothyroidism induced by high cholesterol diet in male albino rats, 45 male albino rats were grouped into three sets. The first group (G1) was fed with normal diet and considered as a control group. The second group (G2) was fed 2% cholesterol-enriched diet for three months to induction of hypercholesterolemia, while The third group (G3) was fed 2% cholesterol-enriched diet +100mg/kg of *Lycium barbarum* Polysaccharide (LBP). Blood samples were withdrawn after starvation of the animals at night, after the end of three months, 5 ml of blood was withdrawn from the heart to measure the following parameters: concentration of total cholesterol (TC), High density lipoprotein (HDL), Low density lipoprotein (LDL), Very low density lipoprotein (VLDL), Triglyceride (TAG), Alkaline Phosphatase (ALP), phosphorus (p+), Calcium (Ca+), Parathyroid Hormone (PTH), Thyronine (T3), Thyroxin (T4) and Thyroid stimulating hormone Hormons(TSH). Rats in G2 had significantly greater levels of TC, TAG, LDL, and VLDL compared to G1, while the picture was an opposite direction in the levels of HDL. G2 rats had significantly greater levels of PTH, calcium and phosphorus, while ALP levels were significantly reduced compared to that observed in G1 rats. Levels of thyroid hormones (T3, and T4) were significantly decreased, while the TSH levels were significantly increased in the G2 rats compared to that of G1 rats. Rats in group 3 did not reveal any significant changes in all measured biomarkers comparing to that values measured in G1. It is concluded from the present study that hyperlipidemia increases osteoporosis risk and causes thyroid dysfunctions and confirms the protective role of the *Lycium barbarum* Polysaccharide against osteoporosis risk and maintain thyroid dysfunctions in male albino rats.

Keywords: *Lycium barbarum, Polysaccharide, bone, thyroid gland, male, albino rats.*

Introduction

Hyperlipidemia, a wide term, also called hyperlipoproteinemia or lipemia is the condition in which one of the serum biomarkers of lipid profile is elevated. These biomarkers involve triglycerides (TAG), total cholesterol (TC), and low-density lipoprotein cholesterol (LDL)[1]. Hyperlipidemia is formed due to the potential lack of lipid metabolism or transport of plasma –derived lipids or a disturbance in both generation and degeneration of lipoproteins2.

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Hyperlipidemia is now recognized that can be seriously detrimental as a main risk factor for fatty liver, atherosclerosis and stroke[1]. Osteoporosis and cardiovascular disease are the two main diseases related to increase the risks of illness and death in the senility population. Hyperlipidemia, result from many factors like increased dietary consumption or genetic mutations, such as in deficiency of LDL receptor, has pernicious effects on the blood vessels, such as progress the calcification of blood vessels. In hyperlipidemia, much of LDL particles pass to subendothelial space cross the endothelial barrier, where they are convert by reactive oxygen species that created by macrophages and adjacent smooth muscle cells[3]. In human osteoporotic bone a same process happen, the particles of oxidized lipoprotein accumulate in the perivascular subendothelial spaces[4]. Many cells in the bone like Osteoblasts having the ability to modify of lipoproteins particles[3], and produce of lipid oxidation in the bone marrow of hyperlipidemic mice[3,4].

Lycium barbarum L. is one of the Chinese materia medica (CMM) that plays many biological roles. These biological roles may have come from its components that include polysaccharides, zeaxanthin, and cerebroside, betaine, *p*-coumaric acid, and β-sitosterol. Specifically, polysaccharides derived from *Lycium barbarum* (LBP) have been suggested to have influences on different physiological processes such as glucose regulation, antioxidant system, and immunity, antihyperlipidemia, antihypertension, and anticancer[5,6]. Recently, many studies indicated that LBP has antioxidant property which may mitigate the potential DNA damage. Therefore, the current study was conducted to test the efficiency of LBP on hyperlipidemia by focusing on bone parameters and thyroid gland hormones.

Materials and Method

Experiment Design: A total of 45 male albino rats were equally grouped into three sets. The first group (G1) was fed with normal diet and considered as a control group. The second group (G2) was fed with 2% cholesterol-enriched diet for three months to induction of hypercholesterolemia; the third group (G3) was fed with 2% cholesterol-enriched diet +100mg/kg of LBP.

Blood samples were withdrawn after starvation of the animals at night, after the end of three months, when 5 ml of blood was withdrawn from the heart. The blood was then placed in clean plastic tubes, especially the non-containment of anticoagulants. At a speed of 3000 cycles/minute for 15 minutes to measure some of the following parameters: concentration of total cholesterol (TC), High density lipoprotein (HDL), Low density lipoprotein (LDL), Very low density lipoprotein (VLDL), Triglyceride (TAG), Alkaline Phosphatase (ALP), phosphorus (p+), Calcium (Ca+) Parathyroid Hormone (PTH), Thyronine (T3), Thyroxin (T4) and Thyroid stimulating hormone Hormones (TSH).

The concentration of cholesterol, was measured according to method[8], the determination of the concentration of HDL was done by enzymatic method[9]. While LDL was measured according to the Friedewald equation. VLDL concentration can be calculated by dividing the value of TAG by (5)[10], The concentration of triglycerides by enzymatic method was estimated according to the method[11]. ALP, p+, Ca+, PTH, T3, T4 and TSH concentrations were measured by Kits using Enzyme-Linked Immunosorbent Assay (ELISA) using the Axiom Minireader ELISA Reader.

Statistical Analysis: Results were statistically analyzed by using the SPSS program and the correlation coefficient was tested by means of the analysis of variance by complete randomized design (CRD). The least significant difference (L.S.D) was used to show the significance of the results[12].

Results and Discussion

Levels of TC, TAG, LDL, and VLDL were significantly higher among males in G2 compared to G1, while the picture was an opposite direction in the levels of HDL. Hoverer, all these measured biomarkers were not significantly changed in G3 rats compared to that observed in G1 rats (see table 1)

G2 rats had significantly greater levels of PTH, calcium and phosphorus, while ALP levels were significantly reduced compared to that observed in G1 rats. Levels of thyroid hormones (T3 and T4) were significantly decreased, while the TSH levels were significantly increased in the G2 rats compared to that of G1 rats. However, Rats in group 3 did not reveal any significant changes in all measured biomarkers comparing to that values measured in G1.(see table 2,3). any.

Table 1: Effect of Cholesterol at the level of TC, HDL, LDL, VLDL and TAG in serum of male rabbits

Groups / Parameters	(G1)	(G2)	(G3)
TC (mg/dl)	126.26 ± 5.14	163.18 * ± 4.28	130.10 ± 4.41
HDL(mg/dl)	35.41 ± 1.39	26.21 * ± 0.96	36.51 ± 1.08
LDL (mg/dl)	91.31 ± 2.54	102.0 * ± 3.46	94.65 ± 3.14
VLDL (mg/dl)	25.25 ± 0.92	32.63 * ± 1.05	26.02 ± 1.03
TAG (mg/dl)	139.34 ± 4.85	142.59 * ± 5.13	140.74 ± 4.91

Mean ± standard error, *= significant difference

Present study demonstrated that the high cholesterol diet has led to boost the levels of TAG, TC, LDL and VLDLC and down regulated the HDL levels. These results are agreed with many experimental tudies[13]. Excrescent intake of cholesterol results in elevation of serum cholesterol concentration by down regulating LDL receptor synthesis by increase intake of LDL by LDL receptor which leads to elevation of blood cholesterol concentration[14]. Increase levels of lipids oxidative damage has been suggested to be a mediator driving the osteoporosis. In bone, many of bioactive oxidized lipids such as the derived pre osteoblasts and oxidized low-density lipoprotein (oxLDL) could negatively interfere with several differentiation processes of osteoblast[15]. In addition, these molecules may also suppress the differentiation of preosteoblast and mesenchymal stem cells[16]. In the current study, HDL levels were significantly decreased in G2 group, suggesting that hyperlipidemia may have caused elevation of LDL and TG together with increasing risk. Serum levels of HDL were inversely related to risk. This result agreed with[17].

Table 2: Effect of Cholesterol at the level of ALP, p+, Ca+ and PTH in serum of male albino rats

Groups / Parameters	(G1)	(G2)	(G3)
ALP(U/100 mL)	18.11 ± 4.38	12.34 * ± 0.48	16.48 ± 1.03
P+(mmol/L)	4.42 ± 2.23	5.36 * ± 1.54	4.72 ± 1.86
Ca+(mmol/L)	2.59 ± 0.17	3.61 * ± 0.24	2.58 ± 0.91
PTH(PG/Ml)	582 ± 10.34	675 * ± 9.91	597 ± 10.13

Mean ± standard error, *= significant difference

In this study we also confirm that, the high fat diet lead to hyperparathyroidism in rats, by the elevation the concentration of PTH, Ca+ and P+. The calcium measurement in the rats with high fat diet may be pseudohypercalcemia as the result of the turbidity of serum riches with fats[18]. Hyperparathyroidism may result from resistance of renal PTH which leading to retention of phosphate or a change in the calcium-sensing receptor. This may be a negative feedback response due to elevation the concentration of PTH[19]. On the other hand, the down regulation of PTH receptor could be due to detrimental effects of oxidized lipids on bone cells especially the osteoblasts [20]. The increased levels of ALP observed in the current study may indicate that diet with high quantity of cholesterol could have had negative impacts on bone functions. It may have also reduced bone formation and promoted bone resorption[21].

Levels of T3 and T4 were significant decreased and there was an increase in the level of serum TSH in treated group compared with the control group. In hypothyroidism, the effects of thyroid hormone on the expression of LDL receptor and absorption of cholesterol exceed the effects of the cholesterol synthsised by hepatic cells[24]. Greater levels of serum lipids levels in these rats with hypothyroidism are agreed with many studies[25,26]. The abnormality of lipid in hypothyroidism could be linked to the changes observed in serum TSH levels

Table 3: Effect of Cholesterol at the level of T3, T4 and TSH in serum of male albino rats

Groups / Parameters	Rats provided with normal diet (G1)	Rats provided with 2% cholesterol-enriched diet (G2)	Rats provided with 2% cholesterol-enriched diet plus 100 mg/kg LBP (G3)
T3	143.86 9.04 ±	127.83 * 4.28 ±	139.97 4.63 ±
T4	51.05 ± 3.72	22.48 * ± 4.19	48.73 4.51 ±
TSH	1.61 ± 0.21	* 4.62 1.04 ±	1.98 0.28 ±

Mean ± standard error, *= significant difference

Historically, LBP has been used as a source of antioxidant that scavenges the potential effects of reactive oxygen species and in turn minimizing the possible oxidative damage. [27]. The effect of LBP on cholesterol riches diet has been tested in rats in order to evaluate its influence on TC, its LDL, HDL and TAG levels. Rats fed

with LBP and cholesterol were distinguished by increased HDL concentrations and decreased concentrations of TC, LDL and TAG compared with cholesterol enriched rats[28]. This study agreement with many studies[29] which get similar results supported the supposition that supplementation of LBP has a positive effect on the serum lipid by decreasing TC and TAG concentrations. Other study demonstrated that the hypolipidemic effect of LBPs was seen on the hyperlipidemic rabbits. In these animals, LBPs have significantly reduced the s total cholesterol and TAG and increased the HDL-C levels after 10 days of treating with LBPs, LBPs also exhibit effective antioxidant activities against hyperlipidemia. The data from that study highlighted the hypolipidemic and antioxidant effects of LBP [30].

Conflict of Interest: This research is a personal non-profit work and there is no conflict of interest.

Source of Funding: None.

Ethical Clearance: Ethical clearance was obtained from the Faculty Scientific Committee (College of Education for Pure Science, University of Kerbala, Iraq) to Study the effect of Lycium barbarum Polysaccharide on bone and thyroid gland in hyperlipidemic healthy male albino rats.

REFERENCE

1. Yakubu M.T., Akanji M. A. and Oladiji A.T.. Lipids: Good and bad. *Asian J Androl.* ; (2006) 7:399−404.
2. Brunzell E.A. HDL: A potential therapeutic target for the prevention of cardiovascular diseases. *Arterioscler Thromb Vasc Biol.* ; (2008). 32:387−391.
3. Brodeur M.R., Brissette L., Falstrault L., Ouellet P. and Moreau R. Influence of oxidized low-density lipoproteins (LDL) on the viability of osteoblastic cells. *Free Radic Biol Med.*;. (2008). 44 (4):506– 517.
4. Tintut Y., Morony S. and Demer L. L. Hyperlipidemia promotes osteoclastic potential of bone marrow cells ex vivo. *Arterioscler Thromb Vasc Biol.* ; (2004). 24(2):e6–10.
5. Jin M.L., Huang Q.S., Zhao K. and Shang P. Biological activities and potential health benefit effects of polysaccharides isolated from Lycium barbarum L. *Int J Biol Macromol.* ; (2013). 54: 16-23.
6. Qin J. l., Li G. W., Zhang J. R, and. Xu Zh. Y. "The research progress of LBP on the immune regulation function of body," *Heilongjiang Animal Science and Veterinary Medicine* ; (2011). 8(39) : 163–165.
7. Luo Q., Li Z., Huang X., Yan J., Zhang S., and. Cai Y.-Z. "*Lycium barbarum* polysaccharides: protective effects against heat-induced damage of rat testes and H2O2-induced DNA damage in mouse testicular cells and beneficial effect on sexual behavior and reproductive function of hemicastrated rats," *Life Sci.* (2006).; 79(7): 613–621.
8. Allani. Measurement of cholesterol. *Clin. Chem.* (1974)., 20:470-475.
9. Burstein, M. J. Measurement of HDL. *Lipid Res.*, (1970). 11:583.
10. Friedewald, W. T. ; Levy, R. I. and Fredrickson, D. S. *Clin. Chem.*, (1972). 18:199.
11. Fassati, P. and Principe, L. Measurement of Triglyceride. *Clin. Chem.*, (1982). 28:2077.
12. Spss Statistical packages social sciences, Verion (1999). 10. USA
13. Park, C.H., E.J. Cho and T. Yokozawa. Protection against hypercholesterolemia by corni fructus extract and its related protective mechanism. *J. Med. Food* ; (2009). 12: 973-981.
14. Dietschy, J.M., Turley S.D. and Spady, D.KRole of liver in the maintenance of cholesterol and low density lipoprotein homeostasis in different animal species including humans. *J. Lipid Res.* ;. (1993). 34: 1637-1659.
15. Parhami F., Morrow A.D., Balucan J., Leitinger N., Watson A.D., Tintut Y., Berliner JA and Demer LL. Lipid oxidation products have opposite effects on calcifying vascular cell and bone cell differentiation. A possible explanation for the paradox of arterial calcification in osteoporotic patients. *Arterioscler Thromb Vasc Biol.* ; (1997). 17: 680–7.
16. Mody N., Parhami F., Sarafian T.A. and Demer L.L. Oxidative stress modulates osteoblastic differentiation of vascular and bone cells. *Free Radic Biol Med.* ; (2001). 31: 509–19.

17. Karam I., Yang Y.J. and Li JY. Hyperlipidemia Background and Progress. *SM Atheroscler J.*; (2017). 1(1): 1003.

18. Kroll M.H. Evaluating interference caused by lipemia. *Clin. Chem.*; (2004). 50(11):1968–1969.

19. Koh A.J., Beecher C.A., Rosol T.J. and McCauley LK. 3′,5′-Cyclic adenosine monophosphate activation in osteoblastic cells: effects on parathyroid hormone-1 receptors and osteoblastic differentiation in vitro. *Endocrinology.* ; (1999). 140(7):3154–3162.

20. Huang M.S., Morony S., Lu J., Zhang Z., Bezouglaia O., Tseng W., Tetradis S., Demer L.L. and Tintut Y. Atherogenic phospholipids attenuate osteogenic signaling by BMP-2 and parathyroid hormone in osteoblasts. *J Biol Chem.*; (2007). 282(29):21237–21243.

21. Gurer G., Sendur O.F. and Aydeniz A. Serum lipid profile in postmenopausal women with osteoporosis or osteopenia. *South Med J.*; (2006). 99:95–6.

22. Hmamouchi I., Allali F., Khazzani H., Bennani L., El Mansouri L., Ichchou L., Cherkaoui M., Abouqal R. and Hajjaj-Hassouni N. Low bone mineral density is related to atherosclerosis in postmenopausal Moroccan women. *BMC Public Health*; (2009). 9: 388.

23. Ouchi Y., Akishita M., de Souza A.C., Nakamura T. and Orimo H. Age-related loss of bone mass and aortic/aortic valve calcification — reevaluation of recommended dietary allowance of calcium in the elderly. *Ann. N. Y. Acad. Sci.* ; (1993). 676: 297–307.

24. Gälman C., Bonde Y., Matasconi M., Angelin B. and Rudling M. Dramatically increased intestinal absorption of cholesterol following hypophysectomy is normalized by thyroid hormone. *Gastroenterology* ; (2008). 134: 1127-1136.

25. Pearce E.N. Update in lipid alterations in subclinical hypothyroidism. *J Clin Endocrinol Metab.*; (2012). 97: 326-333.

26. Duntas L.H. and Brenta G. The effect of thyroid disorders on lipid levels and metabolism. *Med Clin North Am.*; (2012). 96: 269-281.

27. Luo Q., Yan J., and Cui X. Y. "Antaginistic effect of LBP on damage of reproductive system induced by sub-chronic partial 60Co γ-ray radiation in male rats," *China Journal of Public Health*; (2011). 27 (10) : 1358–1359.

28. Li X.M. Protective effect of *Lycium barbarum* polysaccharides on streptozotocin-induced oxidative stress in rats. *Int. J. Biol. Macromol.* ; (2007). 40: 461–465.

29. Pai P., Habeeba P. and Ullal S. Evaluation of hypolipidemic effects of *Lycium barbarum* (Goji Berry) in a murine model. *J. Nat. Rem.* ; (2013). 13: 4–8.

30. Luo Q., Cai Y., Yan J., Sun M. and Corke H. Hypoglycemic and hypolipidemic effects and antioxidant activity of fruit extracts from *Lycium barbarum*. *Life Sci*.; (2004). 76(2):137–149.

Effect of Exposure Biochinin-A During Gestation Stage on HoxA10 Gene Expression and Histological Change in Uterus of Healthy Female Rats

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ABSTRACT

The aim of this study is to estimate effect of exposure BC-A during gestation stage onHoxa10 mRNA expression with histological change in uterus of female rats. This study include Sixty mature female rats were meted with thirty males after making sure all female rats get pregnant. Sixty pregnant females were divided for 5 groups each groups contain 12 female rats as fallowing (control negaative, control positive, 25mg/kg, 50mg/kg, and 100mg/kg) B.W, during gestation in 12th,14th,16th, and 18th *utero* –exposure to BC-A. The pregnant rats were allowed to deliver F1 pups. Adult F1femle rats were also mated with male. HoxA10 mRNA expression was measured by using RT-PCR procedure. Our result found the HoxA10 mRNA expression level were increased more in dose 100 mg/kg B.W. in uterus of female rats compared with doses 25,50 mg/kg B.W. and control groups of F1 mature rats. While, there were histopathological changes generally including uterine hyperplasia, cystic endometrial hyperplasia (CEH), congestion and bleeding in the myometrium and enlargement in the cells lining uterine gland with reduce the number of uterine gland. In conclusion: The BC-A is exposure to during embryonic growth in uterus leads to changes in the level of gene expression of HoxA10 gene. As well as, lead to change in histological of uterus, which affects the reproductive health.

Keywords: *Biochinin-A, HoxaA-10, mRNA expression, phytoestrogens, cystic endometrial hyperplasia(CEH), rats.*

Introduction

These days, as the responsibility on endocrine disturbance were different combinations of compositions of blend that numerous antagonistic influenced the humans and animals or descendants by means of cooperate with endocrine disturbance[1]. Endocrine upsetting are exogenous substance that meddle with hormones combination, digestion, or activity. Furthermore, some of them could epigenetic modification of DNA that can be transmitted to the accompanying ages. The embryo is touchy to any change of hormone condition[2]. Biochanin -A an isoflavone phytoestrogens present in red clover that was a specifically agonist at ER-β estrogens receptor[3]. Perinatal presented to phytoestrogens nourishment could be affecting on ovarian cells in the develop rodents become a few initiation material since[4]. Biochanin An, a non-steroidal estrogen present in plant, dietary-inferred biochanin A mixes show different estrogenic and antiestrogenic consequences for estrogen-related quality articulation, recommending quality explicit guideline[5]. The hox quality family coordinates appropriates morphological improvement and tissue separation along all the key hub of the embryo[6]. HoxA10 quality is the organogenesis of mullerian regenerative tract. HoxA10 is communicated in the uterine epithelium, stroma and muscle. In situ hybridization of HoxA10 mRNA uncovers solid articulation in the uterus, however no articulation in the fallopian tube, cervix or vagina[7]. In Hox A10 quality – a quality is vital for uterus advancement, it is fascinating to take note of that hoxa10 DNA methylation was not adjusted in grown-up mice treated with same of phytoestrogen, it features the incredible defenselessness of the baby and the presence of basic formative window for the epigenetic impacts of EDC[8]. Presentation to estrogenic synthetic substances

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amid fetal life disturbs female conceptive tract developmental[9]. The impacts of formative introduction to phytoestrogen on uterine morphology and function[10]. By adjustment in endometrial stromal morphology[11]. Notwithstanding local differentiation, the endometrial epithelium experiences glandular morphologensis to shape spread glandular structures in endometrial stroma. These cell and provincial separation stroma. These cell and territorial separation forms are stunningly delicate to interruption by steroid hormone singling[12].

Materials & Method

Animals of the Study: The experimental animal model selected for present study is (Rattus Norvegicus) rats were obtained from the Laboratory Animal Unit, College of Medicine, University of Baghdad, Iraq. They were 16 to 18 weeks old with an average body weight (200-250gm) for females and (250-300gm) for males. The animals were clinically healthy, kept under hygienic conditions and air-conditioned room. The light system was 12/12 hrs light/dark cycle;25 ± 5 C° with a relative humidity of 50 ± 5%. Food & water were offered daily, the animals were accommodated to the laboratory Collage of Veterinary Medicine, University of Kerbala, Karbala, Iraq conditions for 30 days before beginning of experiment for acclimation then randomly divided into four groups comprising 12 animals for each group as the following:

G1: Female Rats were given DMSO (IP) & served as control negative

G2: Female Rats were given Estradiol (IP) at dose 5mg/kg B.W & served as control positive.

G3: Female Rats were given Biochinin-A(IP)at dose of 25mg/kg B.W

G4: Female Rats were Biochinin-A (IP) at dose 50 mg/kg B.W.

G5: Female Rats were given Biochinin-A(IP)at dose of 100 mg/kg B.W.

The tested compound is Biochanin-A(BC-A): The test chemical used in this experience is BC-A acquirement from Sigma Chemical Company, USA[13].

Tissue sample: For histological analysis of the uterus to organize the architecture changes and for assessment of mRNA expression level of target gene (HOX10 A):

1. **Histological examination:** The tissues were promptly fixed in formalin (10%). After fixation, tissues were handled in common way and implanted in paraffin for consequent histological examination of uterus. The histological area was assessed by a pathologist earlier learning of BC-A given to creatures done according to[14].
2. **Tissue preparing for expression level of HOX10A gene:** The tissues were placed quickly in normal slain then freezing in -20 c°. Total RNA extraction :Total RNA were extracted from rat uterus horn by using Accuzol Total RNA Extaction Reagent(Bioneer, Korea) and done according to[15].

Primers: Two primers were used in this study, first primer used for 18S gene as Housekeeping gene and second primer used for **HOXA10** gene as target gene. These primers were obtained from[16], the primers used in quantification of gene expression using qRT-PCR techniques based SYBER Green DNA binding dye, and supported from (Bioneer, Korea) company.

Table 1: The Primers and their sequences

Primer	Sequences		(G-C) Amplicon size
HOXA10	F	5′-AACAGTAAGCCTCTCGGA-3′	50 bp
	R	5′-TGCTTCGTGTAAGGGCAGC-3′	57 bp
Housekeeping 18s	F	5′TAAGTCCCTGCCCTTTGTACACA-3′	47 bp
	R	5′GATCCGAGGGCCCTCACTAAAC-3′	59 bp

RT-PCR protocol: Get ready GoTaqR 1-Step RT-qPCR Reaction Mix as a response blend that involvement: Go TaqR 1-Step RT-qPCR Master Mix, CXR dye, nuclease - free water and Go Script™ RT Mix. Conclude the numerous of control and experimental reactions in the assay according to[17].

Static analysis of qRT-PCR: the information consequences of q RT-PCR for target and housekeeping quality were broke down by relative evaluation quality articulation levels (fold change) Livak method that explained by[18].

	Test	Calibrator (cal)
Target gene	CT(target, test)	CT(target, cal)
Reference gene	CT(ref, test)	CT(ref, cal)

Calibrator sample:

ΔCT (calibrator) = CT (ref, calibrator) – CT (target, calibrator)

Test sample:

ΔCT (Test) = CT (ref, test) – CT (target, test)

ΔΔCT= ΔCT (test) – ΔCT (calibrator)

Fold change = 2-ΔΔCT

Ratio (reference/target) = 2CT (reference) – CT (target)

So, the relative expression was divided by the expression value of a chosen calibrator for each expression ratio of test sample.

Results

Reverse transcriptase real-time PCR results presented that HOXA10 mRNA expression level were increased more than in dose 100mg/kg female rats compared with doses 25mg/kg,50mg/kg and control group of female mature rats. The results of this calculations offered the relative expression is (8.229) fold higher in alternative in dose 100 mg/kg. While, in dose 50 mg/kg (5.419) .and in dose 25 mg/kg the fold change (3.449) than in control positive higher (3.557). Fold is lower in control negative (1.152).in table (4-2-6). Again, in time at which all the alternative dose of BC-A produces increased in hoxa10 gene expression Treated groups and with each of other groups, a matter which contribute to significant differences at (P≤0.05).

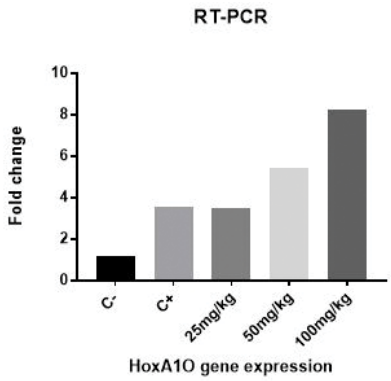
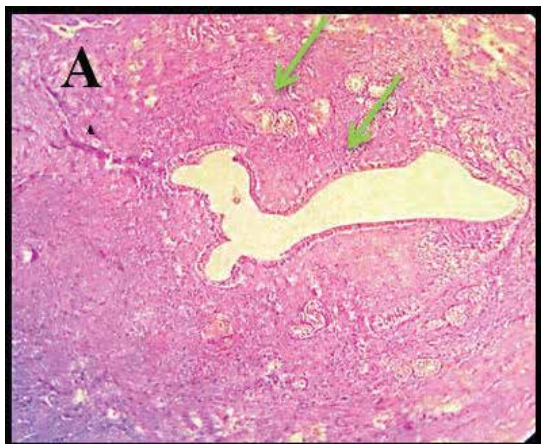


Fig. 1: Effect of BC-A exposure on uterine HOXA10 expression was measured by relative RT-PCR in different dose of BC-A utero-exposure

The effect of BCA on female Uterus Histology: The uterus of rat perinatal treated with BC-A in doses (25 mg/kg,50mg/kg,100mg/kg) B.W. there was histopathological changes generally including uterine hyperplasia, cystic endometrial hyperplasia (CEH), congestion and bleeding in the myometrium and enlargement in the cells lining uterine gland with reduce the number of uterine gland.



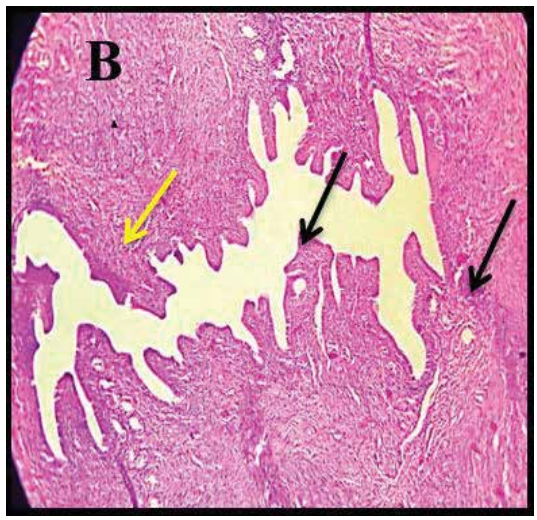






Fig. 2

A: Light micrograph of histological changes in normal uterus of female rats (green arrows) shows normal in cells lining endometrium and uterine gland. H&E, 10x.

B: Light micrograph of histological changes in uterus of female rats perinatal exposed to BC-A in 100mgkg B.W shows the (yellow arrow) uterine hyperplasia in endometrium of uterus. (black arrow) cystic endometrial hyperplasia (CEH). H&E, 10x.

C: Light micrograph of histological changes in uterus of female rats perinatal exposed to DES control positive. shows (black arrow) enlarged cell lining uterine gland. H&E,10x.

D: Light micrograph of histological changes in uterus of female rats perinatal exposed to BC-A in 25mg/kg B.W shows the (yellow arrow) uterine hyperplasia in endometrium of uterus (black arrow) enlarged cell lining uterine gland. H&E, 10x.

E: Light micrograph of histological changes in uterus of female rats perinatal exposed to BC-A in 50mgkg B.W, (black arrow) cystic endometrial hyperplasia (CEH). H&E, 10x.

Discussion

In this present study, we have been researched that effect of the BC-A (phytoestrogens) on hoxa10 gene expression in uterine during gestation stage to fetus in vitro life's results in changed in reproductive dysfunctional via changing HoxA10 expression. In present study have been alteration in HoxA10 expression in various doses due to effect of BC-A, the higher dose 100mg/kg cause uterine histology, hypertrophy and disrupt female fertility. The HoxA10 is important for continuing adult expression in stroma, muscle, uterus and epithelium gland also in normal development of mullerian duct[19]. The HoxA10 was activated by steroid hormone when bind to endometrial receptor that lead to regulation cell differentiation, it caused on endometrium responsive to embryonic development[20]. The HoxA10 is a basic of development immure mesenchymal cell to endometrial tissue[21]. Estrogen is a potent promster of HoxA10 gene through stimulation of stroma and endometrial during control steroid hormones during development stage[22]. The growth and development of female fetus is very sensitive to any components or compounds estrogens[23]. The exposure to BC-A during pregnancy effects on development and growth of uterus and this similar when treated neonataly or during pregnancy to DES[24]. The HoxA10 gene expression during exposure to BC-A to BC-A appears to associated with uterine dysfunction. Gene expression is assign of hormonal imbalance. The histologic evaluation of uterus[25]. In the present study where exposed perinatal to BC-A in different dose (25,50,100) mg/kg B.W. We have been shown the bad effect of BC-A on the activity of estrogen leading to dysfunction in female reproduction system. Light micrograph of histological changes of the uterus rat perinatal treated with BC-A in doses (25 mg/kg,50mg/kg,100mg/kg) B.W. there were histopathological changes including cystic endometrial hyperplasia (CEH), bleeding in the myometrium uterine, hyperplasia, congestion and enlargement in the cells lining uterine gland with reduction the number of uterine gland with enlargement of cell lining uterine gland and uterine hyperplasia in endometrium. The incidence of uterus lesions was described, and this is in accordance with the recent data on the potentially carcinogenic alterations in female reproductive tissues caused by decrease pre-natal doses of xenoestrogen[14]. The exposure to DES during critical stages of pregnancy lead to reprogramming of uterus and this responsible

for changes in the level of estrogen during a lifetime[26]. The exposure to BC-A during uterine organogenesis cause changes in level of DNA and increases the gene expression of estrogen receptors as ERβ in the endometrium[27]. This may increase height of endometrial epithelia[28].

Conflict of Interest: This research is a personal non-profit work and there is no conflict of interest.

Source of Funding: None.

Ethical Clearance: Ethical clearance was obtained from the Faculty Scientific Committee (College of Veterinary Medicine, University of Kerbala) to Study the effect of exposure biochinin-A during gestation stage on HoxA10 gene expression and histological change in uterus of healthy female rats.

Reference

1. Depledge, M. H., & Billinghurst, Z. Ecological significance of endocrine disruption in marine invertebrates. Marine Pollution Bulletin, (1999). 39(1-12), 32-38.
2. Bromer, J. G., Zhou, Y., Taylor, M. B., Doherty, L., & Taylor, H. S. Bisphenol-A exposure in *utero* leads to epigenetic alterations in the developmental programming of uterine estrogen response. The FASEB Journal, (2010). 24(7), 2273-2280.
3. YING, C. W., HSU, J. T., & Yang, Y. C. Diverse effects of phytoestrogen biochanin A on rat pituitary tumor cells. Journal of Food and Drug Analysis, (2004).12(1).
4. Hloucalová, P., Skládanka, J., Horký, P., Klejdus, B., Pelikán, J., & Knotová, D. Determination of phytoestrogen content in fresh-cut legume forage. Animals, (2016). 6(7), 43.
5. Soujanya, M. G. S., Reddy, P. R., & Reddy, P. S. Perinatal exposure of biochanin-A induced abnormalities in offspring of rats. Journal of Infertility and Reproductive Biology, (2014). 2(4), 115-123.
6. Patel, N. H., & Prince, V. E. Beyond. The Hox complex. Genome biology, (2000).1(5), REVIEWS1027
7. Zanatta, A., Rocha, A. M., Carvalho, F. M., Pereira, R. M., Taylor, H. S., Motta, E. L., ... & Serafini, P. C. The role of the Hoxa10/HOXA10 gene in the etiology of endometriosis and its related infertility: a review. Journal of assisted reproduction and genetics, (2010). 27(12), 701-710.
8. Bromer, J. G., Zhou, Y., Taylor, M. B., Doherty, L., & Taylor, H. S. Bisphenol-A exposure in utero leads to epigenetic alterations in the developmental programming of uterine estrogen response. The FASEB Journa,l(2010). 24(7), 2273-2280.
9. Ma, L. Endocrine disruptors in female reproductive tract development and carcinogenesis. Trends in Endocrinology & Metabolism, (2009). 20(7), 357-363.
10. Singh, K. K., Mridula, D., Rehal, J., & Barnwal, P. Flaxseed: a potential source of food, feed and fiber. Critical reviews in food science and nutrition, (2011). 51(3), 210-222.
11. Jefferson, W. N., Patisaul, H. B., & Williams, C. J. Reproductive consequences of developmental phytoestrogen exposure. Reproduction, (2012). 143(3), 247-260.
12. Gray, C. A., Taylor, K. M., Ramsey, W. S., Hill, J. R., Bazer, F. W., Bartol, F. F., & Spencer, T. E. Endometrial glands are required for preimplantation conceptus elongation and survival. Biology of reproduction, (2001). 64(6), 1608-1613.
13. *hettp//www.Sigma alderich.com.*
14. Hassan, A. H. Reproductive efficacy in female rat exposed to bisphenol A during gestation period. Basrah Journal of Veterinary Research., (2013). 12(2), 149-163.
15. *hettp//www.bioneer.com/protcols/*.Accuol total RNAextraction reagent 100 ml.
16. Varayoud, J., Ramos, J. G., Bosquiazzo, V. L., Muñoz-de-Toro, M., & Luque, E. H. Developmental exposure to bisphenol A impairs the uterine response to ovarian steroids in the adult. Endocrinology, (2008). 149(11), 5848-5860.
17. *hettp//www.Promga.com/protcols/*.GO taq probe 1-Step RT-q PCR system.
18. Livak, K. J., & Schmittgen, T. D. Analysis of relative gene expression data using real-time quantitative PCR and the 2− ΔΔCT method. methods, (2001). 25(4), 402-408.

19. Martin, J., Taylor, M. B., Akbas, E., & Taylor, H. S. P-511: Differential cell specific modulation of HOXA10 by estrogen and SP1 response elements. Fertility and Sterility, (2006). 86(3), S324.

20. Taylor, H. S., Arici, A., Olive, D., & Igarashi, P. HOXA10 is expressed in response to sex steroids at the time of implantation in the human endometrium. The Journal of clinical investigation, (1998). 101(7), 1379-1384.

21. Matsuzaki, S., Canis, M., Darcha, C., Pouly, J. L., & Mage, G. HOXA-10 expression in the mid-secretory endometrium of infertile patients with either endometriosis, uterine fibromas or unexplained infertility. Human reproduction, (2009). 24(12), 3180-3187.

22. Cermik, D., Selam, B., & Taylor, H. S. Regulation of HOXA-10 expression by testosterone in vitro and in the endometrium of patients with polycystic ovary syndrome. The Journal of Clinical Endocrinology & Metabolism, (2003). 88(1), 238-243.

23. McLACHLAN, J. A., Newbold, R. R., Burow, M. E., & Li, S. F. From malformations to molecular mechanisms in the male: three decades of research on endocrine disrupters. Apmis, (2001). 109(S103), S1-S11.

24. Thigpen, J. E., Haseman, J. K., Saunders, H. E., Setchell, K. D., Grant, M. G., & Forsythe, D. B. Dietary phytoestrogens accelerate the time of vaginal opening in immature CD-1 mice. Comparative medicine, (2003). 53(6), 607-615.

25. Kojima, H., Katsura, E., Takeuchi, S., Niiyama, K., & Kobayashi, K. Screening for estrogen and androgen receptor activities in 200 pesticides by in vitro reporter gene assays using Chinese hamster ovary cells. Environmental health perspectives, (2004). 112(5), 524-531.

26. Bosquiazzo, V. L., Vigezzi, L., Muñoz-de-Toro, M., & Luque, E. H. Perinatal exposure to diethylstilbestrol alters the functional differentiation of the adult rat uterus. The Journal of steroid biochemistry and molecular biology, (2013). 138, 1-927.

27. Adewale, H. B., Jefferson, W. N., Newbold, R. R., & Patisaul, H. B. Neonatal bisphenol-a exposure alters rat reproductive development and ovarian morphology without impairing activation of gonadotropin-releasing hormone neurons. Biology of reproduction, (2009). 81(4), 690-699.

28. Markey, C. M., Wadia, P. R., Rubin, B. S., Sonnenschein, C., & Soto, A. M. Long-term effects of fetal exposure to low doses of the xenoestrogen bisphenol-A in the female mouse genital tract. Biology of reproduction, (2005). 72(6), 1344-1351.

Prevalence and Associated Risk Factors of Forward Head Posture among University Students

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ABSTRACT

Background: There is an increase of forward head posture among university students due to faulty posture in their daily activities. Age, gender, usage of computer and smart phones are one of the contributing factors of forward head posture.

Methodology: This cross-sectional study was conducted to determine the prevalence of forward head posture and to investigate the associated risk factors that contribute to the development of forward head posture. 188 participants were recruited in the current study with pre-defined inclusion and exclusion criteria. The participants were screened with demographic questionnaire, followed by the cervical angle measurement using photography method. Then, the angle measurement was analyzed using web plot digitizer (WPD) software.

Results: 67 % of participants were identified with forward head posture while 58.5% were not aware of forward head posture. Only computer and smart phones showed significant association with forward head posture.

Conclusion: There is a need of intervention and education on awareness of good posture especially with increased usage of computer and smart phones in recent days.

Keywords: *forward head posture, computers, smart phones, risk factors, university students*

Introduction

Forward head posture has been identified as the displacement of the head anteriorly with cranio-vertebral angle lesser than 50 degrees. [1,2] While the head displaced forward, the centre of gravity also shift and consequently, causes the upper body to shift backward with the shoulder slumped. [3–5] Sustaining the head in this forward posture for prolonged period of time has been associated with the development of other musculoskeletal disorders such as 'upper crossed syndrome', which leads to reduction of lordosis in lower cervical and kyphosis of upper thoracic vertebra. [6,7] In the long run, this may cause shortening of muscular fibers muscles involving the atlanto-occipital articulation, overstretching of muscles around joint and leads to chronic neck pain. [8]

In a study among university students in Pakistan, prevalence of 63.96 % of forward head posture were reported. [1] Whereas in another study among dental staff, 85.5 % reported of forward head posture. [9] In another study among healthy subjects, 66 % reported of forward head posture and they fall under the age range of 20-60 years old. [10] The increase of forward head posture at alarming rate especially among young adults is worrisome. Nevertheless, there is no evidences on the prevalence rate of forward head posture among students in Malaysia. Hence, there is a need for a study to determine the prevalence of forward head and an early intervention in preventing the faulty posture.

There are many factors that could contribute to the development of forward head posture such as age[10], gender [11–14], frequency of physical activity [15,16], occupation [4], usage of computer and smartphones [4,17] and others. However, there is lack of literature addressing the prevalence of forward head posture among university

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students in Malaysia. Besides, no studies have examined all the associated risk factors together that influence the development of forward head postures. Thus, the aim of the current study is to determine the prevalence of forward head posture and to investigate the associated risk factors that contribute to the development of forward head posture among university students.

Methodology

Subjects: A cross-sectional study was conducted to determine the prevalence of forward head posture among university students. This study was conducted among four private universities in Klang Valley, Malaysia with total of 188 participants thru convenience sampling method. The participants were selected with predefined inclusion and exclusion criteria. Selected participants were between the age of 18 to 30 years with good general health. Participants with history of cervical and shoulder fracture or trauma, cervical surgery, functional or structural scoliosis, bone cancer or had excessive thoracic kyphosis were excluded from the study. [18–20]

The first author briefed the study methodology to the participants and written informed consent was obtained prior to the study. The Research Ethics Committee of INTI International University, Malaysia approved the study.

Procedure: The participants were given a demographic questionnaire that includes, age, gender, BMI, usage of computer and smart phone daily as well as the awareness towards forward head posture. The C7 spinous process was palpated and identified with a marker which was attached over its midpoint of the most prominent part. The participants were then instructed to stand at their comfortable stance and not allowed to shift their body weight from one foot to another. Participants were required to flex and extend the head for three times and then look forward while resting in a comfortable position. [18]

Participant's cervical angle were analyzed by taking a photo from the sagittal view. The measurement was standardized as the distance from the participant's shoulder tip to the center of the camera were set at 30cm in standing position. [20] The photos were transferred to the computer and analyzed using Web Plot Digitizer (WPD) software, an open resource, used to retrieve quantitative data from images (http://arohatgi. info/WebPlotDigitizer/). The cervical angles were quantified according to previous study angle measurement methods with a virtual line was drawn between the midpoint of tragus to C7 spinous process and a horizontal line through the spinous process of C7 using WPD software **[Figure 1].** [19,21] Forward head posture was indicated with high decrease in the cervical angle measurement.[22–24].



Figure 1: Reading from WPD software represents craniovertebral angle when two indicator lines were aligned with pin markers (seventh cervical [C7] vertebra spinous process) and tragus

Statistical Analysis: Data were analyzed using statistical software package SPSS (Version 21.0, Chicago, IL, USA). The data were normally distributed based on the Shapiro-Wilk test. Descriptive statistics were used to examine the prevalence and awareness on forward head posture among the university students using frequencies. A Chi-square test was employed to investigate the relationship between forward head posture and risk factors such as age, gender, computer and smartphone usage daily.

Results

Prevalence and Awareness of Forward Head Posture: In the current study, 67% participants were identified with forward head posture. Based on the WPD analysis, the highlighted green group indicates participants with minimal or non-FHP (≥55º cervical angle) whereas the red group indicates severe FHP with <50º of cervical angle. Participants with moderate FHP falls under cervical angle 50º - 54º of CV angle **[Figure 2]**. The results also reveal that 58.5% participants were not aware about the forward head posture. The mean (SD) of the participant's age were 20.12 (2.19).

Forward Head Posture and Age: The age distribution was shown in **Figure 3**. Results revealed that most of the participants with forward head posture were aged between 18-21 (45.2%). The results of the Chi-square demonstrated that there was no significant association between age and forward head posture ($p = 0.625$).

Forward Head Posture and Gender: The number of male and female participants was 74 and 114. The

prevalence of forward head posture (moderate and severe category) among male and female participants was 67.57% (50/74) and 66.67% (76/114) respectively. The results show that the prevalence of forward head posture among male participants is slightly higher than female participants. The Chi-square analysis demonstrated no significant association between gender and forward posture (p = 0.991).

Forward Head Posture and Usage of Computer Daily: The prevalence of forward head posture (moderate and severe category) among the participants of computer use daily between 1 to 5 hours were 41.9% (44/105), 6 to 10 hours were 98.3% (59/60), 11 to 15 hours were 100% (21/21) and more than 15 hours were 100% (2/2) respectively. The use of computer of more than 6 hours per day have shown high number of forward head posture prevalence. The Chi – square analysis demonstrated significant association between duration of computer use daily and forward head posture (p = 0.000).

Forward Head Posture and Usage of Smart Phone Daily: The prevalence of forward head posture (moderate and severe category) among the participants of smart phone use daily between 1 to 5 hours were 23.38% (18/77), 6 to 10 hours were 95.16% (59/62), 11 to 15 hours were 100% (41/41) and more than 15 hours were 100% (8/8) respectively. Similar to computer usage, smart phone usage of more than 6 hours per day also shows high number of forward head posture prevalence. There is a significant association between smart phone usage and forward head posture (p = 0.000).

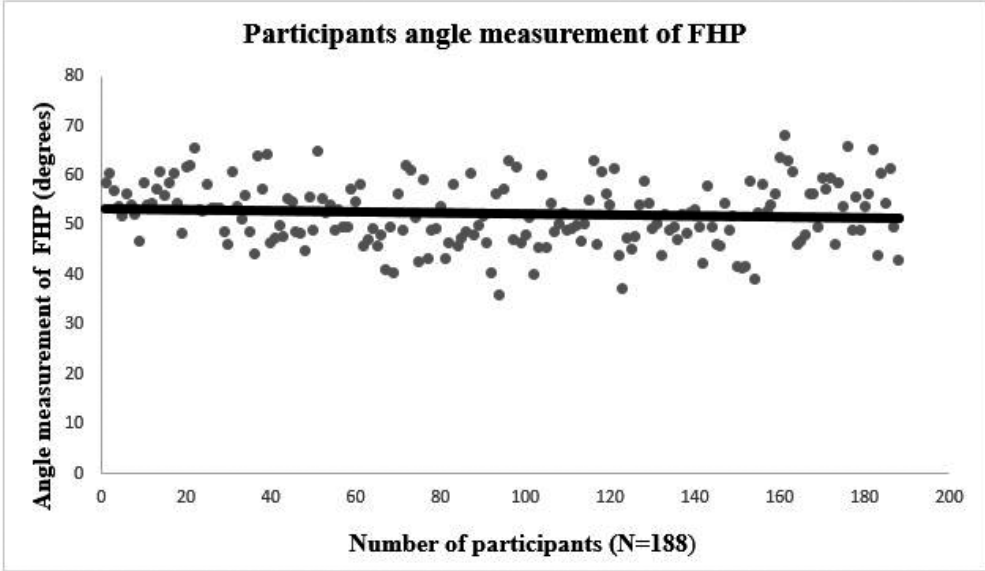


Figure 2: Scatter Plot showing CV angle of each participants

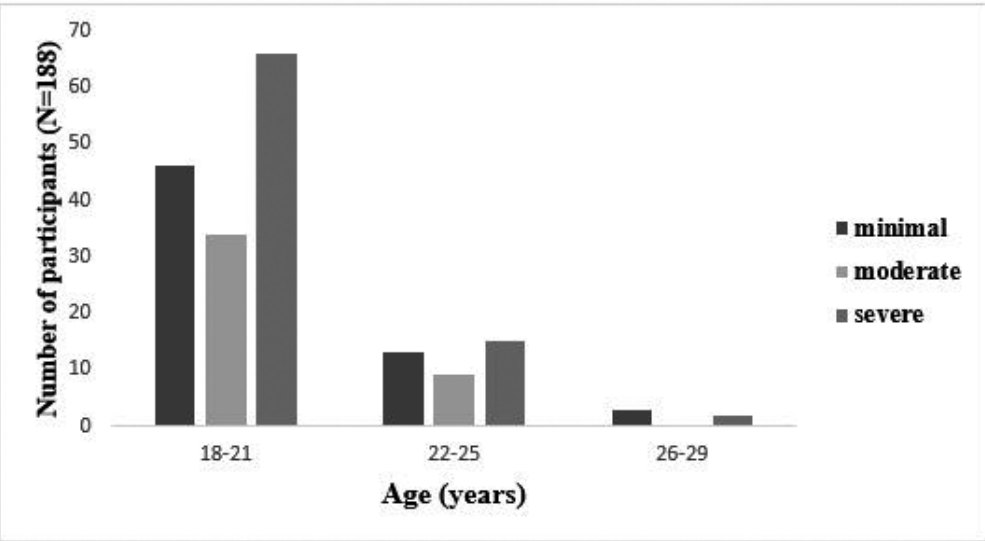


Figure 3: Age distribution of participants

Discussion

The prevalence of forward head posture among 188 university student in the current study is 67% whereas 58.5% of student reported not aware of forward head posture. In another similar study conducted by Arfa et al. among 197 students from four universities in Pakistan, the prevalence of forward head posture was 63.96%. The same study concluded that the high prevalence among the university student could be possibly due to high usage of computers and faulty postures during lectures.[1]

The current study reveals no significant association between forward head posture and age, although a high percentage of 45.2% of participants aged between 18 – 21 reported of forward head posture. This could be possibly due to the usage of computer and smart phones more in this university age range compared to others. [10] There is a significant relationship between computer and smartphone usage with forward head posture in our current study. Previous study has stated that with the increase usage of computers located below eye sight for prolong period of time causes exaggerated anterior curve in lower cervical vertebra and exaggerated posterior curve in upper thoracic vertebra establishing the forward head posture. [4,25] These symptoms are more prominent with the increase of smart phones usage among youth. [4] In the long run, with the protrusion of head forward and shift of centre of gravity anteriorly consequently will lead to posture imbalance and reduced motor control ability of the individuals.

The usage of smart phone in a sustained, static posture with an unsupported arm could induce misalignment of neck and shoulder. ([17]) This is being further explained where the usage of small monitors of smart phones with the device held on the laps causing the individuals to position their head down, increasing the muscle activity in the cervical extensors and eventually triggering muscle fatigue. [26] In fact, many previous studies have also reported positive association between the usage of computer and smart phones with forward head posture similar to our study. [17,26,27] Therefore, the current study emphasizes the importance to create an awareness on the correct posture and consequences of forward head posture in the long run as prolong use of computer and smart phones may induce changes in cervical and even the thoracic and lumbar spine posture.

The limitation of current study is the generalization duration usage of computer and smart phone in the questionnaire as in if the students used the devices for social media, assignment used, entertainment or gaming purpose in the questionnaire. Future studies should examine the responsiveness of the WPD software in longitudinal study for better accurate reliable result. The ability to identify the cervical angle might differ time to time, thus, future studies focusing over the same participants over a length period of time is suggested.

Conclusion

A high prevalence of forward head posture has been identified in the current study among the university student. The current study also indicates a significant association between the computer and smart phone usage with forward head posture. The significant forward head posture differences between these students needed to be intervened as it may affect the health in future. This study, hence, provides evidence for existing data and further emphasize the importance of good posture education and physical exercises for the students.

Acknowledgements

The authors sincerely thank all the participants in the current study.

Conflict of Interest: No potential conflict of interest was reported by the authors

Source of Funding: Self

Ethical Clearance: The Research Ethics Committee of INTI International University, Malaysia approved the study.

REFERENCES

1. Naz A, Bashir MS, Noor R. Prevalance of forward head posture among university students. Rawal Medical Journal. 2018;43(2):260–2.
2. Diab AA, Moustafa IM. The efficacy of forward head correction on nerve root function and pain in cervical spondylotic radiculopathy: A randomized trial. Clinical Rehabilitation. 2012;26(4):351–61.
3. Nejati P, Lotfian S, Moezy A, Nejati M. The study of correlation between forward head posture and neck pain in Iranian office workers. International Journal of Occupational Medicine and Environmental Health. 2015;28(2):8.

4. Kang J-H, Park R-Y, Lee S-J, Kim J-Y, Yoon S-R, Jung K-I. The effect of the forward head posture on postural balance in long time computer based worker. Annual Rehabilitation Medicine. 2012;36(1):98–104.

5. Yip CHT, Chiu TTW, Poon ATK. The relationship between head posture and severity and disability of patients with neck pain. Manual Therapy. 2008;13(2):148–54.

6. Szeto GP., Straker L, Raine S. A field comparison of neck and shoulder postures in symptomatic and asymptomatic office workers. Applied Ergonomics. 2002;33(1):75–84.

7. Moore MK. Upper crossed syndrome and its relationship to cervicogenic headache. Journal of Manipulative and Physiological Therapeutics. 2004;27(6):414–20.

8. Burgess-Limerick R. Gaze angle, heterophoria, and neck biomechanics: implications for the height of visual displays. In: Proceedings of the 36th Annual Conference of the Ergonomics Society of Australia Inc, Adelaide, Australia. 2000. p. 7–13.

9. Vakili L, Halabchi F, Mansournia MA, Khami MR, Irandoost S, Alizadeh Z. Prevalence of common postural disorders among academic dental staff. Asian Journal of Sports Medicine. 2016;7(2).

10. Griegel-Morris P, Larson K, Mueller-Klaus K, Oatis CA. Incidence of common postural abnormalities in the cervical, shoulder, and thoracic regions and their association with pain in two age groups of healthy subjects. Physical Therapy. 1992;72(6):425–31.

11. Carroll LJ, Hogg-Johnson S, van der Velde G, Haldeman S, Holm LW, Carragee EJ, et al. Course and prognostic factors for neck pain in the general population: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. Spine (Phila Pa 1976). 2008;33(4 Suppl):S75–82.

12. Strine TW, Hootman JM. US national prevalence and correlates of low back and neck pain among adults. Arthritis Care Resarch. 2007;57(4):656–65.

13. Fejer R, Kyvik KO, Hartvigsen J. The prevalence of neck pain in the world population: A systematic critical review of the literature. European Spine Journal. 2006;15(6):834–48.

14. Vikat A, Rimpelä M, Salminen JJ, Rimpelä A, Savolainen A VS. Neck or shoulder pain and low back pain in Finnish adolescents. Scandinavian Journal of Public Health. 2000;28(3):164–73.

15. Harman K, Hubley-Kozey CL, Butler H. Effectiveness of an Exercise Program to Improve Forward Head Posture in Normal Adults: A Randomized, Controlled 10-Week Trial. Journal of Manual and Manipulative Therapy. 2005;13(3):163–76.

16. Thigpen CA, Lynch SS, Mihalik JP, Prentice WE, Padua D. The effects of an exercise intervention on forward head and rounded shoulder postures in elite swimmers. British Journal of Sports Med. 2010;44(5):376–81.

17. Kim S-Y, Koo S-J. Effect of duration of smartphone use on muscle fatigue and pain caused by forward head posture in adults. Journal of Physical Therapy Science. 2016;28(6):1669–72.

18. Cheung Lau HM, Wing Chiu TT, Lam TH. Clinical measurement of craniovertebral angle by electronic head posture instrument: A test of reliability and validity. Manual Therapy. 2009;14(4):363–8.

19. Ruivo RM, Pezarat-Correia P, Carita AI. Cervical and shoulder postural assessment of adolescents between 15 and 17 years old and association with upper quadrant pain. Brazilian Journal of Physical Therapy. 2014;18(4):364–71.

20. Guan X, Fan G, Chen Z, Zeng Y, Zhang H, Hu A, et al. Gender difference in mobile phone use and the impact of digital device exposure on neck posture. Ergonomics. 2016;59(11):1453–61.

21. Mani S, Sharma S, Omar B, Ahmad K, Muniandy Y, Singh DKA. Quantitative measurements of forward head posture in a clinical settings: a technical feasibility study. European Journal of Physiotherapy. 2017;19(3):119–23.

22. Gadotti IC, Armijo-Olivo S, Silveira A, Magee D. Reliability of the craniocervical posture assessment: Visual and angular measurements using photographs and radiographs. Journal of Manipulative and Physiological Therapeutics. 2013;36(9):619–25.

23. Twomey L. Posture of the head, shoulders and thoracic spine in comfortable erect standing. Australian Journal of Physiotherapy. 1994;40(1):25–32.

24. Nam SH, Son SM, Kwon JW, Lee NK. The Intra- and Inter-rater Reliabilities of the Forward Head Posture Assessment of Normal Healthy Subjects. Journal of Physical Therapy Science. 2013;25(6):737–9.

25. Cho WH, Lee WY, Choi HK. An investigation on the biomechanical effects of turtle neck syndrome through EMG analysis. In: Proceedings of the Korean Society of Precision Engineering Conference. Korean Society for Precision Engineering; 2008.

26. Mekhora K, Liston CB, Nanthavanij S, Cole JH. The effect of ergonomic intervention on discomfort in computer users with tension neck syndrome. International Journal of Industrial Ergonomics. 2000;26(3):367–79.

27. Park J-H, Kang S-Y, Jeon H-S. The Effect of Using Smart-Phones on Neck and Shoulder Muscle Activities and Fatigue. Physical Therapy Korea. 2013;20(3):19–26.

Exploration of Patients Value as in Accordance with Bugis Philosophy in Public Hospital at the Sulawesi Selatan, Indonesia

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ABSTRACT

In this new era of globalization, Business organizations around the world are struggling to develop effective quality measurement parameters, and strategies to survive in competition, and to achieve customer satisfaction, business organizations such as hospitals must be able to understand the needs, desires and expectations of customers and be able to create value. This study aims to explore the value of patients according to Bugis Philosophy at the Regional Public Hospital in South Sulawesi. The study was conducted at 4 hospitals in 4 regency where the majority of the population were ethnic Bugis namely Siwa Regional Public Hospital WajoRegency, LamadukellengRegional Public Hospital SengkangRegency, TenriawaruRegional Public Hospital Bone Regency and AndiMakkassau Hospital Pare-Pare City in South Sulawesi Province. The research method is qualitative. The results of this study indicate that identification of customer needs in terms of health care services is good even though medical devices are not complete. The underlying reason for patients to choose treatment is mostly because the distance is close enough, good and complete health services, and referral factors from the health center.Health services that should be available in hospitals are improving health services that are prime for all aspects both in terms of nurse care and doctor's vision.The types of services or other supporting facilities needed are still lacking, and presumably the hospital allows families to come to visit even though briefly. The conclusion of this study is that patients' needs related to health services from all aspects are classified as not running optimally because it is caused by several factors such as lack of health human resources (expert doctors), incomplete health equipment, and other supporting facilities that are not yet available. (Marenrengperru') between families within the scope of the region it is advisable to maintain the existing bugis values without violating the rules that apply within the scope of the hospital.

Keywords: *Value, patients, Regional Public Hospital, Bugis Philosophy,*

Introduction

In this new era of globalization, business organizations throughout the world are struggling to develop effective measurement tools for quality measures, and strategies for survival in competition.[1] With increasing competitive competition in the global economy, profitability, requiring more than good products and services, a business must provide customers with unforgettable satisfaction. [2] The health industry is considered to be one of the most challenging sectors in the face of increasing pressure in the health sector, and the introduction of new technology needs attention in its implementation.[3]

On the one hand, the development of information technology makes people more intelligent and demands superior service quality.[4] This is also influenced by the number of service options presented which are marked by the development of the hospital industry. Modern hospital management systems must provide *customer focused services*, which means that the hospital must be able to understand the needs, desires and expectations

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of customers and creating valuein providing services in order to achieve satisfaction and be able to survive competition.[5]

The results of research show that trust in satisfaction is smaller than the indirect effect of trust in satisfaction through customer value. This is also supported by the results of research conducted by Indrianty which shows that the dominant variable to increase the lifetime value of customers for the public is the brand equity value for public hospitals, while those in private hospitals do not show a significant difference. [6,7]

South Sulawesi Province which has various tribes and languages including ethnic and Bugis languages. Bugis language is one of the language groups spoken in the Bone area to Pinrang, Sinjai, Barru, Pangkep, Maros, Pare – Pare,Sidrap, Wajo, Soppeng, this language is the language most used by the people of South Sulawesi.In Bugis tribal culture there are three things that can give an idea of the culture of the bugis, namely the concept of *ade, sirinapesse*and the symbolism of the bugis is the silk sarong.[8]

Bugis ethnics that have theideology*Siri Na Pecce* which include the existence of the nature of *Sipakalebbi*(sip*k*lEbi) which is horizontal mutual respect including *Ada Na Gauk(ad ngau)*namely words according to deeds, *Teppe* (tEpE) namely belief, acknowledging self-servant*Sipakatau* (sipktuuau) namely mutual respect, mutual respect as servants (humanity), *Mamase* (mmes) which is friendly in speaking, always showing affection, *Malempu(*mlEuuPu) u are honest, honest,*macca*(mc), which is smart, smart *MarenrengPerru* (mereREpru) which is faithful, symbolizes a very close family relationship.[9]

Based on the above, cultural aspects need to be considered in providing daily services at the Hospital. This study will explore the needs of patients according to value through the service experienceof ethnic Bugis patients at the South Sulawesi Regional Public Hospital. The focus of the research lies in exploring the needs of patients for the Regional Public Hospital in South Sulawesi based on local wisdom, namely Bugis philosophy.

Materials and Method

Type of research used is descriptive qualitative research with anapproachethnographic. Samples were taken based on the minimum number of needs with the technique of collecting data with indepth interviewsand observationsfor inpatients during November-December 2018 as informants.

Results

A. Characteristics of Informants The: Number of informants was 32 people from 4 Regional Public Hospitals in South Sulawesi, consisting of 13 male and19 female. In this research the theme was compiled based on the purpose of the research, namely identifying customer needs in accordance with the philosophy of Bugis in this case the patient with ethnic Bugis in several Regional Public Hospitals in South Sulawesi Province.

B. Identification of Customer Needs

a. for Health Workers in

1. **SiwaRegionalPublicHospital,WajoRegency:** Experience informants on services provided by health workers both doctors and nurses while being treated at the Regional Public Hospital of WajoRegency. From the interviews, some opinions were conveyed by the informants, most of whom said that the services provided by doctors and nurses at SiwaRegional Public Hospital were good and they served quickly and friendly even though the medical devices were not complete but still made patients feel comfortable.
2. **TenriawaruRegional Public Hospital, BoneRegency:** Experience of informants on the services provided by health workers both doctors and nurses while being treated at the Tenriawaru Regional Public Hospital in Bone Regency. From the results of the interviews, several opinions were conveyed by the informants, namely all informants said that the services provided by doctors and nurses were good and they served kindly and quickly.
3. **LamadukellengRegional Public Hospital, Sengkang Regency:** Services provided by doctors and nurses are good and they serve fast, responsive, friendly and polite especially the doctors and nurses are diligent to visite, even though the ICU is not conducive because visitors are smoke-free in the ICU, but do not reduce patient satisfaction at the hospital. From the results of the interviews, several opinions were conveyed by the informants.

4. **AndiMakkassau Hospital, Pare-Pare City:** From the interviews most of the informants said that the given at AndiMakkassau Hospital, Pare-Pare City is pretty good and they serve quickly.

b. Reasons for Selection of the Hospital as a place Treatment

1. **Siwa Regional Public Hospital in WajoRegency:** The underlying reason for informants to choose SiwaRegional Public Hospital as a place of treatment is mostly because it is close to home, good service, complete specialist doctors and referral factors from the Puclic Medical Center.
2. **Tenriawaru Regional Public Hospital Bone Regency:** The underlying reason for the informant was to choose Tenriawaru Regional Public Hospital mostly because they already had experience in the hospital, besides also because of the complete medical doctors, complete medical devices, good service and due to reference factors.
3. **LamadukellengRegional Public Hospital, Sengkang Regency:** The reason for choosing LamadukellengRegional Public Hospital, SengkangRegency for treatment is because the distance is quite close, good service, complete specialist doctors, friendly nurses, and complete health services. The following is an interview quote about this.
4. **AndiMakkassau Hospital, Pare-Pare City:** The reason underlying the informant for choosingAndiMakkassau Hospital of Pare-Pare City for treatment is because the distance is quite close, good and complete health services, a complete specialist doctor, and already classified as type B which is certainly one of the referral center hospitals.

c. Health services that should be available at the Hospital

1. **SiwaRegionalPublicHospital,WajoRegency:** Health services that should be available in hospitals are improved health services for all aspects. From the interviews, some opinions were conveyed by the informants, most of whom said that the health services that should be provided by doctors and nurses at SiwaRegional Public Hospital were the improvement of primary health services related to doctors being more patient to patients and visite time in the morning.
2. **TenriawaruRegional Public Hospital, Bone Regency:** Health services that should be available at the hospital are improved health services for all aspects. From the interviews, some opinions were conveyed by informants, most of whom said that the health services that should be provided by doctors and nurses at the TenriawaruRegional Public Hospital were the improvement of their main health services related to doctors being more patient and visite time in the morning.
3. **LamadukellengRegional Public Hospital, Sengkang Regency:** Health services that should be available in hospitals are to improve the quality of excellent health and nursing health services and maintain performance. From the interviews, some opinions were conveyed by informants, most informants said that health services should be provided by doctors and nurses in LamadukellengRegional Public Hospital, Sengkang Regency, whose quality of health and nursing services was related to doctors as much as possible to visit patients, quickly and responsive in serving other than that the hospital tightened the rules regarding smoking bans for buyers.
4. **AndiMakkassau Hospital Pare-Pare City:** Health Services what should be available at the hospital is improving the quality of excellent health services and increasing care for nurses. From the results of the interviews obtained several opinions conveyed by informants namely Most of the informants said that health services should be provided by doctors and nurses in theAndiMakkassau Hospital of Pare-Pare City is to improve the quality of health and nursing services.

d. Patient Experience During Care at the Hospital

1. **SiwaRegionalPublicHospital,WajoRegency:** Various patient experiences during hospitalization are very diverse. From the results of interviews conducted, some experiences were conveyed by informants,

namely informants who said that the experience of patients related to the services provided while being treated at SiwaRegional Public Hospital is more attention to the equipment available at the hospital so that everything functions properly such as oxygen cylinders

2. **TenriawaruRegional Public Hospital, Bone Regency:** Patients' experiences while being treated in hospitals are very diverse. From the results of interviews conducted, some experiences were conveyed by informants. Some informants said that the experience of patients related to the services provided during treatment at the Tenriawaru General Hospital was the doctor's lack of attention to visit the patient, besides the visiting hours at the hospital were good so does not interfere with the patient's resting hours, and one informant said that the hospital should not differentiate services between Health Insurance (*BPJS*) patients and general patients.
3. **LamadukellengRegional Public Hospital, Sengkang Regency:** Various experiences of patients while being hospitalized are very diverse. From the results of interviews conducted, some experiences were conveyed by informants, namely patient experience related to the services provided while being treated at LamadukellengRegional Public Hospital, Sengkang Regency, good service and able to maintain the quality of existing health services and improved for all aspects both in terms of nurse care, doctor's vision, and visiting hours are tightened
4. **AndiMakkassau Hospital Pare-Pare City:** Various patient experiences while in hospitalization is very diverse. From the results of interviews conducted, some experiences were conveyed by informants, namely the experience of patients related to the services provided while being treated at theAndiMakkassau Hospital of Pare-Pare City, a good service and able to maintain the quality of existing health services and improved for all its main aspects nurses and applicable rules can be applied properly.

e. Types of services or other supporting facilities needed by

1. **Siwa Regional Public Hospital, Wajo Regency:** Various suggestions related to the types of services or other supporting facilities needed but not yet available in hospitals, especially SiwaRegional Public Hospital so far are still lacking, and hospitals should complete facilities so that patients feel more comfortable while being treated. From the results of interviews conducted, most of the informants said that other types of services/supporting facilities needed at the SiwaRegional Public Hospital were still lacking so far, and the hospital should complement these facilities.
2. **Tenriawaru Regional Public Hospital, Bone Regency:** Various suggestions regarding the types of services or other supporting facilities needed but not yet available in hospitals, especially TenriawaruRegional Public Hospital, BoneRegency has so far been quite good and already complete and make patients feel comfortable.
3. **Lamadukelleng Regional Public Hospital, Sengkang Regency:** Various suggestions regarding the types of services or other supporting facilities needed but not yet available in hospitals, especially LamadukellengRegional Public Hospital, Sengkang Regency, so far have been quite good, and the hospital should complete facilities such as water supply and additional care rooms stays can be given barriers such as curtains so that patients feel more comfortable while being treated in LamadukellengRegional Public Hospital, Sengkang Regency
4. **AndiMakkassau Hospital, Pare-Pare City:** Various suggestions regarding the types of services or other supporting facilities needed but not yet available at the hospital especially AndiMakkassau Hospital, Pare-Pare City as far as this is good enough, it's just that the hospital should equip facilities such as fans or air conditioners need to be added and cleanliness is maintained so that patients feel more comfortable while being treated byAndiMakkassau Hospital, Pare-Pare City**.**

Opinions related to the extended family who came to visit (MarenrengPerru') (mereREpru)

1. **Siwa Regional Public Hospital, WajoRegency:** Opinions of informants regarding large families who came to visit and there were limits to visiting hours were considered good enough, only the hospital allowed the families who came to visit all of them even though briefly because of mutual caring between families was still high (Marenrengperru') (mereREpru).
2. **TenriawaruRegional Public Hospital, Bone Regency:** Opinion of the informants related to the extended family who came to visit and there are limits to visiting hours as far as This was considered considered to be lacking, it was better for the hospital to add visiting hours and it would be possible to allow the families who came to visit even though for a while because of mutual caring between families (Marenrengperru') (mereREpru).
3. **Lamadukelleng Regional Public Hospital, Sengkang Regency:** Opinions of informants regarding large families who came to visit and there were limits on visiting hours were considered good enough so far, only the hospital allowed families to come to visit take turns because the sense of mutual care between families is still high (Marenrengperru') (mereREpru), besides that patient guards can be added according to the patient's situation and condition.
4. **AndiMakkassau Hospital Pare-Pare City:** Opinions of informants regarding large families who came to visit and there were limits to visiting hours were considered good enough so far, only the hospital would allow the families who came to visit all of them while they were still visiting hours, do not be too tightened on the rules of the visiting hours because the sense of mutual care between families is still high (Marenrengperru') (mereREpru).

Conclusion

Conclusion of this study is at the South Sulawesi Provincial Regional Public Hospital, namely SiwaRegional Public Hospital, WajoRegency, TenriawaruRegional Public Hospital, Bone Regency, LamadukellengRegional Public Hospital, Sengkang Regency and AndiMakkassau Hospital, Pare-Pare City needs of patients related to health services from all aspects classified as not yet running with optimally because it is caused by several factors such as lack ofS health human resources (expert doctors), incomplete health equipment, and other supporting facilities that are not yet available. In addition, because of the still high value (Marenrengperru') (mereREpru) between families within the region, it is advisable to maintain existing bugis values without violating the rules that apply within the scope of the hospital.

Conflict of Interest: There is no conflict of interest in this study.

Source of Funding: Domestic government

Ethical Clearance: This study obtained a label of ethics escaped by the number:1466/UN4.14.8/TP/02/02/2019 on April 13, 2018

REFERENCES

1. Talib, F, Rahman, Z. An interpretive structural modelling for sustainable healthcare quality dimensions in hospital services. *International Journal of Qualitative Research in Services.* 2015;*2*(1):28-46.
2. Kim, S., Cha, J., Knutson, BJ, Beck, JA. Development and testing of the Consumer Experience Index (CEI). *Managing Service Quality:An International Journal.* 2011; *21*(2):112-132.
3. Aiken, LH, Sermeus, W., Van den Heede, K., Sloane, DM, Busse, R., McKee, M.,. . . Moreno-Casbas, MT. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *Bmj.* 2012:*344*, e1717.
4. Buetow, S. The scope for the involvement of patients in their consultations with health professionals: rights, responsibilities and preferences of patients. *Journal of Medical Ethics.* 1998;*24*(4):243-247.
5. Cronin Jr, JJ, Taylor, SA. Measuring service quality: a reexamination and extension. *the Journal of Marketing*, 55-68. di Bari, P. Are you

providing the 'right'customer experience? The case of Banca.1992.

6. Alimudin, et al., Model of Customer Value Approach for Improving Satisfaction of the Hospital Patients. Journal of Sinergi. 2017;7(2)
7. Indrianty., S &Indahwaty., S. The Comparison Of Development Model Of Customer Lifetime Value (Clv) For Private And Public Hospitals In Makassar, Indonesia. Academy of Strategic Management Journal. 2018;17(4)
8. Mardiana Adam, Achmad H. The Relationship of Mineral Fluor Exposure in Water with The Presence of Gingivitis (Study Case in Subdistrict of Tempe, Sengkang City, Wajo District). Journal of International Dental and Medical Research. 2018;11(2):470-476
9. Amin Kasma F, Tang M Rafi,ParawansaPatunrungi, Salam. The Ideology of Buginese in Indonesia (Study of Culture and Local Wisdom). Journal of Language Teaching and Research., 2015;6(4):758-765

Validation of the Emotional Competency Module

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ABSTRACT

This study is a design and development-based research which intends to develop a module specifically to be implemented on adolescents to help enhance their emotional competence and also to test the content validity of the module. Seven professionals with experience in dealing with adolescent emotional issues were recruited to validate the module. A rating scale based on this is constructed to be evaluated by the professionals. The overall validity was calculated based on the percentage of agreement between the professionals. The Emotional Competency Module received an overall validity rating of 85.6%. Therefore, there is evidence that shows that this module is suitable to be implemented to enhance the emotional competency level of adolescents.

Keywords: *Emotion competency, Emotional Competency Module, validity*

Introduction

A recent study on adolescent delinquency found that adolescents with better emotional intelligence had lower levels of delinquency[1]. Numerous social problems happen today that start from less serious cases such as coming late to school, skipping class, breaking rules, followed by serious cases such as disobeying teachers, smoking, participating in illegal racing, gangsterism, bullying and more serious cases such as involving in sexual activities, pregnant out of wed lock, baby dumping and rape that has been reported by the mass media almost every day[2].

Research Background: From the year 2009 to 2013, the Malaysian Welfare Department revealed that there are a total of 23,950 male and 1828 female offenders[3]. The Department of Statistic Malaysia reported that Malaysian adolescent population from the age of 10 to 19 years old was estimated to be 5.5 million while the population of Malaysian youths aged 15–25 years old was estimated to be around 5.2 million and approximately 19% of the total population[4]. Although, the number of delinquent juveniles is not high, the number is still alarming and significant enough to simply let this go. In addition, this does not include the number of hotspot schools identified in Malaysia with many delinquent behaviours detected among their students. These delinquent behaviours are such as drug abuse, smoking, vandalism, bully among many others. Hence, a module is developed to help to address these issues among adolescents. Many studies showed that emotional intelligence programmes or trainings were effective in many facets such as positive emotional intelligence shifts and others behaviors [5] enhance emotional intelligence through expressive writing and deep breathing, increase emotional intelligence in adolescents with emotional and behavioral problems.[6]

Problem Statement: We keep observing adults saying these common labels for adolescents these days such as 'disobedient', 'incorrigible', 'unruly' or 'ungovernable'. These social illnesses faced by young generations demand the governable attention of various individuals as there is a link between their current behaviour and the potential for delinquency and future involvement in criminal activities[7]. Recently, there are many studies conducted based on experimental design that implemented training or intervention to develop emotional intelligence. However, very little researches

have been done on emotional intelligence module development in Malaysia. Therefore, this study intends to fill up the gap by developing a module specifically to be implemented on adolescents to help enhance their emotional competence.

Research Objective: This study aims to develop an emotional competency module for adolescents and to test the validity of the module to be implemented for adolescents in Malaysia. Hence, the research objectives for the study are as stated:

i. Is there any content validity evidence for Strategy 1: Self-Awareness?

ii. Is there any content validity evidence for Strategy 2: Self-Management?

iii. Is there any content validity evidence for Strategy 3: Social Awareness?

iv. Is there any content validity evidence for Strategy 4: Relationship Management?

Literature Review

Emotional intelligence is a combination of competencies that allows an individual to be aware of, to understand and to be in control of their own emotions, to recognize and understand the emotion of others, and to use this knowledge to foster their own success and the success of others[8]. A person who can manage their behaviours, face changes, can solve problems, capable of building good relationships with others during worrying situations and can communicate with others are those with high EQ[9]. The current study follows the Goleman's Emotional Intelligence Theory. Although Goleman's theory is more applicable within organization setting but his theory focuses on a wider area in an individual's emotional intelligence. His theory includes the four constructs of emotional competence which are self-awareness, self-management, social awareness and relationship management. Therefore, the module is mainly constructed using the Goleman theoretical framework.

Meanwhile, findings from a survey showed that many higher education students agreed that financial support lead to stress and that a module to deal with emotional problems was necessary [10]. Besides, 86% of the students at the university mentioned that a module is needed to address the emotional issues that university students are facing.

Other emotional problems intervention studies managed to maintain the positive effects and prevent violence among adolescence in terms of use of aggressive strategies to resolve conflict was significantly reduced[11] whereas emotional competence were found to be significant predictors of changes in perceived stress, mental health, somatic complaints and vigour and confusion[12].

Methodology

This study is a design and development research. An Emotional Competency Module was developed for adolescents. Hence, to check for the content validity, the module was sent to be validated to 7 professionals with experience in dealing with emotional issues among adolescents and also in developing modules[13] [14]. According to Yaghmale (2003), having around 5 to 10 field experts is more suitable to measure the content validity[15].

Research Sampling: The samples of this study consisted of 7 professionals with experience in handling adolescents with emotional or/and delinquent behaviours. Five of them are counselling or psychology lecturers from Sultan Idris Education University, National University Malaysia, International Islamic University Malaysia and Putra University of Malaysia. Meanwhile, other experts who were recruited worked at a setting in which they have to deal with adolescents behaviours. Some of them include a counselling teacher at a secondary school, a Welfare Department Assistant Officer and a psychology officer at a juvenile delinquent rehabilitation center.

Research Instruments: There are three criterias for checking for validity of items which are, a) The content measures what it's supposed to measure, b) The items do not underrepresent the content required, c) Items represent what the researcher meant to measure[16]. A rating scale based on this is constructed to be evaluated by the experts. This rating scale was back-to-back translated and underwent face validity before it was given to the experts.

Data Analysis

An inter-rater reliability analysis for the 7 experts ratings was conducted. The results showed that the reliability of the experts ratings was high. A descriptive analysis was conducted based on the percentage of rating

for each activity as well as the overall module by the experts. The results are stated in the research findings. A validity rating of 70% for the content validity of a module is considered high[17][18].

Research Findings

Table 1: Content validity analysis results of module activities

Activity: Theme		Total Score	Percentage of Validity (%)
Theme 1: Self-Awareness		**342**	**81.43**
1	The Emotional Brain: Psycho-biology of emotions	55	78.57
2	Emoticons: Understanding emotions	56	80.00
3	ABC: Emotion rationalization	57	81.43
4	This Is Me: Self-acceptance	57	81.43
5	Triple Vision: Self-efficacy/Resilience	56	80.00
6	The Best Version of Yourself: Self-esteem	61	87.14
Theme 2: Self-Management		**507**	**80.48**
1	Emotional Map: Emotion regulation	57	81.43
2	Breathing Technique: Controlling emotions	58	82.86
3	POP!: Stress management	52	74.29
4	Pressure Cooker: Stress management	59	84.29
5	Time Flies: Stress management/Time management	55	78.57
6	My Spiritual Coping: Stress management	56	80.00
7	Progressive Muscle Relaxation: Stress management	57	81.43
8	Weigh Me Up: Self-motivation	57	81.43
9	Move It!: Self-motivation	56	80.00
Theme 3: Social Awareness		**281**	**80.29**
1	One Day: Social responsibility	56	80.00
2	Empathy: Empathy	58	82.86
3	Colourful Emotions: Empathy	59	84.29
4	Life Tree: Social respect	55	78.57
5	Colours of Malaysia: Social respect	53	75.71
Theme 4: Relationship Management		**286**	**81.71**
1	Sherlocking: Communication skills	55	78.57
2	Let's Win: Assertive skills	58	82.86
3	Maze Runner: Teamwork	56	80.00
4	Rabbits and Hyenas: Dealing with criticism	60	85.71
5	Sorry Sorry: Emotion expression	57	81.43

Table 1 shows that all the module activities has a high percentage of content validity results. Overall, the 'POP!' activity in the self-management theme received the lowest percentage of validation rating which is 74.29% whereas 'The Best Version of Yourself' activity which focuses on enhancing self-esteem received the highest rating which is 87.14%. Obtaining 70% for the content validity of a module is considered high[19]. Hence, all the activities are accepted and presumed to be effective in enhancing the self-awareness, self-management, social awareness and relationship management skills of participants.

Table 2: Overall module validity analysis results

	Overall Module Content Validity Results	Percentage
1	This module covers for the target population.	**84%**
2	This module can be implemented successfully.	**88%**
3	Time allocated to the individuals to complete the module was sufficient and appropriate.	**80%**
4	The emotional competence of the adolescent was enhanced after the completion of the module.	**88%**
5	This module is capable of enhancing the emotion competence.	**88%**
	Total Content Validity	85.6%
	Inter-rater reliability (α = 0.606)	

Based on Table 2, a high validity of 85.6% for the overall module was calculated. Hence, it can be concluded thus far in the research that the module developed is appropriate to be implemented to enhance adolescents' emotional competence.

According to inter-rater reliability the α = 0.606, indicate that there was fair agreement among the rater analysis on the module contents.

Discussions, Implications And Suggestions

The development of this module can aid the Malaysian Youth Policy that helps prepare youths to lead the nation by empowering their emotional competency skills. Besides, the module will also be a tool for psychologists or counsellors as well as other mental health professionals to implement this module for adolescents identified with emotional competency issues. Numerous social problems happen today that start from less serious cases such as coming late to school, skipping class, breaking rules, followed by serious cases such as disobeying teachers, smoking, participating in impulsive behaviors that has been reported by the mass media almost every day [20]. It is quite challenging to handle such numerous number of adolescent involving in problems in Malaysia. In accordance to this, many areas related to adolescent delinquency problems have been investigated by researchers[21]. The Emotional Competency module is developed to meet the challenge to work with vulnerable youth to develop their emotional health. The four main emotional domains are used to assess the emotional competency levels of adolescents in this study, and the valid and inter validity shown the higher (85%) of validity score. The contents of the module are valid with the inter reliability of experts (0.90). activities are most useful and inspire way to practically build up the emotional competency skills[22]

Findings provide evidence that the Emotional Competency Module is suitable to be implemented for adolescents to help enhance their emotional competence level. This is also similar to the Emotional Intelligence Module (EeiM) which also revealed good content validity[23]. Future suggestions for the research would include that testing the module on a wider scale whereby adolescents' population from different background such as juvenile delinquency center, international secondary schools and private institutions can become the participants. Besides, this module can certainly be modified for use for differently abled adolescents.

Conclusion

The Emotional Competency Module has a high validity of 85.6% for the overall module which shows that it is suitable to be used for the adolescent population in Malaysia. Hence showing evidence that the Emotional Competency Module can help enhance the emotional competence of adolescents.

Ethical Clearance: Ethical procedure and clearance was carried from the Research Management and Invocation Center of Sultan Idris University of Education.

Source of Funding: This research was supported by the Ministry of Higher Education through the Fundamental Research Grant Scheme (FRGS/1/2017/SS05/UPSI/02/6).

Conflict of Interest: There are no conflict of interest identified thus far for this research.

Acknowledgment

This Research was supported by Ministry of Education (MOE) through Fundamental Research Grant Scheme(FRGS/1/2017/SS05/UPSI/2/6) 02/5/2). We acknowledge the Ministry of Education and Research Management and Innovation Center (RMICUPSI)

REFERENCE

1. Chong AM, Lee P, Roslan S, & Baba M. Emotional intelligence and at-risk students. 2015; *SAGE Open*, *5*(1).
2. Behera A K. (2016). Understanding emotional intelligence in educational context. *International Journal of Humanities and Social Science Invention*, 2016; *5*(2), 17–28.
3. Che Mohd Nasir, & Mohd Ali Hanafiah. Individual Internal Factors and Delinquencies: A Review on Teenage Girls in Moral Morals. Social Development Journal, 2015; *18*(June), 185–202.
4. Kuldas S, Hashim S, & Ismail H N. Malaysian adolescent students' needs for enhancing thinking skills, counteracting risk factors and demonstrating academic resilience. *International Journal of Adolescence and Youth, 2015; 20*(1), 32-47.
5. Dolev N, & Leshem S. Developing emotional intelligence competence among teachers. *Teacher Development*, 2017; *21*(1), 21–39.
6. Motamedi F, Ghobari-Bonab B, Beh-pajooh A, Shokoohi Yekta, & Afrooz G A. Developing an Emotional Intelligence Program Training and Study Its Effectiveness on Emotional Intelligence of Adolescents with Emotional and Behavioral Problems That Living in Single Parent Families. *Journal of Education and Learning*, 2017; *6*(2), 101. *International Journal of Adolescence and Youth*. Taylor & Francis.
7. Syed Nong, & Mohd Yusoff. The legal concept of children beyond control: A global perspective. *Pertanika Journal of Social Sciences and Humanities*,2015; *23*(SpecialIssue11), 63–74.
8. Christensen L. B, Johnson R B & Turner L A. Research methods, design, and analysis. Essex: Pearson.2015.
9. Goleman D. Emotional intelligence: Why it can matter more than IQ?. New York: Bantam Books. 1995.
10. Machera R P, & Machera P C. Emotional intelligence (EI): A therapy for higher education students. *Universal Journal of Educational Research*, 2017; 5(3), 461-471
11. Garaigordobil M, & Pena-Sarrionandia A. Effects of an emotional intelligence program in variables related to the prevention of violence. *Frontiers in Psychology, 2015; 6 (743), 1-11.*
12. Hodzic S, Ripoll P, Bernal C, & Zenasni F. The effects of emotional competences training among unemployed adults: A longitudinal study. *Applied Psychology: Health and Well-Being. 2015; 7 (3), 275-292.*
13. Jasmi A T, Zakaria M, & Norwaliza A W. Validity and reliability of career exploration model. *Middle-East Journal of Scientific Research*, 2015; *23*(11), 2639–2644.
14. Sidek MN, & Jamaludin A Module building: How to build exercise module and academic module. Serdang: University Putra Malaysia Publisher 2005.
15. Yaghmale F. Content validity and its estimation. *Journal of Medical Education, 2003; 3(1), 25-27.*
16. Tunggak B, Ngadi S, & Abu Naim H. Students delinquency and proposed solutions through teen model of conduct/integrated muslim students. *Jurnal Hadhari*, 2015; *7*(72), 11–30.
17. Salim S S, Arip M A, Mustafa M B, Taff M A, Khairani M Z, & Yasin M H. Construction and validity testing of content specialist encouragement of emotional intelligence module (EeiM). International Journal of Academic Research in Business and Social Sciences, 2018; 8(4), 853–860.
18. Tuckman B W. Conducting educational research (5th Ed). Belmont Wadsworth: Thomson Learning 1999.
19. Salim S, et al. Construction And Validity Testing Of Content Specialist Encouragement of Emotional Intelligence Module (EeiM). International Journal of Academic Research in Business and Social Sciences, 2018; 8(4), 853–860.
20. Tunggak B, Ngadi S, & Abu Naim H. Students Delinquency and Proposed Solutions Through Teen Model of Conduct/Integrated Muslim Students. *Jurnal Hadhari*, 2015; *7*(72), 11–30.
21. Choon L J, et al. Parental attachment, peer attachment, and delinquency among adolescents in Selangor, Malaysia. *Asian Social Science*, 2013; *9*(15), 214–219. https://doi.org/10.5539/ass.v9n15p214
22. Gayathri N, & Meenakshi K. A Literature Review of Emotional Intelligence. *International Journal of Humanities and Social Science Invention, 2013; ISSN*, *2*(3), 42–51.
23. Sidek MN, & Jamaludin A.Module building: How to build exercise module and academic module. Serdang: University Putra Malaysia Publisher. 2005.

Community Led Total Sanitation (CLTS) in Cikupa Village and Teluknaga Village in Tangerang, Indonesia

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ABSTRACT

Diarrhea incidence in Indonesia is 423 per 1000 population in 2006. Increased diarrhea cases in one area can be controlled by sanitation approach. One of the Ministry of Health programs to improve Indonesian health status is Community Led Total Sanitation (CLTS). Teluknaga and Cikupa Health Centers have differences in the number of diarrhea cases. In addition and geographical conditions. This study used observational quantitative study with cross sectional study design. In this study, there was no intervention. Study sample consisted of 200 respondents (100 respondents in Cikupa village and 100 respondents in Teluknaga village). This study used random sampling. One household will be chosen by one respondent to be interviewed. Analysis of the data used independent t-test. The results showed that mean of CLTS for the Teluknaga village and variable was -32.50 with standard deviation was 0.383. While, the mean of CLTS for Cikupa village was 44.14 with a standard deviation was 0.398. According to Mann Whitney test above showed that p-value was 0.000 $<\alpha = 0.05$. It meant that there was significantly different in CLTS between Cikupa and Teluknaga village, Tangerang. Implementation of CLTS in urban and rural areas has been still different. However although there were differences, it has been still a big and complex challenges. In addition, required varied methods, tools and approaches. Latrine subsidy in households was long-term production by government support.

Keywords: *Sanitation, Diarrhea, CLTS, Environmental, Indonesia*

Introduction

Sanitation development challenges in Indonesia are community social culture and behavior. They are accustomed to defecating in any place, especially to water bodies which are also used for washing, bathing and drinking water. In addition poor hygiene and sanitation have been still much. Study by The Indonesia Sanitation Sector Development Program (ISSDP) in 2006 showed that 47% of people behave defecation into rivers, fields, ponds, gardens and outdoors.

WHO states that waterborne disease deaths reach 3,400,000 people per year, and diarrhea is the biggest cause of death, 1,400,000 people per year. The cause of death is poor sanitation and water quality. Diarrhea is an endemic disease and also a potential outbreak disease in Indonesia that often causes death. In 2015 there were 18 outbreaks of diarrhea that spread in 11 provinces, 18 districts/cities with a total sufferers was 1,213 people and 30 deaths (CFR 2.447%)[(1)]. Based on cumulative data from 43 Primary Health Care in Tangerang District, 2014, it was found that the percentage of diarrhea cases of all ages increased since 2011 to 2014. The highest cases of diarrhea in 2011 were 40.19%, in 2012 cases increased to be 42.67%, in 2013 increased to 43.72% cases and in 2014 also increased to be 51.34% cases[(2)].

Increased diarrhea cases in one area can be controlled by sanitation approach. One of the Ministry of Health programs to improve Indonesian health status is Community Led Total Sanitation (CLTS). CLTS is a government program to strengthen efforts to accostume clean and healthy lives, prevent the spread of environment-based diseases, improve community capacity, and implement government commitments to improve access of drinking water and basic sanitation sustainably to achieve SDGs[(3)].

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The CLTS National Strategy is a reference for planning, implementation, monitoring and evaluation related to CLTS. Health sanitation is closely related to community culture. In an effort to foster community participation must be considered also the community socio-cultural conditions. To involve the community in development efforts, especially in the health sector that will bring better results is if the process use educative approach that is trying to raise awareness in the community through increasing knowledge by considering local social culture.

Ministry of Health Indonesia stated that the lowest percentage who implemented CLTS was DKI Jakarta Province 1.87% and Banten Province 24.44%, while the highest percentage who implemented CLTS were Special Region of Yogyakarta Province 93.84%[4].

Teluknaga and Cikupa Primary Health Care are located in Tangerang, Banten Province. Primary Health Care Teluknaga is a primary health care that has an ISO certificate and has been cases of diarrhea that fall into the top 10 diseases in the primary health care area, while the Cikupa is a primary health care that did not have an ISO certificate and for cases of diarrhea does not fall into the top 10 diseases. In addition, based on geographical conditions, Cikupa Village is an administrative area, close to industries, factories, shops and roadside resident, the condition is crowded and has sufficient facilities and infrastructure. Meanwhile, Teluknaga Village has a population whose livelihoods are mostly fishermen, located on the coast, and the area has many fish ponds. This differences is predicted due to the house and surrounding environment has not been health requirements, no sewerage, and littering behavior and communities PHBS has been still lacking[2]. Based on these problems, important to study about Community Led Total Sanitation (CLTS) Differences between Cikupa and Teluknaga, Tangerang District.

Methodology

This study was used observational quantitative study with cross sectional study design. In this study, there was no intervention. Study sample consisted of 200 respondents, 100 respondents in Cikupa village and 100 respondents in Teluknaga village. Sample collected used random sampling. Each family head who was recorded at the household where the data was collected will be chosen one respondent. The respondent criteria were sought as a family decision maker, a husband or wife. Then, the respondent will be given a questionnaire on community led total sanitation that will cover five pillars. Data analysis used an independent t-test analysis to determine CLTS differences between Cikupa and Teluknaga village.

Result

Description of 5 pillars CLTS implementation in Cikupa and Teluknaga Village as bellow:

Table 1: Description of CLTS in Cikupa dan Teluknaga Village, Tanggerang (respondents)

CLTS Implementation	Dwelling			
	Cikupa		Teluknaga	
	Good	Poor	Good	Poor
Open defecation free (ODF)	50	50	9	91
Hand washing with soap	79	21	24	76
Household drinking water and food management	42	58	26	74
Safekeeping of household waste	33	67	16	84
Safekeeping of household liquid waste	7	93	3	97

According to Tabel 1, the highest proportion of handwashing with Soap in Cikupa Village was good. While in the Teluknaga Village, the highest proportion of household drinking water and food management properly was good.

Table 2: Description of Average CLTS in Cikupa dan Teluknaga Village, Tanggerang

	Dwelling	N	Mean ± SD
STBM	Teluknaga Village	100	32,50 ± 0,383
	Cikupa Village	100	44,14 ± 0,398

Based on the table 2 showed that the mean of CLTS for the Teluknaga village variable was -32.50 with a standard deviation was 0.383. While, the mean of CLTS for Cikupa village was 44.14 with a standard deviation was 0.398.

Furthermore, it was conducted normality test first for bivariate analysis. Results of the normality test showed that distribution was not normal with p-value 0.000 $<\alpha = 0.05$. Then, non-parametric statistical tests were used using Mann-Whitney U.

Table 3: CLTS Differences in Cikupa dan Teluknaga Village, Tanggerang

	Dwelling	N	Mean	p-value	95% CI
STBM	Teluknaga Village	100	-11.640	0.000	-12.729 - -10.551
	Cikupa Village	100			

According to Mann Whitney test above showed that p-value was 0.000 <α = 0.05. It means significantly different of CLTS between Cikupa and Teluknaga Village.

Discussion

Incident cases of diarrhea in Cikupa Village were lower than Teluknaga village. In Cikupa Village, diarrhea cases were not included in the top 10 diseases however in Teluknaga Village, cases of diarrhea had been still in the top 10 diseases. Then, study result showed that there were differences in CLTS between Cikupa Village (low diarrhea cases) and Teluknaga village (high diarrhea cases). Study was conducted in Nyando in 2008, where diarrheal disease was found to be a major cause of morbidity and mortality among children under five, especially in rural and suburban communities in the district. Thus, diarrhea contributes 87% and 48% for child morbidity and mortality[5].

Requirement of sewage disposal that met to health rules were not polluting the soil surface, do not contaminate surface water, do not pollute soil water, dirt could not be open so that it could be used as a vector for laying eggs and breeding[6]. Factors that encourage indiscriminate disposal of fecal activities include low socio-economic levels, insufficient knowledge in environmental health, and poor habits in disposal of feces that are passed down from generation to generation. Build latrines depending on i) pre-existing social context factors, ii) socially intensive processes initiated by CLTS, iii) CLTS fosters the confidence to be able to build and rebuild toilets, and iv) CLTS communicates its benefits to health latrine[7]. When the community has succeeded in making changes and declares its environment free of open defecation free (ODF), the further challenge is to maintain these conditions so as to ensure that no single member of the community returns to practice open defecation free (ODF)[8].

According to observations, there has been still many respondents who behave less for pillars 1 to stop defecate at any place. It was because the community behavior was difficult to change, it seen from the community who already have latrines but still have defecation behavior in the river. This was in line with study stated that CLTS was an approach for long-term problems for a sustainable national planning framework with the implementation of CLTS promotion in schools, preparing cadres who follow CLTS, the implementing CLTS's cost included facilitation and installation of latrines cost by own resources, CLTS advocacy in churches and mosques, motivating children as a key role in using latrines in their homes[9].

Removing human waste (feces and urine) properly and maintaining personal hygiene could maintain health. If waste was not maintained and disposed incorrectly and unsafe, it could be affected to human health and caused serious diseases such as diarrhea, dysentery, typhoid, cholera and other types of infectious diseases. These health problems could be prevented if more effort was conducted for changes personal hygiene behaviors, such as handwashing properly, waste disposed properly, and using clean toilets with easy access to clean water sources[10].

Based on pillar 2 about handwashing with soap showed that behavior of handwashing with soap in Teluknaga village was lower than Cikupa village. Based on the observations to the respondents who have lack behavior of handwashing with soap, they have only washing hands with water without soap and lacking of respondent's knowledge regarding to important times for washing hands. Washing hands with water was more less effective in removing diseased germs from the hands than washing hands with soap. Hand washing using soap was one of the most effective and inexpensive ways to prevent diarrheal disease which mostly cau ses death in children. Washing hands with soap after using the toilet or helping children with bowel movements and before handling food could reduce the level of diarrhea, cholera and dysentery about 48 -59%[11].

Household drinking water and food management which was to be the pillar 3 of CLTS showed that the proportion of poor behavior in Cikupa village was 58% and the in Teluknaga village was 74%. Food must be

managed well and properly in order to prevented health problems and benefit for body. A good way to manage food was by applying the principles of food hygiene and sanitation. Household food management, although in small scale or on a household scale must also applying the food principles of sanitation. A good hygiene sanitation principles included sorted food ingredients, stored food ingredients, processed food, stored cooked food, transported food, served food[3].

Safekeeping of household waste which was to be pillar 4 of CLTS showed that the proportion of lack behavior in Cikupa village was 67% and in the Teluknaga village was 84%. Based on observations, it showed that both of two villages there have not been sorting organic and inorganic waste and did not dispose of garbage every day. Still found trash around the river and gardens proved that people's awareness have been still lack for littering impact.

Waste was a source of disease and a breeding for disease vectors such as flies, mosquitoes, rats, cockroaches. Garbage could be pollute the soil also and caused comfort and aesthetic disturbances such as unpleasant odors and unsightly views. Therefore waste management was very important to prevent disease transmission. Trash must be available, trash must be collected every day and disposed of in temporary shelters. If it was not reached by the service of garbage disposal to the final shelter, it could be carried out by eliminating the waste by stockpiled or burned[12].

Household liquid waste management (pillar 5) showed that the proportion was poor in the Cikupa village (93%) and Teluknaga village was 97%. Observations showed that in both village, it has been still poor for safekeeping household liquid waste. It seen from inundated and uncovered drains in almost these villages. Stagnant liquid waste could be a disease vectors source, including public faucets or lavatories. Domestic liquid waste must be disposed properly following to appropriate standards of waste disposal. Domestic liquid waste usually was not an extreme waste hazard to the environment except it was disposed incorrectly that could be impacted to surface water or shallow ground water.

The last and very important step in the waste management process was disposal that must be carried out in an eco-freindly. Rwanda city that liquid waste management was company's responsibility, however the government was also developing guidelines on how disposal activities should be carried out. This study stated that "Every liquid waste, especially from hospitals, clinics, industries and any other hazardous liquid waste must be collected, cared for and changed in a way that does not reduce the environment to prevent, eliminate or reduce adverse effects on human health, resources nature, flora and fauna[13].

The traditional approach to rural sanitation is based on two assumptions. The first assumption is that people do not know about sanitation and hygiene, but if they are educated they will change their behavior. The second assumption is that people will use the toilet if they are given assistance to build it. However, these two assumptions are often proven wrong. Research shows that knowledge of health risks associated with poor sanitation does not always trigger behavior change. Furthermore, the proportion of latrines built with subsidies has never been used but as storage rooms, animal shelters. The traditional approach also focuses on individual households rather than encouraging the whole community to take collective action to clean the environment[14][15][16]. Interventions focused on clean water, sanitation and hygiene have been shown to have an impact on the incidence of diarrhea from many studies conducted[17].

Conclusion

Implementation of CLTS in urban and rural areas has been still different. However although there were differences, it has been still a big and complex challenges. In addition, required varied methods, tools and approaches. Latrine subsidy in households was long-term production by government support. Thus, the problem of this study was people behavior who quite difficult to change in implementing CLTS.

Competing Interst: This research is part of Ministry of Research Technology and Higher Education (RISTEKDIKTI) Indonesian's funding, thus, there is no competition in conducting this research.

Etchical Clearance: The study was approved by the Ministry of Research Technology and Higher Education (RISTEKDIKTI) Indonesian

Source of Funding: This research is Ministry of Research Technology and Higher Education (RISTEKDIKTI) Indonesian's funding.

REFERENCES

1. Departement of Health Tangerang. Profile of Tangerang District Health Office; 2015
2. Departement of Health Tangerang. Profile of Tangerang District Health Office; 2014
3. Ministry of Health. Indonesia Health Profile 2013. Jakarta; 2014
4. Ministry of Health. Guidelines for Implementing Community Based Total Sanitation. Jakarta; 2015
5. Makotsi N, Kaseje D, Mumma J, Opiyo JLL. Association of Community Led Total Sanitation to Reduced Household Morbidity in Nyando District. International Journal of Sciences: Basic and Applied Research (JSBAR); 2016
6. Notoatmodjo S. Public Health Sciences Basic Principles. Jakarta: PT Rineka Cipta; 2003
7. Harter M, Mosch, Sebastian and Mosler HJ. How Does Community Led Total Sanitation (CLTS) affect latrine ownership, A Quantitative Case Study from Mozambique. BMC Public Health; 2018
8. Kar K. Why not Basics for All? Scopes and Challenges of Community-led Total Sanitation. IDS Bulletin; 2012
9. Sah S and Negussie A. Community Led Total Sanitation (CLTS): Addressing the Challenges of Scale and Sustainability in Rural Africa. Desalination; 2008
10. Conant J. Sanitation and Cleanliness For a Healthy Environment. Berkeley: Hesperian Foundation; 2005
11. United Nations Children's Fund (UNICEF). Handwashing; 2008
12. Ministry of Health. Diarrhea Situation in Indonesia. Jakarta; 2011
13. Alice U, Ming Y, Nestor U and Narcisse N. Liquid Wastes Treatment and Disposal in Rwanda. Journal of Pollution Effects & Control; 2017
14. Curtis VA, Biran K, Deverell C. Hughes KB and BD. 'Hygiene in Thehome: Relating Bugs and Behaviour.' Social Science and Medicine; 2003
15. Curtis VB, Kanki T, Mertens E, Traore I. Diallo FT and SC. 'Potties, Pits and Pipes: Explaining Hygiene Behaviour in Burkina Faso.' Social Science and Medicine; 1995
16. Scott BV, Curtis and T. Rabie. 'Protecting Children From Diarrhea and Acute Respiratory Infections: The Role of Handwashing Promotion in Water and Sanitation Programmes.' Regional Health Forum; 2003
17. Fewtrell L, Kaufmann RB, Kay D, Enanoria W, Haller L, & Colford JMJ. Water, Sanitation, and Hygiene Interventions to Reduce Diarrhoea in Less Developed Countries: a Systematic Review and Meta-Analysis. The Lancet Infectious Diseases; 2005

The Prevalence of Explained and Unexplained Subfertility— A Case Study: Kirkuk City (Iraq)

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ABSTRACT

Infertility refers to the inability of a sexually active non-contracepting to get pregnancy in a one year. The diagnosis of explained infertility is performed via standard fertility investigations, which encompasses: assessment of ovulation, semen analysis and tubal patency test. The infertility is considered as an unexplained when the standard fertility evaluation fails to identify an abnormality. This study aims to determine the prevalence and main causes of subfertility. In this study, a multicentre survey is carried out at the infertility centre at the Azadi teaching hospital in Kirkuk, Iraq during the period January 2016 – October 2018. For this aim, 1023 patients are involved in this case-control study: where the females are ranging in age from 18 to 45 years. The results show that (55.35%) have primary subfertility, whereas (44.5%) have secondary subfertility. Additionally, (44.5%) and (75.65%) have primary and secondary subfertility respectively. Furthermore, (75.65%) are explained while unexplained subfertility cases are found in (24.34%). The main causes of female subfertility: 46.64% are ovulation disorders, (21.18%) are primary and (21.18%) are secondary. Besides, out total (774 explained) patients, there is (15.24%) has tubal causes, (6.84%) are primary and (8.39%) are secondary. Moreover, in (20%) the cause is due to male factor, (12.4%) are primary and (7.62%) are secondary. Additionally, in (1.16%) of subfertility is caused by endometriosis, (0.09%) and (0.03%) is primary and secondary subfertility respectively. (16.92%) have multiple disorders found in both partners. Also, in explained subfertility in (63%), the females were responsible for the subfertility, male factor alone is in (20%), (52.66%) are primary and (47.33%) are secondary. Finally, regarding male factor subfertility, the outcomes shows follows: azoospermia in (7.1%), asthenozoospermia in (21.93%), (55.48%) has oligospermia, (8.38%) has oligo-terato-asthenozoospermia and (7.1%) has teratozoospermia.

Keywords: *Infertility, azoospermia, oligospermia, asthenozoospermia, teratozoospermia*

Introduction

Subfertility is a worldwide concern can be either primary or secondary. Primary subfertility is defined as inability to achieve pregnancy after one year of regular intercourse while secondary subfertility is defined when there is a preceding pregnancy irrespective to the outcome. It implies that the processes leading to conception have occurred successfully and so has a better prognosis[1]. The World Health Organization (WHO) anticipated that (60-80 million) couples around the world currently are subjected to have subfertility[2][3]. It varies across regions and expected to affect (8-12 %) of couples[4]. It may also be classified as explained in which there is one or more causes of subfertility and others are unexplained in which all the basic investigations including tests for ovulation assessment, tubal patency, hysterosalpingography, laparoscopy and seminal fluid analysis were normal[5]. In the cases mentioned above, abnormalities are likely to occur, however, it cannot be identified by current methods. There are many reasons which are as follows: 1) the releasing of the eggs could not be at the optimum period of fertilization which may not enter the fallopian tube. 2) the eggs can be reached by sperm which may prevent fertilization. 3) Distribution of transporting of the zygote. 4) Fails in implantation[6]. It is well known

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that the quality of the egg is crucial and the eggs of females in advanced maternal age have reduced capacity to achieve successful fertilization. Furthermore, in some women with unexplained infertility, another reason fertility complications could arise from polymorphisms in folate pathway genes[4][5]. Therefore, unexplained infertility is not the main reason. However, it is a relative inability to get pregnancy, and lots of these patients may be imagined without getting any treatment[7].

It may be appropriate to investigate and treat those patients with less than one-year history of subfertility when they have obvious features which can lead to subfertility such as patients with endocrine problems like severe PCOS, hypothyroidisim or hyperthyroidisim, female age more than 35 years or cases diagnosed as endometriosis before marriage[8]. There is some other term in subfertility which is called fecundability which means the probability of having a pregnancy within one menstrual cycle[9]. Female age and duration of subfertility is the most important predictor of the outcome. It is well known that the fecundity is reduced with aging, it is usually decreasing in 32-years old, then, it will fall dramatically in 37 [10][11]. In the other hand, the rate of the natural monthly fecundity can be about (25%) in ranging 20-30 years of age which reduces to under (10%) upper the 35 years old. Furthermore, both the female and male factor are involved and account approximately for 35% [12]. In over 5800 couples in 25 counties, WHO identified that more than 85% of infertility among African females was subjected to infection comparing with 30% in females worldwide[13]. This means that there is the different demographic distribution of the causes of subfertility. Accordingly, this work is also aiming to investigate the existing surveys on the causes of the prevalence of subfertility and proportion of couples in order to obtain a medical help for fertility problems in Kirkuk city in Iraq[14].

Patients and Method

To estimate the prevalence and main causes of subfertility, a multicentre survey was conducted over 3 years and 9 months from (January 2015–October 2018) in Kirkuk subfertility clinic of Azadi teaching hospital. 1023 couples in this region, who consulted a practitioner for primary or secondary subfertility during this period were included in the study. patients who were involved in the research, the female age was ranging between 18-45, and male age was between 18-55 years, patient with primary infertility had never get pregnancy, while secondary subfertility include any patient had at least one time in which pregnancy test was positive whatever the outcome, whether it ended to full term pregnancy or ended as early abortion, to all patients the main basic investigation of subfertility were done including hormonal profile (FSH, LH, TSH, Prolactin hormones were estimated at the second day of the cycle, and progesterone level was measured between day 21 -29 according to the patients cycle, all female patients had test for tubal patency (HSG) which was done 2 days after finishing her period, transvaginal ultrasound was done on day 2 and day 13 to assess ovulation, and seminal fluid analysis was done after 3 days of abstinence.

Results

The study shown in the following tables. In Table (1), it is shown that among 1023 patients, 567 patients (55.35%) have primary subfertility among that primary subfertility 311 (30.4%) of the patients were between (18-30) years age, 198 (19.35%) their age was between 31-39 years, 58 (5.6%) were between 40-45. At the same time from total cases (1023) it was found that 456 (44.5%) have secondary subfertility, 261 (25.5%) their age was between (18-30), 163 (15.9%) their age was between (31-39), 32 (3.1%) patients their age was between (40-45). In Table 2 three fourth from the total number of cases 774 (75.65%) were explained while unexplained subfertility cases were found in one fourth 249(24.34%) of the couples surveyed. In Table (3) result shows that the main causes of female subfertility were ovulation disorders 361 (46.64%), 197 (25.46%) were primary and 164 (21.18%) were secondary. Out of 1023 total patients (774 explained) there was 118 (115.24%) had tubal causes, 53 (6.84%) were primary, and 65 (8.39%) were secondary. In 155 (20%) the cause of subfertility was only due to male factor 96 (12.4%) was primary and 59 (7.62%) were secondary. 9 (1.16%) patients had endometriosis, 7 patients (0.09%) was primary and 2 (0.03%) secondary subfertility. 131 (16.92%) had multiple disorders in which the cause was found in both partners. Out of 774 cases (explained subfertility), the females were responsible for subfertility in 488 (63%) which means that more than half of the cases of explained subfertility were only due to female causes, and male factor alone was in 155 (20%), which mean around one-fifth of explained subfertility was

due to male factor alone. 257 (52.66%) were primary, and 231 (47.33%) were secondary as shown in Table 3. Regarding male factor subfertility, out of 155 patients with male factor subfertility, azoospermia was found in 11 (7.1%), 34 (21.93%) patients the cause of male factor was asthenozoospermia, 86 (55.48%) oligospermia, 13 (8.38%) had oligo-terato-asthenozoospermia, and teratozoospermia in 11 (7.1%) patients.

Table 1: Distribution of primary and secondary subfertility according to female age

Age groups	No of patients	Types of subfertility			
		Primary		Secondary	
		No.	%	No.	%
18-30	572	311	30.4	261	25.5
31-39	361	198	19.35	163	15.9
40-45	90	58	5.6	32	3.1
Total	1023	567	55.35	456	44.5

Table 2: Number of explained and unexplained subfertility

	Causes of subfertility			
	Explained		Unexplained	
	No.	%	No.	%
Primary (567)	429	41.93	138	13.48
Secondary (456)	345	33.72	111	10.85
Total 1023	774	75.65	249	24.34

Table 3: Causes of Explained subfertility in 774 male and female patients

	Causes									
	Endometriosis		Anovulation		Tubal factor		Male factor		Combined	
	No.	%	No.	%	No.	%	No.	%	No.	%
Primary (411)	7	0.09	197	25.46	53	6.84	96	12.4	58	7.4
Secondary (363)	2	0.03	164	21.18	65	8.39	59	7.62	73	9.43
Total 774	9	1.16	361	46.64	118	15.24	155	20	131	16.92
	488 (63%) total only female causes alone						155 (20%)		131 (16.92%)	

Table 4: Types of abnormalities in the seminal fluid analysis of 155 patients with male factor subfertility

	Abnormalities in the seminal fluid analysis									
	Azospermia		Asthenozospermia		oligospermia		oligoasthenozo-ospermia		Teratozospermia	
	No.	%	No.	%	No.	%	No.	%	No.	%
Primary 94 (60.64%)	11	7.1	21	13.54	47	30.32	8	4.68	7	4.51
Secondary 61 (39.35%)	0	0	13	8.38	39	25.16	5	3.22	4	2.58
Total 155	11	7.1	34	21.93	86	55.48	13	8.38	11	7.1

Discussion

WHO has reported in[1], in developing countries, 25% of couples are found to be infertile. Additionally, the organization stated that the prevalence of females has kept as it is from 1990 to 2*010. In 2010, US CDC reported that the prevalence rate of infertility was 10.9% where the rate has demonstrated variations across parts of any country[2]. It is worth mentioning that abnormalities are possible to present; however, they can not be detected via current methods. In this study, we found that the prevalence of unexplained subfertility reached 24.34% similar to US prevalence rate (the unexplained infertility rate was about 25% of infertile couples)[8]. Furthermore, we found that the rate of male subfertility is 23.25%. This rate is less than what has obtained in India where the malefactor prevalence was between (40- 50%) and impacts of 7% of all males[12].

The incidence of pathological subfertility is difficult to determine precisely, especially for male factor due to our social culture which always defends men against women resulting in delay or underestimating the diagnosis of the male element. In some cultures, subfertility bears a sense or stigma of being declined by the couple. Additionally, therefore, subfertility causes a noticeable disillusionment[15]. It is well known that the subfertility reasons vary with geographic and socioeconomic variation[11]. Deprivation, starvation and mass migration due to war in Iraq, especially in Kirkuk city in the last 4 years. Furthermore, the high cost of infertility investigation and treatment and non-availability of them in government hospital make patients unable to attend private infertility clinic. On limit resources, the infertility places a large burden by seeking helps for widespread couples.

The results demonstrated that 63% from total 774 patient with explained subfertility was due to pure female causes. Also, 46.64% have anovulation and 15% tubal causes. This finding is similar to study done in England where it was found that 50% are female causes, 25% is due to anovulation and 25% are caused by tubal problems. In the literature, the studies showed that the woman causes are ranged between 25-37% of the infertility worldwide. The larger proportions in Southeast Asia and Sub-Saharan Africa are mainly caused by tubal factor[13], other 20% male and 16.92% combined causes. The reason of these findings is due to restricted sexual relation within a marriage relation only. Additionally, the low level of sexual transmitted disease in Iraq is because of the country religion is Islam which prohibits the sexual relations between the unmarried couples.

In Sub-Saharan Africa[16], primary infertility is less common than secondary infertility, where most often the outcome of untreated STIs or complications from pregnancy/birth[14]. Since the 1980s, there was an increasing in infertility rates about 4%, and most of them are due aging[15]. It is well known that the females become less fertile as they grow old. For instance, females in 35 years old get pregnant after three years of regular unprotected intercourse. Nevertheless, only 77% women in 38 years old get pregnant after three years of regular intercourse. In the UK, in infertile couples, male factor infertility rate reaches 25%, and another 25% remains as unexplained infertility[17]. On the other hand, 10% of couples in Sweden who seek for children are infertile[18]. Additionally, male factor, female factor, and both side factors have equally rate (about 33%) of infertility in all these cases[18].

Conclusion

We concluded that there are differences in the causes of the subfertility in different areas in the world. Several reasons are behind this finding which can be as follows:

Religious points.

The age of marriage.

Poverty.

The differences in the national resources in each country which can support subfertile people.

Conflict of Interest: The authors have no financial, consultative, institutional, and other relationships that might lead to bias or conflict of interest.

Source of Funding: The authors have no sources of funding, so it is self-funding research.

Ethical Clearance: We declare that the study does not need ethical approval.

REFERENCES

1. Organisation WH. WHO laboratory manual for the examination of human semen and sperm-cervical mucus interaction. Cambridge university press; 1999.

2. Rutstein SO, Shah IH. Infecundity infertility and childlessness in developing countries. 2004;

3. Organization WH, Organization WH. Infecundity, infertility, and childlessness in developing countries. DHS Comp reports. 2004;9.

4. Shankardass MK. Looking back, looking forward: A profile of sexual and reproductive health in India. JSTOR; 2006. p. 338–40.

5. Moghissi KS, Wallach EE. Unexplained infertility. Fertil Steril. 1983;39(1):5–21.

6. Aston KI, Uren PJ, Jenkins TG, Horsager A, Cairns BR, Smith AD, et al. Aberrant sperm DNA methylation predicts male fertility status and embryo quality. Fertil Steril. 2015;104(6):1388–97.

7. Altmäe S, Stavreus-Evers A, Ruiz JR, Laanpere M, Syvänen T, Yngve A, et al. Variations in folate pathway genes are associated with unexplained female infertility. Fertil Steril. 2010;94(1):130 7.

8. Isaksson R, Tiitinen A. Present concept of unexplained infertility. Gynecol Endocrinol. 2004;18(5):278–90.

9. Arain F, Arif N, Halepota H. Frequency and outcome of treatment in polycystic ovaries related infertility. Pakistan J Med Sci. 2015;31(3):694.

10. Spandorfer SD, Avrech OM, Colombero LT, Palermo GD, Rosenwaks Z. Effect of parental age on fertilization and pregnancy characteristics in couples treated by intracytoplasmic sperm injection. Hum Reprod. 1998;13(2):334–8.

11. Jansen RPS. Elusive fertility: fecundability and assisted conception in perspective. Fertil Steril. 1995;64(2):252–4.

12. Kumar N, Singh AK. Trends of male factor infertility, an important cause of infertility: A review of literature. J Hum Reprod Sci. 2015;8(4):191.

13. Ombelet W, Cooke I, Dyer S, Serour G, Devroey P. Infertility and the provision of infertility medical services in developing countries. Hum Reprod Update. 2008;14(6):605–21.

14. Killick S, Trussell J, Cleland K, Moreau C. Factors associated with subfertility among women attending an antenatal clinic in Hull. Hum Fertil. 2009;12(4):191–7.

15. Schmidt L, Christensen U, Holstein BE. The social epidemiology of coping with infertility. Hum Reprod. 2005;20(4):1044–52.

16. Gerais AS, Rushwan H. Infertility in Africa. Popul Sci. 1992;12:25.

17. Tamura T, Picciano MF. Folate and human reproduction. Am J Clin Nutr. 2006;83(5):993–1016.

18. Gupta JK, Mires G, Khan KS. Core Clinical Cases in Obstetrics and Gynaecology Third Edition: A problem-solving approach. CRC Press; 2011.

Irisin, Resistin and 25-Hydroxyvitamin D in Iraqi Obese and Non-Obese Type 2 Diabetic Patients

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ABSTRACT

Objective: evaluate the serum levels of irisin, resistin, and vitamin D in a population of Iraqi obese diabetic men and to compare non-obese diabetic men.

Method: A case-control study, carried out from July 2017 to January 2018, and included 160 men; 80 patients with type 2 diabetes mellitus (DM) and 80 aged- and BMI matched apparently healthy men. The Subjects subdivided according to their BMI into; obese, overweight and normoweight. Investigations included serum measurements of fasting serum glucose (FSG) and lipid profile, 25-Hydroxyvitamin D, resistin, irisin and insulin.

Results: Serum resistin levels and 25-hydroxyvitamin D did not differ significantly among groups of diabetic men and healthy men with respect to their obesity. Serum irisin concentrations were significantly decreased in diabetic obese when compared with that of healthy obese. While, the mean values of serum irisin of diabetic overweight and diabetic normoweight were higher than those of healthy overweight and normoweight, but did not reach the significant level. The results also showed that there was significant positive correlation between serum 25-hydroxyvitamin D levels and irisin concentrations in diabetic obese group ($r= 0.398$, $P<0.022$).

Conclusion: The present study suggested the significant role of irisin myokine in pathogenesis of diabetes mellitus type 2, while that of resistin and vitamin D need to be evaluated in one more large study. Obesity may have an important effect on blood levels of irisin and vitamin D.

Keywords: *Diabetes mellitus, obesity, 25-hydroxyvitamin D, Irisin, resistin*

Introduction

Diabetes mellitus (diabetes) is a metabolic disorder with heterogeneous etiologies, which is characterized by chronic hyperglycemia and disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both[1]. Obesity has been recognized as one of the most important single risk factors in the pathogenesis of type 2 diabetes mellitus. In obese individuals there are marked increases in the secretion of pro-inflammatory adipokines including resistin, IL-6 and TNF-α and decreased production of anti-inflammatory adipokines such as adiponectin[2, 3]. In humans, resistin is mainly secreted by macrophages, which suggests that resistin is linked to inflammation. Obesity and T2DM have been recognized as chronic inflammatory disorders that may be connected to pro-inflammatory cytokines and various adipokines, including resistin[4]. Irisin is a myokine that causes brown coloration of white fat, promotes fat burning and inhibits weight gain. Irisin is associated with glucose/lipid metabolism[5] and may prevent obesity and onset of diabetes[6, 7].

Vitamin D is not only essential for maintaining bone health, but it also plays a role in several other biochemical mechanisms within the human body. The mechanism of action of the active form of vitamin D is similar to that of other steroid hormones and is mediated by its binding

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to vitamin D receptor (VDR). VDRs are found in most tissues, not just in those that participate in the classic actions of vitamin D such as bones, intestines and kidneys, and the enzyme responsible for converting 25 (OH)D to 1,25(OH)2D is also expressed in a variety of extra-renal sites, such as endothelial cells, beta cells, and immune cells[8]. The complex biochemical interactions between adipose tissue and vitamin D in vitro raise the question as to whether hypovitaminosis D, itself, may contribute to obesity or inhibit weight loss in vivo. Several studies have indicated a relationship between vitamin D status and the risk of diabetes or glucose intolerance. Vitamin D has been proposed to play an important role and to be a risk factor in the development of insulin resistance and the pathogenesis of type 2 DM by affecting either insulin sensitivity or β-cell function, or both[9]. The aim of the present study is to evaluate the serum levels of irisin, resistin, and vitamin D in a population of Iraqi obese diabetic men and to compare the results with those of non-obese diabetic men.

Method

Study Design: This case-control study was carried out at Department of Biochemistry, College of Medicine, University of Baghdad, at El-Imam Ali Hospital and at Research laboratory for the College of Health and Medical Technology/Baghdad, Iraq during the period from July 2017 to January 2018. It consisted of 160 men subjects; 80 men patients with type 2 diabetes mellitus and 80 apparently healthy men age and BMI matched with patients. The patients and controls were also be subdivided according to their obesity into different groups: normo-BMI group which consisted of 28 men with BMI range between 18.5 – < 25 kg/m² and aged (40 – 65 years), overweight group consisted of 19 men with BMI range between 25 – < 30 kg/m² and aged (40 – 65 years), and obese group which included of 33 men their BMI was more than 30 kg/m² and aged (40 – 65 years). Formal consent was taken from each men.

Data Setting: Blood sample was taken in the fasting state from peripheral vein of each patient and control. The aspirated blood sample allows clotting for 30 minutes, centrifuged at 3000 rpm. The fasting serum glucose and lipid profile parameters were measured in the same day of blood collection by Abbott c4000 automatic biochemical analyzer. The remainder fraction of separated serum was frozen at – 20 ºC until the day of estimation of serum insulin levels using enzyme immunoassay kit (Demeditec, Germany), homeostasis model assessment of insulin resistance (HOMA-IR) and (HOMA-B) were derived from fasting glucose and insulin level by using equation[10], serum irisin levels were determined by using a commercially available human ELISA kit (cat no. MBS2600406, MyBiosource, USA), serum resistin was measured by using a human resistin demeditec elisa kit (Germany), and serum 25(OH)D level was estimated by using a commercially available human 25-hydroxyvitamin D ELISA kit (Human, Germany).

Statistical Analysis: Statistical analysis was performed by using SPSS version 24 for window was used for all statistical analysis. Statistical significance was assessed by ANOVA and student t-test. The linear regression test was applied for the correlation between different parameters, and the significance of the p-value was checked using t-test. P-value of less than 0.05 was considered significant.

Results

Table 1 illustrate serum levels of various markers according to studied groups

Table 1: Assessment of various markers in Diabetic Patients and Healthy Controls Groups

Parameter	D.obese	H.obese	D.over	H.over	D.norm	H.norm
Number	33	33	19	19	28	28
FSG (mmol/l)	10.21 ± 4.11•	5.32 ± 0.49	10.81 ± 4.10•	5.1 ± 0.57	13.92 ± 3.89•	4.76 ± 0.76
Insulin (µIU/ml)	22.12 ± 17.54^{NS}	22.38 ± 17.30	13.99 ± 5.31••	8.11 ± 3.61	7.48 ± 3.21^{NS}	8.22 ± 3.06
HOMA-IR	10.15 ± 9.22•••	5.49 ± 4.61	6.92 ± 4.42•••	1.85 ± 0.85	4.87 ± 3.90•••	1.76 ± 0.77
HOMA-β	103.50 ± 107.8••••	256.9 ± 150.0	59.42 ± 61.50••••	120.48 ± 79.36	26.46 ± 29.80••••	139.23 ± 67.56
Resistin (ng/ml)	5.09 ± 1.36^{NS}	4.74 ± 2.32	4.85 ± 2.38^{NS}	4.58 ± 1.54	4.60 ± 2.33^{NS}	4.51 ± 2.49
Irisin (ng/ml)	2.73 ± 1.48•	3.92 ± 2.71	4.56 ± 1.72^{NS}	4.01 ± 2.14	4.90 ± 4.79^{NS}	4.63 ± 4.81
25- Hydroxyvitamin D (ng/ml)	17.22 ± 4.33^{NS}	19.10 ± 5.69	19.78 ± 4.84^{NS}	18.98 ± 5.02	17.80 ± 7.12^{NS}	20.31 ± 6.70

D.obese: diabetic obese, H.obese: Healthy obese, D.over: diabetic overweight, H.over: healthy overweight, D.norm: diabetic normoweight, H.norm: healthy normoweight

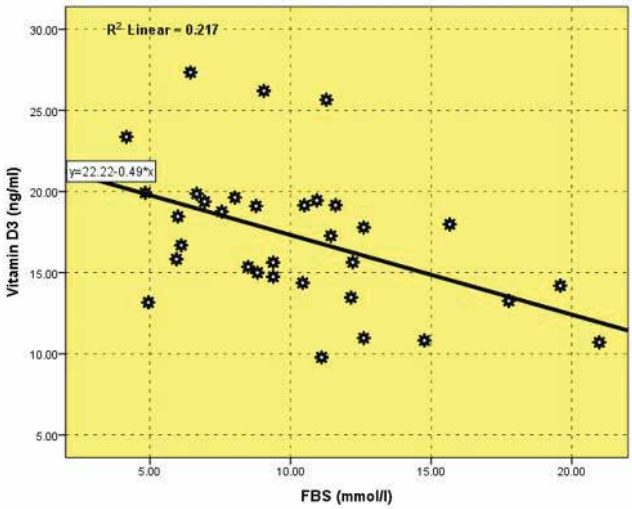


Figure 1: correlation of FBS with Vitamin D (r= -0.466, p<0.006) in diabetic obese group

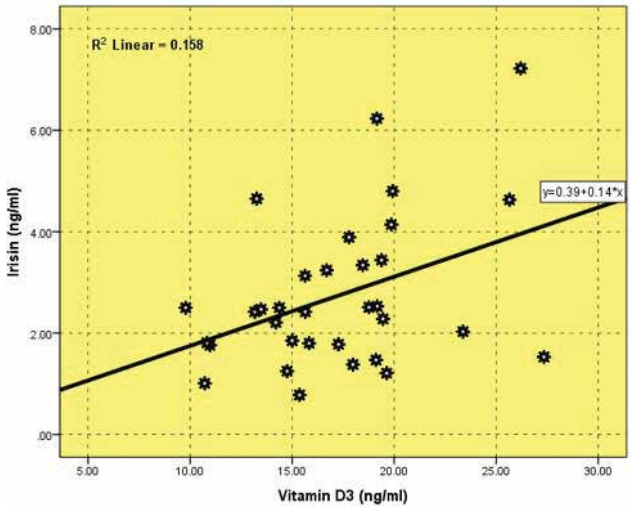


Figure 2: correlation of serum Vitamin D with Irisin (r= 0.398, p<0.022) in diabetic obese group

Discussion

In the present study, the serum 25(OH)D values were lower than the ideal level of 32 ng/mL (80 nmol/L). However, the range of the serum 25(OH) D concentration in the participants was in accordance with that in a number of other studies establishing the prevalence of vitamin D deficiency in T2DM[11]. In our study the controls (normo-BMI, overweight, obese) presented mean vitamin D levels within the lower range of vitamin D insufficiency and averaging (20.31 ± 6.70, 18.78 ± 5.02, 19.1 ± 5.69 ng/mL, respectively). This finding corresponds to concentrations reported for the Central European general population (17-to-33 ng/mL in mean) from cities in similar latitude[12]. For obese patients with diabetes, we revealed a significant positive correlation between irisin and serum 25(OH)D levels (r= 0.398, p=0.022). This finding corresponding with Nasser M Al-Daghri et al. who found a significant increase in circulating irisin at 12 months post-vitamin D intervention[13]. The elevation in circulating irisin was parallel to the increase in vitamin D level. The possible mechanisms of the involvement for 25(OH) D include the following; 1) Vitamin D can reduce IR in peripheral tissues by regulating inflammatory cytokines and inhibiting the expression of PPAR-γ[14]. Besides, it can affect insulin sensitivity by stimulating PPAR-δ and the gene expression of insulin receptor[15]. 2) Another possible mechanism may involve the direct involvements of both irisin and vitamin D in energy metabolism and regulation as well as adipocyte biology through uncoupling proteins[16].

Resistin is an adipokine that functions as a pro-inflammatory biomarker and a mediator of obesity-related insulin resistance[17]. The pro-inflammatory effects of resistin were attributed to its ability to activate the nuclear factor κB signaling pathway and subsequently enhance the production of pro-inflammatory cytokines, including TNF-α and IL-6, which impair insulin signaling pathways and result in the development of insulin resistance[18]. In addition, TNF α and IL-6 have been shown to alter the expression of PPARγ in adipocytes. PPARγ is an anti-inflammatory nuclear protein with insulin sensitizing functions[19]. The current study did not reveal any relationships between 25(OH) D and resistin. These results are consistent with those reported by other scientists[20,21]. According to the National Health and Nutrition Examination Survey (NHANES III) reports indicated that physical activity is related to serum 25(OH)D either due to enhanced vitamin D metabolism or increased sun exposure. Wanner et al.[22] reported significantly higher levels of 25(OH)D in those who exercised outdoors than in those who exercised indoors. Moreover, it was reported that exercise training is associated with systemic anti-inflammatory effects, with a reduction in pro-inflammatory markers such as IL-6 and TNF-a in plasma[23].

Conclusion

The present study suggested the significant role of irisin myokine in pathogenesis of diabetes mellitus type 2, while that of resistin and vitamin D need to be evaluated in one more large study. Obesity may have an important effect on blood levels of irisin and vitamin D.

Conflict of Interest: None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by Scientific Committee of the Biochemistry Department, College of Medicine, University of Baghdad.

Source of Funding: The work were supported by authors only

REFERENCES

1. 2. Classification and Diagnosis of Diabetes. Diabetes Care. 2016;39 Suppl 1:S13-22.https://doi.org/10.2337/dc16-S005
2. Northcott JM, Yeganeh A, Taylor CG, Zahradka P, Wigle JT. Adipokines and the cardiovascular system: mechanisms mediating health and disease. Canadian journal of physiology and pharmacology. 2012;90(8):1029-59.https://doi.org/10.1139/y2012-053
3. Saleh BO. Role of growth hormone and insulin-like growth factor-I in hyperandrogenism and the severity of acne vulgaris in young males. Saudi medical journal. 2012;33(11):1196-200
4. Patel L, Buckels AC, Kinghorn IJ, Murdock PR, Holbrook JD, Plumpton C, et al. Resistin is expressed in human macrophages and directly regulated by PPAR gamma activators. Biochemical and biophysical research communications. 2003;300(2):472-6
5. Kraemer RR, Shockett P, Webb ND, Shah U, Castracane VD. A transient elevated irisin blood concentration in response to prolonged, moderate aerobic exercise in young men and women. Horm Metab Res. 2014;46(2):150-4.https://doi.org/10.1055/s-0033-1355381
6. Huh JY, Panagiotou G, Mougios V, Brinkoetter M, Vamvini MT, Schneider BE, et al. FNDC5 and irisin in humans: I. Predictors of circulating concentrations in serum and plasma and II. mRNA expression and circulating concentrations in response to weight loss and exercise. Metabolism: clinical and experimental. 2012;61(12):1725-38. https://doi.org/10.1016/j.metabol.2012.09.002
7. Al-Radeef MY, Allawi AAD, Fawzi HA. Interleukin-6 gene polymorphisms and serum erythropoietin and hemoglobin in hemodialysis Iraqi patients. Saudi journal of kidney diseases and transplantation : an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia. 2018;29(5):1042-9.http://dx.doi.org/10.4103/1319-2442.243952
8. Bikle D. Nonclassic actions of vitamin D. The Journal of clinical endocrinology and metabolism. 2009;94(1):26-34.https://doi.org/10.1210/jc.2008-1454
9. Deleskog A, Hilding A, Brismar K, Hamsten A, Efendic S, Ostenson CG. Low serum 25-hydroxyvitamin D level predicts progression to type 2 diabetes in individuals with prediabetes but not with normal glucose tolerance. Diabetologia. 2012;55(6):1668-78.https://doi.org/10.1007/s00125-012-2529-x
10. Song Y, Manson JE, Tinker L, Howard BV, Kuller LH, Nathan L, et al. Insulin sensitivity and insulin secretion determined by homeostasis model assessment and risk of diabetes in a multiethnic cohort of women: the Women's Health Initiative Observational Study. Diabetes Care. 2007;30(7):1747-52.https://doi.org/10.2337/dc07-0358
11. Nikooyeh B, Neyestani TR, Tayebinejad N, Alavi-Majd H, Shariatzadeh N, Kalayi A, et al. Daily intake of vitamin D- or calcium-vitamin D-fortified Persian yogurt drink (doogh) attenuates diabetes-induced oxidative stress: evidence for antioxidative properties of vitamin D. Journal of human nutrition and dietetics : the official journal of the British Dietetic Association. 2014;27 Suppl 2:276-83.https://doi.org/10.1111/jhn.12142
12. Pludowski P, Grant WB, Bhattoa HP, Bayer M, Povoroznyuk V, Rudenka E, et al. Vitamin d status in central europe. Int J Endocrinol. 2014;2014:589587.https://doi.org/10.1155/2014/589587
13. Al-Daghri NM, Rahman S, Sabico S, Amer OE, Wani K, Al-Attas OS, et al. Impact of vitamin D correction on circulating irisin: a 12 month interventional study Int J Clin Exp Med. 2016;9(7):13086-92

14. McCarty MF, Thomas CA. PTH excess may promote weight gain by impeding catecholamine-induced lipolysis-implications for the impact of calcium, vitamin D, and alcohol on body weight. Medical hypotheses. 2003;61(5-6):535-42

15. Dunlop TW, Vaisanen S, Frank C, Molnar F, Sinkkonen L, Carlberg C. The human peroxisome proliferator-activated receptor delta gene is a primary target of 1alpha,25-dihydroxyvitamin D3 and its nuclear receptor. Journal of molecular biology. 2005;349(2):248-60.https://doi.org/10.1016/j.jmb.2005.03.060

16. Norheim F, Langleite TM, Hjorth M, Holen T, Kielland A, Stadheim HK, et al. The effects of acute and chronic exercise on PGC-1alpha, irisin and browning of subcutaneous adipose tissue in humans. The FEBS journal. 2014;281(3):739-49. https://doi.org/10.1111/febs.12619

17. Codoner-Franch P, Alonso-Iglesias E. Resistin: insulin resistance to malignancy. Clinica chimica acta; international journal of clinical chemistry. 2015;438:46-54.https://doi.org/10.1016/j.cca.2014.07.043

18. Kumar R, Prakash S, Chhabra S, Singla V, Madan K, Gupta SD, et al. Association of pro-inflammatory cytokines, adipokines & oxidative stress with insulin resistance & non-alcoholic fatty liver disease. The Indian journal of medical research. 2012;136(2):229-36

19. Fernandez-Veledo S, Nieto-Vazquez I, Vila-Bedmar R, Garcia-Guerra L, Alonso-Chamorro M, Lorenzo M. Molecular mechanisms involved in obesity-associated insulin resistance: therapeutical approach. Archives of physiology and biochemistry. 2009;115(4):227-39.https://doi.org/10.1080/13813450903164330

20. Al-Daghri NM, Al-Attas OS, Alokail MS, Alkharfy KM, Al-Othman A, Draz HM, et al. Hypovitaminosis D associations with adverse metabolic parameters are accentuated in patients with Type 2 diabetes mellitus: a body mass index-independent role of adiponectin? J Endocrinol Invest. 2013;36(1):1-6.https://doi.org/10.3275/8183

21. Roth CL, Elfers C, Kratz M, Hoofnagle AN. Vitamin d deficiency in obese children and its relationship to insulin resistance and adipokines. Journal of obesity. 2011;2011:495101.https://doi.org/10.1155/2011/495101

22. Wanner M, Richard A, Martin B, Linseisen J, Rohrmann S. Associations between objective and self-reported physical activity and vitamin D serum levels in the US population. Cancer causes & control : CCC. 2015;26(6):881-91.https://doi.org/10.1007/s10552-015-0563-y

23. Lira FS, Rosa JC, Yamashita AS, Koyama CH, Batista ML, Jr., Seelaender M. Endurance training induces depot-specific changes in IL-10/TNF-alpha ratio in rat adipose tissue. Cytokine. 2009;45(2):80-5.https://doi.org/10.1016/j.cyto.2008.10.018

Cellular Immunity of River Water Consuments and Bandarmasih Municipal Waterworks Consuments

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ABSTRACT

The quality of water used for daily needs affects human health. Some people in Banjarmasin use the PDAM Bandarmasih water and some use Martapura River water. One of the infection signs is the increases of white blood cell, includes neutrophil, monocyte, eosinophil and lymphocyte. The aims of this study was determine the differences of neutrophil, monocyte, eosinophil and lymphocyte count between Martapura river water consuments and Bandarmasih Local Water Supply Utility consuments in Banjarmasin. This study was an analytic observational with a cross sectional approach. Sample selection used purposive sampling technique. The result showed that neutrophil, monocyte, eosinophil and lymphocyte count average level of 30 consuments of Martapura River water were 54.03%, 7.43%, 3.2%, 34.8%, respectively; and neutrophil, monocyte, eosinophil and lymphocyte count average level of 30 consuments of Bandarmasih Local Water Supply Utility was 54.9%, 7.53%, 4.39%, 32.8%, respectively. Statistical analysis with unpaired t-test showed that there wasn't any difference of neutrophil, monocyte, eosinophil and lymphocyte.count between Martapura River water consuments and Bandarmasih Local Water Supply Utility consuments (p=0.723, p=0.822, p=0.623%, p=0.318) in August 2018 period.

Keywords: *river water consuments, local water supply consuments, immunity, leukocytes*

Introduction

The river flow in the Province of South Kalimantan, especially the City of Banjarmasin, is used for various activities. The percentage of river water use by the people of the Alalak River to clean their houses is 95%; to water the plants 92%; to bath 77%; to wash the clothes, the cooking utensils, and the eating utensils 74%; and forthe ablution 1%.[1]

The more the activity of the people on the riverside grows, the higher the level of pollution in the waterdue to the direct household waste thrown away to the water.[2]The huge amount of waste disposalinto the river will make the quality of water worse.As many as 34% of the people around the river in Banjarmasin throw feces directly into the river and 64% use traditional septic tang (*cubluk*) that do not meet the requirements of good sanitation, causing the surrounding environment to be polluted. It is very possible to find many bacteria, viruses, and parasites in polluted water.[3]The bacteriological test of river water in Berangas, Barito Kuala showed that the MPN values of *Coliform* and *E. Coli* are respectively 29 and 0 MPN/100 ml. The MPN value of *Coliform*dropped to 18 MPN/100 ml in the river water which has been given alum.

Another cause of river water pollution in the city of Banjarmasin is the disposal of domestic waste and factory waste into the river.[4] As the population increases, the effortsto fulfill the water needs are increased through the Local Water Company (PDAM). The clean water in the city of Banjarmasin is supplied by the PDAM Bandarmasih through the process of coagulation-flocculation, filtration, sedimentation and disinfectation. Chlorineisa disinfectant commonly used by PDAM.[5]This substance is capable of killing pathogenic bacteria and protozoa in the water and inhibiting the growth of moss.[6]The existence offreechlorine compound in the distribution of water permitted by PERMENKES 2010is 0.2-0.5 mg/l.[7]

The microbiological quality of water provided by PDAM Bandarmasih is proven to be good through the analysis of the quality of customers clean water of Water Treatment Plant (IPA)zone 1 PDAM Bandarmasih on

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the period of June-July 2018, the amount of *E. Coli* and the total of *Coli* is 0 per 100 ml of water in the sample thatmeets the drinking water requirements.[8]

Neutrophils together with monocytes are phagocytic cells and are the first immune cells to respond during infection to fight bacteria.[9] Eosinophils play a role in allergic and parasitic infections.[10] Whereas lymphocytes are able to produce the body's defense components against foreign objects that have been specifically identified. There are B lymphocytes that function in humoral immunity and produce antibodies in the blood, and T lymphocytes as cellular immunity that does not produce antibodies, but works directly to destroy specific foreign objects with chemicals.[9,10]

The poor water quality, especially microscopically, increases the risk of infection for its users, one of which is an increase in the number of leukocytes. Based on the description above, a study was conducted to determine the differences in the number of neutrophils, monocytes, lymphocytes and eosinophils of Martapura River water users with water users of PDAM Bandarmasih.

Research Materials and Method

The implementation of this study was using an observational analytic cross sectional method. The population of this study is the people using the water from Martapura River on Ray Street 17 RT. 02 Berangas District with a total population of 155 people and the people using the water from PDAM Bandarmasih on Maluku Street RT. 05 Pasar Lama District with a total population of 176 people for daily needs in Banjarmasin City in August 2018.

Results

The Shapiro-Wilk test showed that the data on the number of neutrophils and lymphocytes of river water user group and PDAM water user group spread out normally. The data onthe number of eosinophils and monocytes were not normally distributed, hence data transformation was carried out. After all data were normally distributed, it was followedby hypothesis testing with unpaired t, the results showed that there were no statistically significant differences in the number of neutrophils, monocytes, lymphocytes and eosinophils between the two groups of research subjects with *p* values of 0.723, 0.822, 0.623 and 0.318.

Table 1: Characteristics of Respondents of Water Users of Riveron Ray Street 17 and Water Usersof PDAMon Maluku Street inAugust 2018 according to Gender, Range of Age, Current Disease History (RPS), Drug Consumption History and Neutrophil Levels

Category		Group			
		Water User of River		Water User of PDAM	
		Total (people)	Percentage (%)	Total (people)	Percentage (%)
1	**Gender**				
	Female	19	63.3	23	76.7
	Male	11	36.7	7	23.3
2	**Range of Age (year)**				
	18-31	5	16.7	3	10
	32-46	13	43.3	18	60
	47-60	12	40	9	30
3	**Current Disease History (RPS)**				
	Pain	2	6.66	2	6.66
	Hypertension	0	0	1	3.33
	Hypercholesterol	0	0	1	3.33
	Anemia	0	0	1	3.33
	Diabetes mellitus	0	0	2	6.66
4	**Drug Consumption History**				
	Antihipertensi	4	13.33	1	3.33
	NSAID	2	6.66	2	6.66
	Anticholesterol (statins)	0	0	4	13.33
	Contraception (birth control pill)	2	6.66	2	6.66
	Antipyretic	1	3.33	1	3.33
	Ulcer medication (antacid & H2-receptor antagonist)	2	6.66	3	10
	Chlorpheniramine maleate	1	3.33	1	3.33
	Anti gout	0	0	1	3.33
	Antihyperglycemic	0	0	2	6.66

Table 2: Results of Laboratory Test of Water from PDAM Bandarmasih on Maluku Street, RT 05, Banjarmasin and Water from Martapura River on Ray Street 17, RT 02, Berangas with and without Alum

	Parameter	Maximum Limit	River Water	River Water with Alum	PDAM Water
1.	**Physics**				
	Color	≤15	19.7	2	5
	Turbidity(NTU)	≤5	84.6	0.1	1.27
	Temperature (C°)	Air temperature ± 3	26.9	26.9	26.5
2.	**Chemicals**				
	Chlorine(mg/L)	≥0.2	-	-	0.82
	Aluminium (mg/L)	6.5-8.5	0.55	1.25	-
	Iron (mg/L)	1.0	2.24	0.09	-
	Lead (mg/L)	0.2	0.38	0.1	-
3.	**Bacteriological**				
	E. Coli (MPN/100 mL)	0	0	0	0
	MPN *Coli* (MPN/100 ml)	0	50	18	0

Table 3: Average Number of Neutrophils, Monocytes, Lymphocytes and Eosinophils in Respondents ofWater Users of Riveron Ray Street 17, RT 02, Berangas and Water Users of PDAM Bandarmasih on Maluku Street, RT 05, Banjarmasin in the Period of August 2018

#	Category	Group of User Respondent			
		Martapura River Water		PDAM Water	
		N	%	N	%
1.	**Monocytes**				
	Average	30	7,43	30	7,54
	Normal	20	6,36	18	6,28
	Monocytosis	10	9,57	12	9,4
	Monocytopenia	-	-	-	-
2.	**Neutrophils**				
	Average	30	54,03	30	54,9
	Normal	19	57,2	18	59,25
	Neutropenia	9	42.3	11	46.2
	Neutrophilia	2	77	1	72.6
3.	**Eosinophils**				
	Average	30	3,21	30	4,39
	Normal	14	2,8	9	3
	Eosinopenia	9	1	9	1,2
	Eosinophilia	7	7	12	7,9
4.	**Lymphocytes**				
	Average	30	34,8	30	32,8
	Normal	19	31,4	21	31
	Lymphocytosis	9	46	5	42,5
	Lymphocytopenia	2	17,5	4	22,7

Discussion

The average number of each cell type is almost entirely within the normal range, both in the group of the river water users and thegroups of the PDAM water users.Only the average number of eosinophils of PDAM water users has increased from the normal value (4.39%). The statistical results showed that there were no significant differences in the number of neutrophils, monocytes, lymphocytes and eosinophils between the two groups of respondents, this could be due to the two groups of respondents giving direct treatment of water to be used, namely deposition, alum and boiling which could interfere with the sustainability of the pathogenic bacteria in the water thereby reducing the risk of infection for users. In addition, the use of soap, toothpaste and other cleaning agents can kill pathogenic microorganisms because they are antibacterial.

The river water used by the people on Ray Street 17, Berangas for daily activities, especially kitchen needs is always accommodated and given the alum which functions as a floculator where its activities are to agglomerate pollutants such as industrial residues, metals, and microorganisms and are known also as an antibacterial[11].Alum can inhibit the bacterial growth. The concentration of alum as much as 1% makes gram-positive bacteria experience a death phase, and the concentration of 2% causes the death of gram-negative bacteria.

The disposal of soap and detergent waste into the river results to aworse quality of river water. However,

alum can reduce detergent levels by absorbing dyes and other pollutants, and alum is effective in reducing iron levels in water.[13]

Particularly for drinking water, besides being given alum, it can also be boiled. The bacteria and the other pathogens in the water that go through a cooking process to 100°C for 5-10 minutes will disappear.[14]

The water needs for the daily activities of people in Maluku Street, Pasar Lama are fulfilled with the water from PDAM Bandarmasih. The water has been given chlorine as a disinfectant. The results of qualitytest of PDAM water (table 2)are in accordance with the standard, where one of the indicators, known as the value of water turbidity, is not more than 5 NTU. It is because the high value ofturbiditywill reduce the disinfection activity during the processing of water purification.[15] The disinfection will work effectively if the free chlorine in the water amounts to between 0.2-0.5mg/l, if the disinfectation is less, it will not be effective, andif it is more, it will be carcinogenic.[16]

The disinfection process of water from PDAM Bandarmasihis proven to be good, according to the lab results in June 2018 showing that the MPN values of *Coliform* and *E. Coli*are 0 per 100 mL.[17] Therefore, the water flow that reaches the people's houses is of good quality and free of pathogenic microorganisms. This is in accordance with the results of the study that the average number of neutrophils, monocytes and lymphocytes using PDAM water on Maluku Street, RT02, Banjarmasin is in the normal range.

In addition to the direct treatment of water used, people in both locations also use soap for bathing, washing dishes and other eating utensils, and toothpaste for brushing their teeth. One of the ingredients contained in toothpaste is flour which is antibacterial. The use of toothpaste with flour has been proven to be effective in killing bacterial colonies.[18,19] The antibacterial content found in toothpaste is baking soda (sodium bicarbonate). Baking soda is alkaline which can neutralize the pH of the oral cavity, so that it can inhibit the bacterial metabolic activity. Baking soda also has hypertonic activity which later results in hypotonic content of water-losing bacteria which will make the bakery cells become dehydrated and can eventually destroy the bacteria.[20,21]

Ordinary soap (not antibacterial) can reduce 50% of pneumonia in infants and 53% of diarrhea in children under 15 years old.And there is no significant difference between antibacterial soap and ordinary soap in its effectiveness in killing bacteria.[22]

Although there were no statistically significant differences between the neutrophil counts of the two groups of respondents, there were variations in the number of respondents between the two groups of respondents. This was probably due to the differences in the environmental characteristics of the two research locations. Maluku Street is a market area with dense environmental characteristics. The houses and the merchant stalls are located side by side on both sides of the road with a large number of local people and market visitors.An environment with a huge amount of population and a minimum amount of air ventilation can increase the density of germs or bacteria.[23] The people around such location have a higher risk of exposure to bacteria. Meanwhile, on Ray Street 17, Berangas District, it looks cleaner.

Gender also affects the number of leukocytes. In this study, the number of female respondents in the group of river water users (19 people) was less than the female respondents in the group of PDAM water users (23 people). The immune response of women is faster to respond toinfectioncompared to the immune response of men. When an infection occurs, a woman's immune system recognizes and destroys pathogens that enter the body more quickly than men.[24]

Conclusion

Based on a study of the difference in the number of leukocytes ofusers of water from Martapura Riverand users of water from PDAM Bandarmasih, it was concluded that the average numbers of neutrophils and monocytes, lymphocytes and eosinophils of the people using the water from Martapura River in August 2018 were 54.03%, 7.43%, 34.8% and 3.2%. The average numbers of neutrophils, monocytes, lymphocytes and eosinophils of the people using the water from PDAM were 54.9%, 7.54%, 32.8% and 4.39%, respectively. The statistical results showed no significant differences between the average number of neutrophils, monocytes, lymphocytes and eosinophils ofthe water usersof Martapura Riverand the water users of PDAM Bandarmasih.

Source of Funding: Domestic government

Conflict of Interest: There is no conflict of interest in this study.

Ethical Clearance: This study obtained a label of ethics escaped by the number:761/KEPK-FKUNLAM/EC/VIII/2018 on August 10, 2018

REFERENCES

1. Sari, M., Adyatma, S. dan Normelani E. Utilization of northern alalak river water by communities on the north alalak river in the sub-district of Alalak Utara in banjarmasin sub-district north of Banjarmasin city. Journal of Geography Education. 2016;3:33–41
2. Hapsari D, Sari P, Pradono J. 2009. Effect of healthy environment and healthy living behavior on health status. Ecology research and development center and health status of Jakarta.2009;37:40-49.
3. Rahman A, Alim MS, Utami UB. Inventory and identification of water pollutant sources in Banjarmasin City. Enviro Scienticeae.2011;7:58-68.
4. Rahman A. 2015. Analysis of pollutant load and identification of water pollutant sources from institutional sources in Banjarmasin City. *Biodidaktika*. 2015;10(2):1
5. Sofia E, Riduan R. Evaluation of the presence of free chlorine in the Sungai Lulut IPA distribution network in Bandarmasih PDAM.*Jukung Jurnal Teknik Lingkungan*. 2015;1(1):33–52.
6. Cahyaning, N. dan Mulyadi, A. Effect of Siak River water utilization on diarrheal diseases and skin diseases in the community on the banks of the Siak River (a case in Rumbai Sisir District, Pekanbaru). Journal of Environmental Sciences. 2009;3(1):46-57.
7. Pemerintah Indonesia. Health Minister Regulation of the Republic of Indonesia No.492/Menkes/PER/IV/2010 concerning drinking water quality requirements. Republic of Indonesia Gazette. Jakarta: Sekretariat Negara. 2010.
8. PDAM Bandarmasih. Water Quality Check Results in the Zone 1 Pipeline Network. PDAM Bandarmasih, Banjarmasin. 2018.
9. Sherwood, L. Human physiology:from cell to system. 8th ed.EGC, Jakarta. 2014.
10. Guyton, A.C, Hall, J.E.Medical physiology textbook.12thed.Elsevier, Indonesia.2014.
11. Susanto. Effect of demographic characteristics, utilization of river water and chemical parameters of water on dermatitis in the community using river water in Gampong Teungoh in 2016 [Thesis]. University of North Sumatra, Medan. 2016.
12. Helmiyati, A.F., Nurrahman. Effect of Alum Concentration on Gram positive and negative bacterial growth. Food and Nutrition Journal.2010;1(1):1-6
13. Tamzil A., Dwi Y., dan Lola R. Effect of addition of alum $AI_2(SO_4)_3$ and chlorine $Ca(OCI)_2$ on the physical and chemical characteristics of lambidaro river water. *Jurnal Teknik Kimia*. 2013;19(3): 55-65.
14. Ananda PR, Ismail A. Effect of 30-day dose of alum in feed for 30 days on liver histopathology of wistar rats. Diponegoro Medical Journal. 201;5(3):210 – 221.
15. Hery K. Comparison of the use of poly aluminum chloride (PAC) and alum against turbidity and manganese content (Mn) in raw water at the PDAM Tirtanadi Water Treatment Plant (IPA) Silver Overlay [Thesis]. Universitas Sumatera Utara, Medan. 2017.
16. Elma S., Rony R., dan Chairul A. Evaluation of the presence of free chlorine in the Sungai Lulut IPA distribution network in Bandarmasih PDAM. Support the Journal of Environmental Engineering. 2015;1(1): 33-52
17. PDAM Bandarmasih. Result of test.PDAM Bandarmasih, Banjarmasin. 2018.
18. Pratama, R.N. The antibacterial effect of toothpaste containing baking soda and toothpaste containing flour against the growth of plaque bacteria [thesis]. Faculty of Dentistry, Hasanuddin University, Makassar. 2014.
19. Mardiana Adam, Achmad H. The Relationship of Mineral Fluor Exposure in Water with The Presence of Gingivitis(Study Case in Subdistrict of Tempe, Sengkang City, Wajo District). Journal

of International Dental and Medical Research, 2018;11(2):470-476

20. Maharani. The inhibiting effect of various toothpastes on the growth of Streptococcus mutans bacteria[Thesis]. UIN Syarif Hidayatullah, Jakarta. 2012.
21. Achmad H, SherlyHorax, Sri Ramadhany, Irene Edith Rieuwpassa, Melyanti Sari, HendrastutiHandayani, Marhamah F. Singgih, SumintartiSugiharto. Anti-Cancer and Anti-Proliferation Activity of Ethyl Asetat Extract From Ant Nest (Myrmecodiapendans) in Burkitt's Lymphoma Cancer Cells.Pesquisa Brasileiraem Odontopediatria e Clinica Integrada 2019;19(1):e4325
22. Luby S.P., Agboatwalla, M., Feikin, D.R., Painter, J., Billhimer MS, W., Altaf, A., Hoekstra, R.M. Effect of handwashing on child health: a randomised controlled trial. *Lancet*. 2005;366:225-233
23. Departemen Kesehatan RI. Decree of the Minister of Health of the Republic of Indonesia NO829/ Menkes/SK/VII/1999 concerning Housing Health Requirements. Indonesian Ministry of Health, Jakarta.1999.
24. Austad SN. Why Women Live Longer Than Men:Sex Differences in Longevity. *Gender Medicine*. 2006;3(2): 79 – 92.

Role of Sentinel Lymph Node Biopsy in Staging of Early Endometrial Cancer

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ABSTRACT

Background: Many endometrial cancer patients will undergo a comprehensive lymphadenectomy despite having disease confined to the uterus with low percent of lymph node metastasis, resulting in prolonged operating time, additional cost, and potential side effects, sentinel lymph node (SLN) procedure has been evaluated in Endometrial Cancer and has emerged as a possible middle solution to overcome under treatment of high risk patients or over treatment of low risk patients.

Method: This is a cross sectional non randomized, prospective study, non-comparative study with the purpose of determining rate of SLN detection at Egyptian National Cancer Institute, Cairo University for patients presented with early endometrial carcinoma.

Results: 46 patients have SLN using blue dye. 32 case injected with methylene blue (69.6%) and patent blue injection was in 14 cases with (30.4%). SLN was detected in 39/46 cases with detection rate (84.8%). With failure of detection in 7/46 cases with failure rate (15.2%), false -ve rate 16.7% and test sensitivity is 84.3% with NPV 97.1% and accuracy 97.4%. No false positive cases present in this study this means that False +ve rate 0%, specificity 100% and PPV 100%.

Conclusion: SLN using Blue dye is very simple especially in low resource countries but is associated with low detection rate and false negative rate. As surgeons gain experience in SLN mapping for endometrial cancer and achieve detection rates of 90% or greater, with a combined decrease in false-negative rates.

Keywords: *blue, dye, endometrial, lymphadenectomy, lymphedema*

Introduction

Endometrial cancer is the most common malignancy of the female reproductive tract worldwide, in Cairo National Cancer Institute registry, it is the third most common gynecological cancer constituting 23%, with median age is 60 years. [1]

The uterus is midline structure, its lymphatic drainage likely to be bilateral mainly along obturator, iliac, caval and paraortic nodes. Also parametrium and presacral areas are at risk. This pattern of spread needs complete staging with pelvic and paraortic lymphadenectomy.[2]

Histological grade, depth of myometrial invasion, lymph node metastasis are the most important prognostic factors of endometrial cancer. [3] Thus FIGO group recommends pelvic lymphadenectomy to stage patient disease and assess lymph node status, whereas GOG group recommends systematic pelvic and paraortic lymphadenectomy which is associated more morbidity. [4]

Surgical staging by total abdominal hysterectomy, bilateral salpingo-oophorectomy and pelvic lymphadenectomy was agreed by most surgeons as standard of care for patients with grade 2 and 3 endometrioid cancer as well as patients with clear cell and papillary serous tumors. [4, 5]

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Patients with grade 1 endometrioid cancer some of them are staged appropriately others are not staged according to surgeon assessment during surgery. This increased concern about over treating low risk group of patients who may have prolonged survival especially when complete regional lymphadenectomy is done which may have long term effects and morbidity. [6, 7]

Sentinel lymp f symptomatic lymphedema, bleeding, increase operative time and cost. [8]

Aim of the Work: To detect the accuracy and sensitivity of colorimetric method of SLN in staging of endometrial cancer, to evaluate the feasibility of SLN to stage patients with early endometrial cancers.

Patients and Method

This cross-sectional study was conducted on endometrial cancer patients presented to National Cancer Institute, Cairo University, Egypt

Inclusion Criteria: Stage IA histological grade 2 and 3 endometrioid adenocarcinoma, clear cell and papillary serous carcinoma, Stage IB endometrial carcinoma, Stage II endometrial carcinoma.

Exclusion Criteria: Patients with grade 1 endometrioid adenocarcinoma, stage III and IV disease, and patients with allergy to blue dye.

Study Design: This non-randomized, prospective, non-comparative study for determining the SLN detection rate by histopathological examination, anatomical distribution of SLNs.

Method used for SLN in Endometrial Cancer Cases: Cervical injection of blue dye 2-sided at 3 and 9 o'clock, 4 ml used in a combined superficial (1-3 mm) and deep (1-2 cm) cervical injection, fundal injection with 2 ml of blue dye has been also used in number of cases with cervical injection.

Procedure: After anesthesia patient cervix was and 22-gauge spinal needle was used to inject blue dye into cervix at 3'oclock and 9'oclock for each side 2ml of dye (1 ml superficial from 1-3mm depth and the other 1 ml deep 1-2cm cervical depth). Immediately following cervical injection surgical field prepared, abdomen was opened and 2ml of blue dye was injected subserosal in uterine fundus, field prepared and abdomen was packed for surgery till 10 minutes after fundal injection and about 25 minutes after cervical injection, it was estimated that it might take up to 30 minute for tissues to absorb blue dye and to be taken by lymphatic vessels to turn lymph node blue. Surgery was proceeded as routine and started with pelvic lymphadenectomy for which visual identification of colored or blue nodes were searched for and identified, its anatomical site was reported, and such node excised separately and sent separately for histopathological examination, then surgery was completed as standard (total abdominal hysterectomy, bilateral salpingooophorectomy and standard pelvic lymphadenectomy). None identified SLN or failed mapping was reported, and surgery also completed as standard.

Results

46 patients with endometrial carcinoma meeting selection criteria underwent SLN procedure in endometrial carcinoma using colorimetric method using either methylene blue (69.6%, n=32/46) or patent blue (30.4%, n=14/46) cervical (34.8%, n=16/46, injection site 3 o'clock and 9 o'clock superficial and deep) and or cervical and fundal subserosal injection (65.2%, n=30/46). Their mean age was 57.9 years with range (51-69). All patients (100%) have been surgically done through laparotomy and all have preoperative pathology endometrial carcinoma. 67.4% (n=31/46) of patients had less than myometrial invasion and 32.6% (n=13/46) had more than half myometrial invasion. Mean time to detect SLN defined as time from dye injection till visualization of dye colored node (SLN) was 30 minutes with range (20–40) minutes. The detection rate was calculated as the number of patients with at least one detected pelvic colored SLN divided by the total number of patients who underwent SLN mapping. SLN was detected in 84.8% (n=39/46) of cases. Location of detected colored SLN included obturator group (59%, n=23), internal iliac group (23.1%, n=9), paracervical (15.4%, n=6) and external iliac group (2.6%, n=1), bilateral detection was reported in 33.3% (n=13).

All SLNs were examined histopathologically and the uterus examined for myometrial invasion, grade of carcinoma, LVSI and pelvic lymphadenectomy examined histopathologically for lymph node metastasis.

Pathological nodal metastasis had been detected in 12.8% (n=5/39) of examined SLNs, and in 15.2% (n=7/46) of standard postoperative pelvic

lymphadenectomy. Postoperative less than half myometrial invasion was detected in 67.4% (n=31/46) patients while 32.6% (n=15/46) patients had more than half myometrial invasion. Pathological grading of endometrial carcinoma showed 11 case (23.9%) as G I, 33 case (71.7%) as G II and 2 cases (4.3%) as G III.

Diagnostic Accuracy of SLN: One case of detected SLNs have negative histopathological examination and their associated standard pelvic lymphadenectomy was proved to be positive for nodal metastasis which means that false -ve rate was 16.7% and test sensitivity was 84.3% with NPV 97.1% and accuracy 97.4%. No false positive cases were detected in this study meaning that False +ve rate was 0% with specificity 100% and PPV 100%. Significant higher LN positivity with myometrial invasion more than half '6/9' than those with less than half myometrial invasion '1/30' was detected (40% vs. 3.25; P=0.003). LN positivity in grade II and III (20%) versus no positive LN with grade I (0%) has been found (P=0.107). Out of 7 cases with undetected SLN, one case proved to have +ve nodal involvement on pathological diagnosis which means failure rate of 14.3%.

Discussion

LN metastasis affects management of endometrial cancer and usually indicates a poor prognosis. [9, 10] Thus, surgical staging with pelvic LN dissection is recommended for all high-risk endometrial cancer patients. However, most patients with endometrial cancer don't not have LN metastasis making lymphadenectomy and its drawbacks major concern, many surgeons perform selective lymphadenectomy based on pre or intraoperative findings. As the decision to perform LN staging often is based on the individual surgeon's experience there is a lot of bias.

The challenge is to identify accurate surgical technique to stage endometrial cancer and avoid unnecessary morbidity and procedure that give information about nodal status while avoiding the potential for over treating low-risk patients and undertreating patients with metastatic disease. [11]

Burke et al.[12] published the first report on identification of SLNs in endometrial carcinoma in series of 15 patients they occluded the tubes with clips and injected isosulfan blue into the subserosal myometrium of uterine fundus at 3 midline sites, dye uptake was observed in 67% of cases with false negative rate of 50%.

Holub et al. [13] and Gien et al. [14] reported similar detection rate of 61.5% and 56% respectively using the same technique of burke et al. [12] Niikura et al. [15] in their series of 28 patients injected radioactive tracer around the tumor under direct visualization by hysteroscopy the day before surgery, SLNs was identified using gama probe and removed the detection rate was 82%. Fersis et al. [16] reported only a 50% detection rate. Bats et al. [17] used cervical injection of the dye with a detection rate of 80%. Holub et al. [18] used a combination of cervical and subserosal fundal injections of blue dye and reported detection rate 80%. Our results of blue dye injection in cervical and subserosal showed comparable detection rate of 84.8%.

El-Agwany et al. [19] reported detection rate 86% in series of 30 patients with early endometrial cancer having blue dye injection cervical and fundal subserosal, and 93% detection rate in series of 30 patients with hysteroscopic injection of blue dye. Barlin et al. [20] in a study of 498 endometrial cancer patients who received blue dye cervical injections, SLN was identified in 81% of patients. The SLN correctly diagnosed nodal metastases in 40/47 patients who had at least one SLN mapped, for a 14.9% false-negative rate. Youssef, et al. [21] studied 20 cases with fundal injection of blue dye and reported a detection rate for the SLN of 85% and a failure rate of 15%. Altgassen et al. [22] reported 92% detection rate using blue dye injection fundal subserosal in series of 20 patients. Vidal et al. [23] reported a 62% detection rate in a series of 66 patients with cervical injection of blue dye with sensitivity 86% and NPV 98%. Mais et al. [24] reported a 62%detection rate in a series of 34 patients with cervical injection of blue dye with sensitivity 50% and NPV 85%. Lopes et al. [25] reported a 78%detection rate in a series of 40 patients with cervical injection of blue dye. Holloway et al.[26] reported 76%detection rate in a series of 200 patients with cervical injection of blue dye with sensitivity 98% and NPV 99%.

An acceptable SLN detection rate varies among literature, but a detection rate of 80- 90% or greater is preferred. Khoury-Collado et al.[27] studied 115 patients with endometrial cancer to determine the SLN detection rate and how many SLN mapping cases a surgeon

needed to perform to reach the 90% benchmark. During the early phase of the study an SLN was identified in 78% of cases with 2 false-negatives, while during the late phase an SLN was identified in 94% of cases with no false negatives. Detection rates increased from 77-94% (P=0.033) during the 2 periods, with surgeon experience (≥30 cases) playing an integral role.

SLN mapping can play a more prominent role in LN assessment and staging in early-stage endometrial cancer. For now, the standard in many practices continues to include a comprehensive lymphadenectomy versus no nodal assessment. Further prospective studies are needed in order to assess the role of SLN biopsy in endometrial cancer.

Conclusion

SLN procedure using blue dye is very simple especially in low resource countries but is associated with low detection rate and false negative rate. Cervical injection technique may be promising procedures for sentinel node mapping. In a setting in which hysteroscopic skills are lacking, cervical injection should be the preferred way to sentinel node identification.

Ethical Clearance: taken from Egyptian National Cancer Institute Ethical Committee.

Source of Funding: self-funding

Conflict of Interest: Nil

REFERENCES

1. Elbolkainy N, Nouh A., Farahat I, et al.: Gynecologic malignancies. In: Pathology of cancer. 4th ed. Cairo Press. Cairo 2013, 277-97.
2. Frumovitz M, Bodurka DC, Broaddus RR et al. Lymphatic mapping and sentinel node biopsy in women with high-risk endometrial cancer. Gynecol Oncol 2007; 104:100–3.
3. Disaia PJ, Creasman WT, Boronow RC, Blessing JA. Risk factors and recurrent patterns in stage I endometrial cancer. Am. J. Obstet. Gynecol.1985; 151: 1009-15.
4. Abu-Rustum NR, Khoury-Collado F, Pandit-Taskar N, et al. Sentinel lymph node mapping for grade 1 endometrial cancer: is it the answer to the surgical staging dilemma? Gynecol Oncol 2009; 113(2):163–9.
5. Schwartz GF, Giuliano AE, Veronesi U, the consensus conference committee. Proceedings of the consensus conference on the role of sentinel lymph node biopsy in carcinoma of the breast April 19 to 22, 2001, Philadelphia, Pennsylvania. Human Pathol 2002(33):579–89.
6. Morton DL, Wen DR, Wong JH, et al. Technical details of intraoperative lymphatic mapping for early stage melanoma. Arch Surg1992; 127:392–9.
7. Morton DL, Thompson JF, Essner R, et al. Validation of the accuracy of intraoperative lymphatic mapping and sentinel lymphadenectomy for early-stage melanoma: a multicenter trial. Multicenter selective lymphadenectomy trial group. Ann Surg 1999; 230:453–63.
8. H.C. Kitchener, Sentinel-node biopsy in endometrial cancer: a win-win scenario? Lancet Oncol. 12 (5) (2011) 413–414.
9. Abu-Rustum NR, Soslow, F. Dao Y, et al., Sentinel lymph node mapping for grade 1 endometrial cancer: is it the answer to the surgical staging dilemma? Gynecol. Oncol. 113 (2) (2009)163–169.
10. Morrow CP, Bundy BN, Kurman RJ, et al. Relationship between surgical-pathological risk factors and outcome in clinical stage I and II carcinoma of the endometrium: a Gynecologic Oncology Group study. Gynecol Oncol 1991; 40(1):55–65.
11. Kang S, Yoo HJ, Hwang JH, et al. Sentinel lymph node biopsy in endometrial cancer: meta-analysis of 26 studies. GynecolOncol2011; 123:522-527.
12. Burke TW, Levenback C, Tornos C, et al. intraabdominal lymphatic mapping to direct selective pelvic and paraaortic lymphadenectomy in women with high risk endometrial cancer: results of pilot study. Gynecologic oncology 1996 Aug; 62(2):169-73. Pubmed PMID: 8751545.
13. Holub Z, Jabor A, Kliment L. comparison of two procedures for sentinel lymph node detection in patients with endometrial acncer: apilot study. European journal of gynecological oncology. 2002:23(1):53-7. PubMed PMID: 11876394.
14. Gien LT, Kwon JS, Carey MS. Sentinel node mapping with isosulphan blue in endometrial cancer. Journal of obstetric and gynecology canda

: JOGC= Journal d'obstetrique et gynecologie du canda: JOGC. 2005 Dec;27(12):1107-12. PubMed PMID: 16524529.

15. Niikura H, Okamura C, Utsunomiya H, et al. sentinel lymph node detection in patients with endometrial cancer. Gynecologic oncology. 2004 Feb; 92(2):669-74. PubMed PMID: 14766264.
16. Fersis N, Gruber I, Relakis K. et al. sentinel node identification and intraoperative lymphatic mapping. First results of apilot study in patients with endometrial cancer. European journal of gynecological oncology. 2004; 25(3)339-42. PubMed PMID: 15171314.
17. Bats AS, Clement D, Larousserie F, et al. (Is sentinel node biopsy feasible in endometrial cancer? Results in 26 patients) journal de gynecologie, obstetrique et biologie de la reproduction. 2005 Dec; 34(8):768-74. PubMed PMID: 16319767.
18. Holub Z, Jabor A, Kliment L. et al. laparoscopic detection of sentinel lymph nodes using blue dye in women with cervical and endometrial cancer. Medical science monitor: international medical journal of experimental and clinical research. 2004 oct; 10(10):CR587-91. PubMed PMID: 15448599.
19. El-Agwany A, Meleisa M. Value and best way for detection of Sentinel lymph node in early stage endometrial cancer. European Journal of Obstetrics & Gynecology and Reproductive Biology 225 (2018) 35–39.
20. Barlin JN, Khoury-Collado F, Kim CH et al. The importance applying a sentinel lymph node mapping algorithm in endometrial cancer staging: Beyond removal of blue nodes. Gynecol Oncol 2012; 125: 531–535.
21. Youssef O, Selim A, Touny A, Khalil I, Shabaan H. Sentinel Node Mapping in Early Stage Endometrial Cancer: A Pilot Study Med. J. Cairo Univ. 2013, Vol. 81, No. 2, December: 155-160.
22. Altgassen C, Pagenstecher J, Hornung D, et al. A new approach to label sentinel nodes in endometrial cancer. Gynaecol Oncol. 2007; 105:457–61.
23. Vidal F, Leguevaque P, Motton S, et al. Evaluation of the sentinel lymph node algorithm with blue dye labeling for early stage endometrial cancer in a multicentric setting, Int. J. DOI: 10.14660/2385-0868-29 Gynecol. Cancer 23 (7) (2013) 1237–1243.
24. Mais V, Peiretti M, Gargiulo T, et al. Intraoperative sentinel lymph node detection by vital dye through laparoscopy or laparotomy in early endometrial cancer, J. Surg. Oncol. 101 (5) (2010) 408–412.
25. Lopes LA, Nicolau SM, Baracat FF, et al. Sentinel lymph node in endometrial cancer, Int. J. Gynecol. Cancer 17 (5) (2007)1113–1117
26. Holloway RW, Gupta S, Stavitzski NM, et al. Sentinel lymph node mapping with staging lymphadenectomy for patients with endometrial cancer increases the detection of metastasis, Gynecol. Oncol. 141 (2016)206–210.
27. Khoury-Collado F, Glaser GE, Zivanovic O, et al. Improving sentinel lymph node detection rates in endometrial cancer: how many cases are needed? Gynecol Oncol 2009; 115:453–455.

Inorganic Nitrogen Salts in Fibrinolytic Enzyme Production from *Bacillus Megaterium BM 9.1* with Solid State Fermentation

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ABSTRACT

Background: The use of fibrinolytic enzymes is necessary as a thrombolytic agent in the treatment of vascular disorders. Most fibrinolytic enzymes are obtained from fermented food bacteria.

Objective: This study was conducted to determine the effect of inorganic nitrogen salt against the production of fibrinolytic enzyme from *Bacillus megaterium BM 9.1*.

Method: This experimental study was first conducted on *Bacillus megaterium BM 9.1* from coastal waters which were overgrown with mangrove trees. Media preparation used consisted of 3 types, namely nutrient agar, nutrient agar with the addition of inorganic nitrogen salts (KNO_3, $NaNO_3$, $(NH_4)2SO_4$ and NH_4Cl) and agar with addition of inorganic nitrogen salts (KNO_3, $NaNO_3$, (NH4) $2SO_4$ and NH_4Cl).

Results: From 9 media that have been treated, 100% of them positive in producing fibrinolytic enzymes. Nutrient Agar (NA) + KNO_3 is the best medium with the highest Fibrinolytic Index (IF) mean, which is 5.60 ± 0.087. Determining the optimum concentration of potassium nitrate does not mean the highest concentration are having the high influence. The optimum fibrinolytic activity of *Bacillus megaterium BM 9.1* are found at 2% potassium nitrate concentration.

Conclusion: Fibrinolytic enzymes can be easily found from some fermented foods, especially the *Bacillus (genus Bacillus)*. *Bacillus megaterium BM 9.1* in the inorganic nitrogen salts is one of the agents that produce fibrinolytics enzymes which can be used as a therapy for fibrinolytics agents.

Keywords: *Bacillus megaterium BM 9.1, Inorganic nitrogen salts, fibrinolytic activity, solid state fermentation*

Introduction

Every day the body carries out a homeostasis process. When bleeding occurs will prevent thrombus formation, that is formed will clog the blood flow that carries oxygen to the tissue so that the blood flow stops, as a result the tissue is not getting oxygen supply. If the thrombus in the blood vessels moves to the brain, oxygen cannot reach the brain and a stroke occurs. Stroke can be treated using thrombolytic agents. One of the thrombolytic agents that are widely used in the treatment of vascular disorders is fibrinolytic enzymes[1–3].

Sources of fibrinolytic enzymes can be obtained from bacteria, fungi, algae and animals[1]. Bacteria are the group that produces the most fibrinolytic enzymes. Most bacteria that can produce fibrinolytic enzymes are from *Bacillus*, *Streptococcus*, *Staphylococcus*, *Vibrio*, *Paenibacillus Chryseobacterium Pseudomonas*. Some of them are Bacillus subtilis which is produces sodiuminase, *Streptococcus hemolyticus* which is produces streptokinase and Staphylococcus aureus which is produces staphylokinase[4–6]

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Previous study it was found that *Bacillus vallismortis Ace02* isolated from traditional Korean fermented foods and *Bacillus amyloliquefaciens CD-4* were isolated from douchi fermented soybeans (traditional Chinese food) capable of producing fibrinolytic enzymes[7,8]. In addition, cotton cake and wheat bran as nitrogen sources of *Bacillus cereus NS-2* and *Bacillus megaterium KSK-07* isolated from Kisk, traditional fermented food from Egypt have produced fibrinolytic enzymes[9,10].

The use of Solid State Fermentation for protease and amylase production by thermophilic bacteria, Bacillus sp. BBXS-2 has been done and had been contain fibrinolytic enzymes[11]. Most of the nitrogen available in nature is ammonia (NH_3), nitrate (NO_3-), or nitrogen gas (N_2). Almost all prokaryotes can use NH_3 as their nitrogen source, many also can use NO_3-, and some can use organic nitrogen sources, such as amino acids[12]. Nitrogen is very important in the growth of bacteria. This is because nitrogen will be metabolized to produce amino acids, nucleic acids, proteins and cell wall components[13].

Bacillus megaterium BM 9.1 is a microorganism from the Bacillus group, which is still in one genus with *Bacillus subtilis* which was isolated from mangrove forest[14]. Where almost all genus bacillus is used as fermented foods there is a content of fibronolytic enzymes. Thus, this study was conducted to determine the effect of potassium nitrate (KNO_3), ammonium chloride (NH_4Cl), sodium nitrate ($NaNO_3$) and ammonium sulfate (NH_4) $2SO_4$ on *Bacillus megaterium BM 9.1.*

Materials and Method

***Bacillus* Microroganism, *Bacillus megaterium BM 9.1*:** Similar to many proteolytic enzymes originated from microorganisms, most fibrinolytics also originate from the genus Bacillus microorganisms[15]. Study of experiment microorganism[16] that were used in this study are Bacillus megaterium BM 9.1 that been isolated from the mangrove ecotourism coast of Wonorejo Surabaya, Indonesia.

Media Preparation and BM 9.1. enzyme production: The media that been used in this study for culturing *Bacillus megaterium BM 9.1* consists of 3 types of media as follow, nutrient agar with addition of inorganic nitrogen sources (KNO_3, $NaNO_3$, (NH_4) $2SO_4$ and NH_4Cl) and agar with addition of inorganic nitrogen sources (KNO_3, $NaNO_3$, (NH_4) $2SO_4$ and NH_4Cl). All of the media were put in each test tube that consist of 8 mL and 12 mL and sterilized by autoclave at 121ºC for 30 minutes.[17,18].

Production of Fibrinolytic Enzymes in inoculated media: The production of fibrinolytic enzymes uses the solid-state fermentation method. The media consists of a based layer and seed layer. The first based layer was made by using 8 mL of fibrinolytic enzyme production media which from three variations of nutrient agar media which were included in the petri dish and evenly distributed. While the seed layer is made with 12 mL of fibrinolytic enzyme production media[19].

Fibrinolytic activity with Fibrin Plate. Test media for fibrinolytic enzyme activity were incubated at 37 ° C for 24 hours. Bacteria that produce fibrinolytic enzymes will provide a clear zone around the hole. The clear zone diameter is measured by using the calipers and determined by its fibrinolytic index[20].

Results

First, the growth of *Bacillus megaterium B.M 9.1* in various media for producing Fibrinolytic Enzymes ai observed. After an incubation period of 24 hours at 37 ° C there is a growth of bacterial colonies in various media that producing fibrinolytic enzymes. Then to determine the fibrinolytic enzyme activity it can be measured by the fibrinolytic index. The fibrinolytic index is measured by comparing the clear zone formed on the fibrin plate to the diameter of the well.



Figure 1: *Bacillus megaterium BM 9.1* culture on *nutrient agar* + potassium nitrate



Figure 2: Fibrin plate activity from nutrient agar + ammonium chloride media

From Figure 2, which is one example of the growth of *Bacillus megaterium B.M 9.1* bacteria on nutrient agar + potassium nitrate, a clear zone is observed in this media. Figure 4 also shows that the diameter of the clear zone in the fibrin plate activity of the nutrient agar + ammonium chloride is wider than the diameter of the well. This clear zone formation shows the activity of fibrinolytic enzymes around the media. Complete results from 7 media with the combination of nitrogen sources from inorganics salts produces a clear zones, which means that there are fibrinolytic enzymes in each medium. Each medium replicated three times with phosphate buffer pH 7.4 as the negative control agent.

Table 1: Observation results of fibrinolytic enzyme activity on various inorganic nitrogen salts

Production Media		Clear zone diameter (mm)	Fibrinolytic Index (FI)
Nutrient agar	1st	18,30	4,58
	2nd	18,35	4,59
	3rd	18,30	4,58
	Control (-)	-	-
Nutrient agar + KNO_3	1st	22,0	5,50
	2nd	22,60	5,65
	3rd	22,60	5,65
	Control (-)	-	-
Nutrient agar + $NaNO_3$	1st	18,25	4,56
	2nd	18,80	4,70
	3rd	18,35	4,59
	Control (-)	-	-
Nutrient agar + NH_4Cl	1st	19,40	4,85
	2nd	19,15	4,79
	3rd	19,70	4,93
	Control (-)	-	-
Nutrient agar + $(NH_4)2S$	1st	19,30	4,83
	2nd	19,15	4,79
	3rd	18,60	4,65
	Control (-)	-	-
agar + KNO_3	1st	21,00	5,25
	2nd	21,00	5,25
	3rd	20,00	5,00
	Control (-)	-	-
agar + $NaNO_3$	1st	18,00	4,50
	2nd	17, 50	4,38
	3rd	17,30	4,33
	Control (-)	-	-
agar + NH_4Cl	1st	16,90	4,23
	2nd	16,90	4,23
	3rd	17,20	4,30
	Control (-)	-	-
agar + $(NH_4)2S$	1st	16,00	4,00
	2nd	16,40	4,10
	3rd	15,40	3,85
	Control (-)	-	-

Conted…

Table 2: The observation results of the effect from KNO_3 Concentration against the activity of fibrinolytic enzymes

KNO_3 Concentration (%b/v)		Clear zone diameter (mm)	Fibrinolytic Index (FI)
0,5%	1st	20,35	5,09
	2nd	20,40	5,10
	3rd	20,40	5,10
	Control (-)	-	-
1,0 %	1st	21,30	5,33
	2nd	21,50	5,38
	3rd	21,30	5,33
	Control (-)	-	-
1,5%	1st	21,60	5,40
	2nd	21,70	5,43
	3rd	21,60	5,40
	Control (-)	-	-
2,0%	1st	22,10	5,53
	2nd	22,00	5,50
	3rd	22,05	5,51
	Control (-)	-	-

Furthermore, similar observations were made on the production of fibronolytic enzymes and optimum inorganic nitrogen sources with different concentrations. The activity test procedure is repeated again from the culture stage and following the stages that are appropriate to the previous procedure. All media produce clear zones in the fibrinolytic index. Likewise, the most significant concentration of KNO_3 on the activity of fibrinolytic enzymes is found in the 2% potassium nitrate.

The results of statistical analysis using one way ANOVA resulted in differences in fibrinolytic activity of various inorganic nitrogen salts. With the value of F count 83,085> F table 5,32. The differences in data

must have a normal and homogeneous distribution. In accordance with the results of one way anova in fibrinolytic activity at various concentrations of KNO_3 it also produced differences.

The results of the post hoc test analysis shows that Nutrient Agar (NA) + potassium nitrate has the significant differences on the production of fibrinolytic enzymes with means difference is higher than the other treatment groups. This result is supported by the homogeneous subsets test results which shows if NA + potassium nitrate has the significant effect with a value of 22.4. Whereas the 2% KNO_3 media has the significant differences on the production of fibrinolytic enzymes with means difference is higher than the other treatment groups.

Discussion

The study was conducted on *Bacillus megaterium BM 9.1* that isolated from the Eco Wisata Mangrove Coast Wonorejo, Surabaya city, Indonesia[14]. The results from this study is to determine the effect of inorganic nitrogen salts on the production of fibrinolytic enzymes and to determine which inorganic nitrogen salts that have the significant influence against the production, then fibrinolytic enzyme production media with added inorganic nitrogen salts are made with solid fermentation method.

In fibrin plate, 4 wells were made using sterile holes with a diameter of 0.4 mm. Substances from fibrinolytic enzyme production medium was inoculated into a well on the fibrin plate media. Phosphate buffer pH 7.4 is used as a negative control. The fibrin plate media was incubated for 24 hours at 37 ° C. The addition of methylene blue to the media aims to clarify the formation of clear zone, this is because fibrin is colorless. The clear zone of the fibrin plate media indicates the ability of the enzyme to degrade the fibrin substrate and its diameter which is formed in accordance with the potential of its fibrinolytic activity[21]. Degradation of fibrin by fibrinolytic enzymes into soluble amino acids causes the formation of clear zones.

Enzyme production is influenced by several factors, such as media, temperature, pH, activators and inhibitors [22]. A good medium for bacterial growth is a medium that containing carbon, nitrogen and minerals. Nutrient Agar (NA) is a standard medium for culturing and as metabolite production media for *Bacillus sp.* In another case, LSD analysis concluded that the Nutrient Agar (NA) + potassium nitrate had the greatest influence on the production of fibrinolytic enzymes. Potassium nitrate, ammonium chloride, ammonium sulfate and ammonium nitrate that have been used as nitrogen source for Bacillus sp. The results show the maximum growth rate and production of enzymes found in the media with potassium nitrate as its nitrogen source [23].

After determining the most effective inorganic nitrogen salts for the production of the fibrinolytic enzyme from *Bacillus megaterium BM 9.1*, then the optimum concentration of potassium nitrate for the production of the fibrinolytic enzyme *Bacillus megaterium BM 9.1* will be determined. After the comparison, the higher concentration potassium nitrate was accompanied by an increase in fibrinolytic activity of *Bacillus megaterium BM 9.1*. The optimum fibrinolytic activity of Bacillus megaterium BM 9.1 are achieved at 2% potassium nitrate, but at 2.5% potassium nitrate concentration the production rate is decreasing. This can be caused by two things. First because along with the increase in concentration there is also an increase in the amount of nutrients, so the bacteria growth rate will increase and the products of the metabolites produced are enzymes, will also increase. But the higher concentration of nutrient not always accompanied by an increase in activity, because an excessive amount of nutrient may lead to death of bacteria.

Second, there is a feedback inhibition mechanism. At feedback inhibition, the first enzyme activity in the biosynthetic pathway is inhibited by the end product of the pathway. The first reaction in the biosynthetic pathway produces an intermediate product used by the next enzyme as a substrate. Thus, inhibition of enzyme activity in the first reaction can stop the formation of intermediate products used for the formation of the final product [24,25]. Finally, the statistical test using one way anova showed a significant difference between the concentration of potassium nitrate and the activity of the fibrinolytic enzyme of *Bacillus megaterium BM 9.1*. Increased potassium nitrate concentration (% b / v) also causes an increase in fibrinolytic activity.

Conclusion

All inorganic nitrogen salts increases the production of the fibrinolytic enzyme *Bacillus megaterium BM 9.1*. The best nitrogen source from inorganic nitrogen salt for the production the fibrinolytic enzyme of *Bacillus megaterium BM 9.1* is potassium nitrate. With the

optimum concentration of 2% b / v. So that the *Bacillus megaterium BM 9.1* with inorganic nitrogen salts can be used as one of the therapies as fibronolytic agents.

Ethical Clearance: The research process involves participants in the survey using a questionnaire that was accordant with the ethical research principle based on the regulation of research ethic committee. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, nonmaleficence, and justice.

Conflict of Interest: None declared

Source of Funding: This study is done with individual funding.

REFERENCES

1. Kotb E. Fibrinolytic bacterial enzymes with thrombolytic activity. In: *Fibrinolytic Bacterial Enzymes with Thrombolytic Activity*. Springer; 2012:1-74.
2. Poernomo AT, Purwanto I. FIBRINOLYTIC ACTIVITY ON THE VARIETY OF TEMPEHS BY RHIZOPUS OLIGOSPORUS FNCC 6010. 2015.
3. Arif M. MEASUREMENT AND APPLICATION OF THROMBIN CLINICS ACTIVATABLE FIBRINOLYSIS INHIBITOR. *INDONESIAN JOURNAL OF CLINICAL PATHOLOGY AND MEDICAL LABORATORY*. 2018;16(1):42-45.
4. Kotb E. Activity assessment of microbial fibrinolytic enzymes. *Applied microbiology and biotechnology*. 2013;97(15):6647-6665.
5. Yogesh D, Halami PM. Fibrinolytic enzymes of Bacillus spp.: An overview. *International Food Research Journal*. 2017;24(1):35-47.
6. Loof TG, Deicke C, Medina E. The role of coagulation/fibrinolysis during Streptococcus pyogenes infection. *Frontiers in Cellular and Infection Microbiology*. 2014;4(September):1-8. doi:10.3389/fcimb.2014.00128
7. Kim J-B, Jung W-H, Ryu J-M, et al. Identification of a fibrinolytic enzyme by Bacillus vallismortis and its potential as a bacteriolytic enzyme against Streptococcus mutans. *Biotechnology letters*. 2007;29(4):605-610.
8. Peng Y, Yang X, Zhang Y. Microbial fibrinolytic enzymes: an overview of source, production, properties, and thrombolytic activity in vivo. *Applied Microbiology and Biotechnology*. 2005;69(2):126.
9. Bajaj BK, Sharma N, Singh S. Enhanced production of fibrinolytic protease from Bacillus cereus NS-2 using cotton seed cake as nitrogen source. *Biocatalysis and Agricultural Biotechnology*. 2013;2(3):204-209.
10. Kotb E. Purification and partial characterization of serine fibrinolytic enzyme from Bacillus megaterium KSK-07 isolated from kishk, a traditional Egyptian fermented food. *Applied biochemistry and microbiology*. 2015;51(1):34-43.
11. Qureshi AS, Khushk I, Ali CH, Chisti Y, Ahmad A, Majeed H. Coproduction of protease and amylase by thermophilic Bacillus sp. BBXS-2 using open solid-state fermentation of lignocellulosic biomass. *Biocatalysis and Agricultural Biotechnology*. 2016;8:146-151.
12. Madigan MT, Clark DP, Stahl D, Martinko JM. *Brock Biology of Microorganisms 13th Edition*. Benjamin Cummings; 2010.
13. Funke BR, Case CL, Gerard J, Tortora G. *Microbiology: An Introduction*. Benjamin Cummings; 2010.
14. Fakhri CH. SCREENING OF FIBRINOLYTIC ENZYME PRODUCING BACTERIA FROM ECOTOURISM COASTAL WATERS MANGROVE WONOREJO SURABAYA CITY INDONESIA. 2016.
15. Wilkesman J, Kurz L. Protease analysis by zymography: a review on techniques and patents. *Recent patents on biotechnology*. 2009;3(3):175-184.
16. Rosita N, Setyawan D, Soeratri W, Mrtodihardjo S. Physical Characterization of Beewax and Glyceryl monostearate binary system to predict characteristics of solid lipid nanoparticle (SLN) loaded Para Methoxy Cinnamic Acid (PCMA). *International Journal of Pharmacy and Pharmaceutical Sciences*. 2014;6(2):939-945.
17. Gangadharan D, Sivaramakrishnan S, Nampoothiri KM, Pandey A. Solid culturing of Bacillus amyloliquefaciens for α-amylase

production. *Food Technology and Biotechnology*. 2006;44(2):269-274.

18. Agil M, Kusumawati I, Purwitasari N. Phenotypic variation profile of Marsilea crenata Presl. cultivated in water and in the soil. *Journal of Botany*. 2017;2017.
19. Pandey A. Solid-state fermentation. *Biochemical Engineering Journal*. 2003;13(2-3):81-84.
20. Cha W-S, Park S-S, Kim S-J, Choi D. Biochemical and enzymatic properties of a fibrinolytic enzyme from Pleurotus eryngii cultivated under solid-state conditions using corn cob. *Bioresource technology*. 2010;101(16):6475-6481.
21. Rovati, J.L., Delgado, O.D., Figueroa, L.I.C., Farifia J. A novel source of fibrinolytic activity : Bionectria sp. an unconventional enzyme-producing fungus isolated from las yungas rainforest (tucuman, argentina). *World J Microbiol Biotechnol*. 2009;26.
22. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA. *Harpers Illustrated Biochemistry 30th Edition*. McGraw Hill Professional Google Scholar; 2015.
23. Patel R, Dodia M, Singh SP. Extracellular alkaline protease from a newly isolated haloalkaliphilic Bacillus sp.: Production and optimization. *Process Biochemistry*. 2005;40(11):3569-3575.
24. Yates, R.A., and Parde AB. The Enzymology of Feedback Inhibition by Arthur B . *Journal of Biological Chemistry*. 2005;280(41):38-40.
25. Goyal S, Yuan J, Chen T, Rabinowitz JD, Wingreen NS. Achieving Optimal Growth through Product Feedback Inhibition in Metabolism. *PLOS Computational Biology*. 2010;6(6):e1000802. https://doi.org/10.1371/journal.pcbi.1000802.

Relationship Exclusively Giving Mother's Milk with Growing Baby

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ABSTRACT

Breast milk is the best nutrient for infant especially for the newborn. Nutrition in breast milk has benefits for improving infant's growth and development. The infant are expected to be the successor of the nation that has competitiveness and high productivity by getting the best nutrition in the breastmilk. This research aims to determine the relationship of breastfeeding with infant's growth and development in Sudiang Raya District Makassar City. This research is an analytic with cross sectional study design. The population were all the infant aged 6-12 months in Sudiang Raya distric as many as 192 infants. Total sample were 78 infant. The results showed that the exclusive breast feeding was high (66,7%) compared to the non-exclusive breast feeding (33,3%). Based on data analysis found that there were a significant relationship between breastfeeding and infant's growth based on BB/U index with ρ: 0,000, PB/U index with ρ: 0,001 and BB/PB index with ρ: 0,010. There were also a significant relationship between breastfeeding and infant's development with *ρ: 0,000. Giving breast milk to the infant can increase growth and development so that it can improve their health status.*

Keywords: *breast milk, infant, growth, development*

Introduction

Based on data from the 2013 basic health research for the city of Makassar, breastfeeding <1 hour was 63.6%, breast milk for the past 1-6 hours was 20.5%, who gave breast milk for the last 7-23 hours was 1.5%, breastfeeding for the last 24-47 hours was 7.7% and the last ≥48 hours was 6.8%[2,5,9].

Growing and developing are two things that have different meanings. Growth and development is a continuous process that occurs since conception and continues into adulthood. Therefore, in the process of reaching this age the child must go through various stages of growth and development[15,16,18].

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Data from the Ministry of Health of the Republic of Indonesia (2006) in Kholifah (2014), there are 16% of children under five in Indonesia who experience general developmental disorders. Whereas UNICEF (2011) data in Fauzia (2015), there are 27.5% or 3 million children under five who experience motor development disorders. This shows an increase in the number of toddlers who experience general developmental disorders which include gross motor development disorders, fine motor skills, hearing loss, intelligence and delayed speech.

Based on the description of the low rates of exclusive breastfeeding, the importance of the benefits of exclusive breastfeeding and the number of patients with growth disorders in Indonesia which continues to increase, the authors are interested in examining the "relationship between breastfeeding and infant growth in the Sudiang Raya area of Makassar City".

Material and Method

This study is an analytical study with a cross sectional study design. This research was conducted in the Sudiang Raya Urban Village in February-June 2017.

The population in this study were 192 infants aged 6-12 months. The sample was chosen by random sampling method and selected 78 babies.The instrument used was the Pre Development Screening Questionnaire, digital scales and fixation boards[12].

The type of data collected consists of two types, namely primary data and secondary data. Primary data is data obtained from respondents through observation and interview activities.

The primary data collected is as follows:

1. Respondent and family characteristics including name, age, date of birth, parent's name, address of parents, work of parents, education of parents, tribes of parents and religion of parents obtained through interviews.
2. Providing breast milk to babies obtained through interviews directly with the mother of the baby.
3. Baby growth which includes data on body weight and body length of the baby. Body weight data was measured using weight scales and body length data was measured using a fixation board conducted directly by the researcher towards the respondent.
4. Development of infants is assessed based on the suitability of development based on the age of the baby at that time. Developmental screening uses the form of the Pre Development Screening Questionnaire conducted by researchers on parents, closest people or baby caregivers.

Meanwhile, secondary data obtained in the form of the number of babies, schedules and locations of posyandu were obtained through the Sudiang Raya Health Center in Makassar City.

Data on body weight and body length were processed using the WHO Antro application that displays the nutritional status of the sample[2,3,5,14,15].

Data from the sample development interviews were assessed manually based on scoring from the Pre Development Screening Questionnaire form[7,9,10]. Data analysis using SPSS with the chi square test

Findings

Characteristics of Respondents

Table 1: Characteristics of Respondents

Characteristics	n[1]	%
Baby age		
6-8 month	56	71,9
9-12 month	22	28,1
Baby Gender		
women	41	52,6
administration of breast milk		
Exclusive	52	66,7
Father's age		
19-30 years	43	55,1
Mother's age		
19-30 years	58	74,3
Fathers's education		
Graduated from high school	52	66,7
Mother's education		
Graduated from high school	50	64,1
Father's occupation		
private employees	29	37,2
Mother's occupation		
housewife	70	89,7

n[1] = 78

Based on age, it was found that infants who were sampled were generally aged between 6-8 months as many as 56 infants (71.9%). According to gender, it is known that babies are generally female, as many as 41 babies (52.6%) and exclusively breastfed as many as 52 babies (66.7%)

It is known that mothers of babies generally aged between 19-30 years are 58 people (74.3%). While the baby's father is generally aged 19-30 years as many as 43 people (55.1%). he majority of parents' education is graduating from high school. The mother of a baby with high school education graduated as many as 50 people (64.1%) and father of a baby with high school education as many as 52 people (66.7%). Mother's work as a housewife is 70 people (89.7%), while the baby's father works as a private employee as many as 29 people (37.2%).

Administration of Breast Milk

Table 2: History of Administration of Breast Milk to Infants Aged 6-12 Months

Administration of breast milk	Total	
	n[1]	%
Exclusive	52	66,7
Non Exclusive	26	33,3

Based on the results of research conducted in the Sudiang Raya area of Makassar City in infants aged 6-12 months, it was found that 52 infants (66.6%) received exclusive breastfeeding and 26 exclusive breastfeeding (33.4%).

Relationship between Giving Breast Milk with Baby Growth

Table 3: Relationship between Giving Breast Milk with Baby Growth

Good nutritional status	Administration of breast milk				p
	Exclusive		Non Exclusive		
	n	%	n	%	
good nutritional status	51	73,9	18	26,1	0,000
body length according to age	50	74,6	17	25,4	0,001
body weight according to body length	52	70,3	22	29,7	0,010

The chi-square test results of the relationship between breastfeeding and infant growth based on index body weight according to age and body length according to age with a value of ρ = 0,000, body length according to age index with a value of ρ = 0.001 and index body weight according to body length with a value of ρ = 0.010. According to the results of the study, infants who were exclusively breastfed had normal nutritional status based on the body weight according to age index of 51 infants (98.1%) and those who were not exclusively breastfed 18 infants (69.2%) had good nutritional status. Based on body length according to age index, 50 infants (96.2%) had normal body length and were given exclusive breastfeeding and 17 babies (65.4%) had normal body length but were not given exclusive breastfeeding. Meanwhile, based on the body weight according to body length index all infants fed exclusively breastfed had normal nutritional status while 22 infants who were not given exclusive breastfeeding (84.6%) had normal nutritional status and 4 infants (15.4%) among them were thin.

Relationship between Breastfeeding Mother and Baby Development

Table 4: Relationship between Breastfeeding Mother and Baby Development

Baby development	Administration of breast milk				ρ
	Exclusive		Non Exclusive		
	n	%	n	%	
Corresponding	49	84,5	9	15,5	0,000
Not corresponding	3	15	17	85	

The results of statistical analysis prove that there is a significant relationship between breastfeeding and infant development in the Sudiang Raya area of Makassar City with a value of p = 0,000. Infants who were exclusively breastfed were 52 babies (66.7%), 49 infants (94.2%) of whom had development according to their age and 3 babies (5.8%) had inappropriate developments. Meanwhile, of the 26 babies (33.3%) who were not given exclusive breastfeeding as many as 17 babies (65.4%) had inappropriate development and 9 babies (34.6%) had the appropriate development.

Discussion

Mother's milk (ASI) is the best food for newborns, breast milk should also be given as early as possible when the new baby is born. Breastmilk given to babies after birth until the fourth or seventh day contains colostrum which is a liquid that is rich in protein and functions to fight infection, thereby reducing morbidity and even mortality. The provision of ASI can also help the survival of babies, especially families from low socio-economic groups by helping to alleviate the family's economic burden and improve the quality of life for babies from poorly maintained sanitation environments.

Based on the results of research conducted in the Sudiang Raya area of Makassar City in infants aged 6-12 months, it was found that 52 infants (66.6%) received exclusive breastfeeding and 26 exclusive breastfeeding (33.4%). The provision of exclusive breastfeeding to infants is higher than that of infants who are not given exclusive breastfeeding according to previous studies. Previous research conducted in the working area of the health center in Tamalanrea, Makassar, also stated that more groups were given exclusive breastfeeding, namely 29 respondents (56.9%) compared to non-exclusive breastfeeding groups, namely 22 respondents (43.1%)[19,20,21]. Growth is a quantitative change in the form of an increase in the number, size, dimensions of cells, organs and individuals. Not only changes in physical size of the body but also the structure of organs and brain[18,19].

Based on the results of statistical analysis states that there is a significant relationship between breastfeeding and infant growth in the Sudiang Raya area of Makassar City based on the index body weight according to age, body length according to age and body weight

according to body length. The chi-square test results of the relationship between breastfeeding and infant growth based on index body weight according to age with a value of ρ = 0,000, body weight according to age index with a value of ρ = 0.001 and index body weight according to body length with a value of ρ = 0.010.

This is in accordance with previous research where there was a significant relationship between exclusive breastfeeding and the growth of 6-month-old infants in the Working Area of Berseri Pangkalan Kerinci Health Center, Pelalawan Regency. Likewise with the research which states that exclusive breastfeeding affects the nutritional status of infants [9,10,11,14].

Giving intake other than breast milk for infants under 6 months of age can increase the risk of infectious diseases and trigger malnutrition. This is because the provision of intake other than breastmilk cannot be properly digested by the intestines of the newly developing baby and the non-sterile manufacturing process can mediate the entry of infectious disease-causing bacteria[4].

Development is a change that occurs quantitatively and qualitatively, increasing the ability of the body's function to be better and predictable which is an interpretation of maturation or maturity. Changes in development occur in gross motor function, fine motor, cognitive, language, emotional and behavioral development as a result of development that is influenced by the environment[1,3,4].

The results of statistical analysis prove that there is a significant relationship between breastfeeding and infant development in the Sudiang Raya area of Makassar City with a value of p = 0,000. Infants who were exclusively breastfed were 52 babies (66.7%), 49 infants (94.2%) of whom had development according to their age and 3 babies (5.8%) had inappropriate developments. Meanwhile, of the 26 babies (33.3%) who were not given exclusive breastfeeding as many as 17 babies (65.4%) had inappropriate development and 9 babies (34.6%) had the appropriate development.

The results of this study are in line with research conducted in July (2015) where there was a significant relationship between exclusive breastfeeding and exclusive breastfeeding on the development of children aged 3-12 months in which 25 infants (41.7%) who were exclusively breastfed had normal development.

Optimal child growth is influenced by three basic needs. The three basic needs are ASUH in the form of fulfilling children's basic needs in the form of intake such as breastfeeding and monitoring growth, ASIH in the form of fulfilling children's emotional needs such as love and treatment from people around their environment and ASAH obtained through the learning process[20,21].

Conclusion

1. Based on the body length according to age index, 96.2% had normal body length exclusively breastfed and 65.4% had normal body length but were not given exclusive breastfeeding. Meanwhile, based on the body weight according to body length index all infants who were given exclusive breastfeeding had normal nutritional status (100%) while 84.6% of infants who were not given exclusive breastfeeding had a normal nutritional status and 15.4% were thin.
2. Infants aged 6-12 months who are given exclusive breastfeeding in the Sudiang Raya area of Makassar City have a development that is in accordance with their age of 62.8%. Meanwhile, infants who were not given exclusive breastfeeding and had an inappropriate development of 65.4%.
3. Giving breast milk to infants aged 6-12 months in the Sudiang Raya area of Makassar City has a significant relationship to the growth of infants with ρ: 0,000 for index body weight according to age, ρ: 0,001 for display body according to age index and ρ: 0,010 for index body weight according to body length index.
4. Giving breast milk to infants aged 6-12 months in the Sudiang Raya area of Makassar City has a significant relationship to the development of infants with ρ: 0,000.

Conflict of Interest: There was no conflict of interest at the time this research was conducted.

Source of Funding: This study received independent funding and assistance through the Makassar health polytechnic Risbinakes fund of the Ministry of Health of the Republic of Indonesia.

Ethical Clearance: Before the research was conducted, researchers obtained ethichal clearence from the ethics commission of health research at the Makassar Health Polytechnic.

REFERENCES

1. Adriani Merryana and Wirjatmadi Bambang. The Role of Nutrition in the Life Cycle. First Book, Jakarta Kencana Prenada Media Group. 2012: 22-34.
2. Almatsier, Sunita. Basic Principles of Nutrition. Jakarta Gramedia Pustaka Utama. 2004: 54-67.
3. Almatsier S, Soetardjo S and Soekatri M. Balanced Nutrition in the Life Cycle. Jakarta: Gramedia.2011: 76-88.
4. Ambarwati, Wulan. Comparison of the Growth of Infants Given Breast Milk Exclusively with Substitutes for Mother's Milk in Kebon Jeruk Sub-District Jakarta. Universitas Islam Negeri (UIN) Syarif Hidayatullah Jakarta. 2014: 55-74.
5. Arisman, MB. Nutrition in the Life Cycle, Jakarta EGC. 2010: 98-102.
6. Atiqa, Ulfa. Differences in the Growth and Development of Infants Aged 6 Months Given Exclusive and Non Exclusive Breastfeeding in the Work Area of Puskesmas in Tamalanrea Makassar City. Hasanuddin of University, Makassar. 2016: 43-51.
7. Cahyadi Budi. Relationship between Giving ASI and Baby Growth. 2012: journal of (Online) (www.q.journal.co.id/paper-281 diakses 31 Januari 2017).
8. Diana, Fifi Melva. (2010). Toddler Child Development Monitoring, Jakarta Journal of Public Health, 2010: Vol. 4 (2): 53-77.
9. Fitri D I, Chundrayetti E dan Rima S. Relationship between Giving ASI and Growth of Infants at 6 Months of Age at Nanggalo Health Center. Andalas Health Journal, 2014: Vol. 3 (2): 51-57.
10. Harahap, Dewi Anggriani. Relationship between Exclusive Breastfeeding and Growth of Infants Aged 6 Months in the Work Area of Berseri Puskesmas Pangkalan Kerinci Pelalawan Regency. Nutrition Journal of STIKes Tuanku Tambusai Riau, 2013: Vol 4 (1): 44-49.
11. Khamzah, Siti N. A Myriad of Wonders of Breast Milk. Yogjakarta FlashBook. 2012: 79-86.
12. Lemeshow, Stanley, Hosmer, David W, Klar, Janelle, Lwanga, Stephen Kaggwa & World Health Organization. Adequacy of sample size in health studies. World Health Organization Genewa, 1997: 59-65.
13. Rizanti Fiola and Trevino Pakasi. The Relationship Between Mother's Education on the Duration of Exclusive Breastfeeding for Children in East Jakarta. Department of Community Medicine. Faculty of Medicine University of Indonesia. Jakarta. 2014: 23-31.
14. Saputra, Andrian Reza. The Role of Exclusive Breastfeeding on Nutritional Status and Early Childhood Growth.J Agromed Unila 2016: Vol 3 (1): 21-33.
15. Soetjiningsih dan Ranuh IG.N. Gde. Child Growth and Development Edition 2. Jakarta: EGC. 2013: 66-68.
16. Sulistyoningsih, Hariyani. Nutrition for Mother and Child Health. Yogyakarta Graha Sciens. 2011: 65-70.
17. Susanti, A, Fadlyana E dan Nataprawira H M. Benefits of Early Intervention of Children 6-12 Months With Suspicion of Developmental Deviations.Jakarta MKB 2014: Vol 46 (2): 39-45.
18. Sringati Sringati, James Walean, Ahmil Ahmil, Widya Lita Fitrianur, Vemy. Relationship between Mother's Knowledge and Motivation towards Exclusive Breastfeeding in Jono'oge Village. Tadulako Health Journal 2016: Vol. 2 (1): 88-92.
19. Syahriani, Ajeng. The Differences in Rough Motoric Development in Preschool Children Between Less, Normal, and Obesity Growth in AL Firdaus Kindergarten (TK) Surakarta. Essay. University of Muhammadiyah Surakarta. 2013: 56-66.
20. Widati, Tri. Improving the Fine Motoric Ability of Children Through Paper Folding Method in Group B Children ABA Gani Kindergarten Socokangsi Jatinom Klaten Academic Year 2011/2012. Essay. University of Muhammadiyah Surakarta. 2012: 43-55.
21. Widayati Wahyu, Detty Siti Nurdiati dan Anjarwati. Effect of Exclusive Breastfeeding on Nutritional Status and Development of Infants at Trucuk Health Center I. Surabaya Journal of Midwifery and Nursing, 2016: Vol. 12 (1): 23-29.

Application of Community Models in an Effort to Control Smoking Behavior

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ABSTRACT

Smoking is a serious threat to global health, around 1.3 billion tobacco users have nearly 6 million people who die each year due to diseases that arise from tobacco use. Smoking behavior not only can trigger NCDs *(Non-Communicable Disease)* but it also has an effect on economic problems, the more cigarettes consumed, the higher the costs that will be incurred due to health care and the cost of death due to diseases that arise from smoking behavior. Comprehensive smoking behavior problems which are caused not only by psychological and pharmacological factors but also social and environmental needs a community approach to control these behaviors.

This study aims to collect and analyze articles related to the application of community models in an effort to control smoking behavior. The design used is the *literature review*, articles are collected using search engines such as *ProQuest*, BMC Public Health, Google Scholar and *Plos One*. Criteria article used was published in 2007 -2017. Based on the collected articles, the result is found that the community-based approach can be applied in the context of controlling smoking behavior as an effort to move the community and to modify the social environment that can support the creation of behavioral changes and to control smoking behavior.

Keywords: *Smoking Behavior, Community Approach, Control smoking*

Introduction

Smoking behavior has becomes a people's lifestyle, compared to rural areas, smokers in urban areas are more numerous, this is because urban residents or urban communities have very high social movements[1.] Smoking remains a serious threat to global health, around 1.3 billion tobacco users, nearly 6 million people die each year from diseases arising from tobacco use[2,3.] Tobacco use causes excessive health costs and loss of one›s productivity[3.] About 80% of the 1.3 billion smokers worldwide live in low and middle income countries, where the burden of disease and death from tobacco use are the biggest problem in the country[3.]

Based on data from the Global Adult Tobacco Survey (GATS) in 2015 from 22 countries there were 879 million smokers with a total of 721 men who smoked and 158 women who smoked[2]. If there is no serious prevention in inhibiting the growth of smoking behavior, in the 21st century, there will be 1 billion people die of illness due to smoking. It can be concluded that, the higher the consumption of cigarettes the higher the mortality rate[4.]

The problem given of smoking behavior is a comprehensive problem because it is caused not only by psychological factors such as the presence of comfort when smoking, and addiction due to addictive substances contained in cigarettes, but also there are social and environmental factors that have an important role in shaping a person›s smoking behavior, so what is done is not enough to approach individually but in a community.

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Handling community-based smoking behavior has been carried out in various countries starting from the implementation of non-smoking regional policies, interventions by providing counseling, and various smoking cessation programs[5,6]. Nierkens (2013) revealed that community-based interventions to overcome the problem of tobacco use are more effective by combining family values[7]. Helping smokers to quit without creating an environment that supports them to quit will be difficult for a smoker and can cause them to relapse. Whereas community-based intervention has a framework that shows that individuals, interpersonal, community, organization and government have an influence on individual health status and can overcome several factors that form smoking behavior simultaneously[8]. Therefore, the handling of community-based smoking behavior is considered effective in overcoming the problem of smoking behavior. Based on the background above, the authors are interested in discussing "community model applications in an effort to control smoking behavior".

Method

The method used in writing this article is a literature review. That is a search for literature conducted using an online database that provides free journal articles in PDF format: ProQuest, BMC Public Health, Google schooler and Plos One. In the initial stages of searching for journal articles, around 400 articles from the Year 2007 to 2017 were obtained. Exploration and identification of articles that have relevance will be compiled. Of these, only about 95 articles are considered relevant.

Results

Based on the results of the articles collected and the analysis of the authors, it was found that smoking behavior was caused by things that were multi cause. Smoking does not necessarily become a person›s daily activities. There are various kinds of factors that influence a person to become a smoker that is starting from lack of knowledge related to the dangers of smoking to health, low education, weak economy, influence of parents, influence of friends, influence of advertising, influence of substances in cigarettes, psychological influences and cultural influences[9-20] .

The most important thing on a problem of smoking behavior that their exposure to smoke by people around who do not smoke, especially mothers and children are usually known as SHS (Secondhand *Smoker).* The higher the number of active smokers, the higher the SHS (Second Hand Smoker) will be. This prompted the Government to issue a policy related to the protection of SHS such as prohibiting smoking in certain places and in vehicles with children[21-24]. Therefore, to handle and control the behavior of smoke, which is quite alarming, many countries implementing strategies that can touch the biggest factor causing the increase of smoking behavior that social environmental factors by implementing a strategy based on community.

Forms of community-based smoking behavior control are carried out by various countries, namely the application of assessed smoke-free policies can decrease my smoking prevalence, exposure to SHS and health issues that arise from smoking[24]. Brazil is one of the success stories that has succeeded in reducing deaths arising from tobacco. A policy strategy called «The Sim Smoker Policy Simulation Model» developed in Brazil has succeeded in overcoming the problem of smoking. The policy model adopted is starting with raising the price of cigarettes, strict restrictions on cigarette advertisements and health warnings, the existence of laws or rules for non-smoking air and increasing smoking cessation programs[25].

Other policies in the form of increasing tobacco tax, intervention in packaging tobacco products, campaigns through mass media and prohibitions on cigarette advertising at the point of sale, can effect smoking attitudes and behavior[24.26]. In America, various media lift isseu related dangers of smoking on health, the efforts of the media to support the advocacy process and help policy makers easily to employ the new area without smoke and to shape public opinion in order to pro-restaurant and non-smoking bar[27].

Along with the development of the times, increasingly developing technology is used as a medium for delivering information to a broad audience. In New Zealand, using a social media program is called «Online Smoking Cessation Social Network». The program helps the wider community to obtain information regarding the dangers caused by smoking and guide smokers to stop smoking[28].

In Indonesia one form of community-based intervention that has been proven to be able to control

smoking behavior, namely being in a bone-bone village. Bone-bone Village in Enrekang District, South Sulawesi Province is a clear proof of the success of overcoming the problem of smoking with a community-based approach. The information obtained related to the dangers of smoking for themselves and surrounding people, aroused the heart of one of the Public Figure, namely the Village Head to deal with smoking behavior in his village. The strategy used by conducting a survey previously was related to the community›s opinion about cigarettes and then together with other community leaders, they drew up a plan and invited the community to participate to jointly determine the area of smoke-free Bone-bone Village[29].

Discussion

Smoking behavior has become the lifestyle of today's society from a variety of elements either old, young, poor or rich. Smoking has a major impact on the environment that is unhealthy and has a worse impact on the overall health of the community[30]. Smoking behavior is not only detrimental to the health of the smoker itself but also the people around him. Viewed from any angle the cigarette remains negative. The more a person smoked the more death and the emergence of the risk of disease NCD›s (Non-Communicable Disease).

The World Health Organization in the Ottawa Charter through the International Conference on Health Promotion in 1986 has provided a framework clearly as an approach to changing people›s behavior towards better public health by developing health-minded public policies, create an enabling environment, strengthen community action or movement, develop individual skills, and reorient the health care system[30,31].

Given the smoking behavior of the world community is very alarming, one of the efforts of the WHO (World Health Organization) to overcome the current tobacco problem is to invite each country to implement the MPOWER strategy[3]. The strategy MPOWER question are: **M**onitoring of tobacco use and prevention policies, **P**rotect from tobacco Smoker, **O**ffer help to quit tobacco use, **W**arn about the dangers of tobacco, **E**nforce bans on tobacco advertising, promotion and sponsorship, **R**aising taxes on tobacco. Referring to this MPOWER strategy, several countries make community-based smoking behavior control programs.

Community refers to a group of people who share a sense of social identity, general norms, values, goals, and institutions[32]. A community is based on geographical boundaries (environment, city, or other place), social identity and interests (ethnic groups), or sharing political responsibility[33,34]. Various studies reveal that the handling of community-based smoking behavior is effective in dealing with smoking behavior in certain groups[7,35]. Community -based interventions not only take place in society, but also important in guiding into a characteristic.

The following are three principles in community-based interventions; Community-based interventions are guided by an ecological framework, where individuals, interpersonal, community, organization, and government factors are believed to influence individual health status, efforts by community-based programs to overcome several factors, either simultaneously or sequentially[8]. Community-based interventions are designed to meet community desires and membership-based interventions. Communities usually begin with needs assessment and developing relationships with community leaders who understand the strengths and problems of the community. The third characteristic of community-based interventions is community participation. Community participation refers to the process by which individuals and families take an active part in discussions and activities to improve people›s lives, services, or resources.

Community-based intervention by relying on community participation is considered capable of overcoming multi-causes health problems. The community-based approach recognizes that health problems have several causes, requiring several interventions to influence individual behavior and simultaneously changing the social, political and economic environment based on local health conditions[8]. Applying a community-based approach shows that the role of family or community leaders influences smokers to stop smoking and reduce exposure to Secondhand Smoker (SHS). In this case, community participation in an environment where a smoker is located can influence a smoker to quit[35].

Conclusion

Community-based interventions are considered effective in overcoming the problem of smoking

behavior because, the problem of smoking behavior is a comprehensive problem caused not only by psychological factors but also by social or environmental factors. Community-based interventions place more emphasis on community participation which refers to the process by which individuals and families take an active part in discussions and activities to improve people›s lives by continuously controlling smoking behavior. With a community approach, we are able to create an environment that supports changes in one›s smoking behavior. Further research needs to be done by considering the implementation of community-based smoking behavior control for marginal areas with special characteristics.

Conflict of Interest: All authors declared no conflict of interest.

Ethical Clearance: Taken from ethics committee at the Faculty of Public Health, Hasanuddin University in Makassar Indonesia.

Source of Funding: Self-funded.

REFERENCES

1. Bahaa-Eldin, E., Mahfouz, M. S., Yagoub, U., Solan, Y. M. & Alsanosy, R. M. 2014. Practice and attitude of cigarette smoking: A community-based study. *PloS one,* 9**,** e92939.
2. ATLAS. GTTS (Global Tobacco Survaeillance System). Atlanta: CDC Foundation, The GATS Atlas; 2015.
3. WHO. WHO REPORT ON THE GLOBAL TOBACCO EPIDEMIC, 2015: Raising Taxes On Tobacco. WHO Web Site (www.who.Int/tobacco).
4. Kumboyono. Analysis of inhibiting factors for smoking cessation based on HBM in Students of Faculty of Engineering of Brawijaya University. *Keperawatan Soedirman.* 2011;6(1).
5. Kruger J, O'Halloran A, Rosenthal AC, Babb SD, Fiore MC. Receipt of Evidence-Based Brief Cessation Interventions by Health Professionals and Use of Cessation Assisted Treatments Among Current Adult Cigarette-Only Smokers: National Adult Tobacco Survey, 2009-2010. *BMC Public Health.* 2016;16:141.
6. Wu L, He Y, Jiang B, et al. Effectiveness of Additional Follow-Up Telephone Counseling in a Smoking Cessation Clinic in Beijing and Predictors of Quitting Among Chinese Male Smokers. *BMC Public Health.* 2016;16:63.
7. Nierkens V, Hartman MA, Nicolaou M, et al. Effectivenes of Cultural Adaptations of Interventions Aimed at Smoking Cessation, Diet, and/or Physical Activity in Ethnic Minorities. A Systematic Review. *Plos One.* 2013;8(10):e73373.
8. Coreil J, A.Bryant C, Henderson JN. Social and Behavioral Foundation of Public Health. New Delhi: *Sage Publications*; 2000.
9. Ngahane BHM, Ekobo HA, Kuaban C. Prevalence and determinants of cigarette smoking among college students: a Cross-Sectional Study in Douala, Camerook. *BMC (Archives of Public Health).* 2015;73:47.
10. Spanopoulos D, Britton J, McNeill A, Ratschen E, Szatkowski L. Tobacco Display and Brand Communication at The Point of Sale: Implications for Adolescent Smoking Behaviour. *Tobacco Control.* 2014;23:64-69.
11. Passey ME, Gale JT, Sanson-Fisher RW. " It's almost expected": rural Australian Aboriginal women's reflections on smoking initiation and maintenance: a qualitative study. *BMC women's health.* 2011;11(1):1.
12. Li HCW, Chan SS, Lam TH. Smoking among Hong Kong Chinese women: behavior, attitudes and experience. *BMC public health.* 2015;15(1):1.
13. Schaefer DR, Haas SA, Bishop NJ. A Dynamic Model of US Adolescents' Smoking and FrienshipNetwork. *American Journal of Public Health.* 2012;102(6):e12-e18.
14. Thrul J, Lippermen-Kreda S, Grube JW, B.Friend K. Community-Level Adult Daily Smoking Prevalence Moderates the Association Between Adolescent' Cigarette Smoking and Perceived Smoking by Friends. *Springer.* 2014;43:1527-1535.
15. Cui Y, Ying M, Fan H. Cigarette smoking practice and attitudes, and proposed effective smoking cessation measures among college student smokers in China. *Emerald.* 2012;112(4):365-379.
16. Zaloudikova I, Hruba D, Samara I. Parental Education and Family status- Association with

Children's Cigarette Smoking. *European Journal Public Health.* 2012;21(1):38-44.

17. Xu X, Liu L, Sharma M, Zhao Y. Smoking-Related Knowledge, Attitudes, Behaviors, Smoking Cessation Idea and Education Level among Young Adult Male Smokers in Chongqing, China. *International Journal of Environmental Research and Public Health.* 2015;12:2135-2149.
18. Guo H, Sa Z. Sosioeconomic Differentials in Smoking Duration among adult male smokers in China : Result from the 2006 China Health and Nutrition Survey. *Plos One.* 2015;10(1):e0117354.
19. Babatunde OA, Omowaye Oa, Alawode DA, Omede O, Olomofe CO, Akinyandenu J. Smoking Prevalence, Willingness to Quit and Factors Influencing Smoking Cessation among University Students in a Western Nigerian State. *Asian Social Science.* 2012;8(7):149.
20. Liao Y-M, Chen Y-T, Kuo L-C, Chen P-L. Factors Associated with Parental Smoking in the Presence of School-aged Children: a Cross-Sectional Study. *BMC Public Health.* 2013;13:819.
21. Martinez-Sanchez JM, Fernandez E, Fu M, et al. Smoking behaviour, involuntary smoking, attitudes towards smoke-free lagislations, and Tobacco Control Activities in the European Union. *Plos One.* 2010;5(11):e13881.
22. Patterson C, Semple S, Wood K, Duffy S, Hilton S. A Quantitative Content Analysis of UK Newsprint Coverage of Proposed Legislation to Prohibit Smoking in Private Vehicles Carrying Children. *BMC Public Health.* 2015;15:760.
23. Edwards R, Peace J, Russell M, Gifford H, Thomson G, Wilson N. Qualitative Exploration of Public Health and Smoker Understanding of, and Reactions to, an Endgame Solution to The Tobacco Epidemic. *BMC Public Health.* 2012;12:782.
24. Hoffman SJ, Tan C. Overview of Systematic Review On The Health-Related Effects of Government Tobacco Control Policies. *BMC Public Health.* 2015;15:744.
25. Levy D, Almeida LMd, Szklo A. The Brazil SimSmoke policy Simulation Model: The Effect of Strong Tobacco Control Policies on Smoking Prevalence and Smoking-Atrributable Deaths in a Middle Income Nation. *Plos One.* 2012;9(11):e1001336.
26. Haw S, Amos A, Eadie D, et al. Determining the Impact of Smoking Point of Sale Legislation Among Youth (Display) Study : A Protocol for an Evaluation of Public Health Policy. *BMC Public Health.* 2014;14:251.
27. McDaniel PA, Offen N, Yerger V, Forsyth S, Malone RE. "Tired of Watching Customers Walk Out The Door Because of The Smoke": A Content Analysis of Media Coverage of Voluntarily Smokefree Restaurants and Bars. *BMC Public Health.* 2015;15:761.
28. Healey B, Hoek J, Edward R. Posting Behaviour Patterns in an Online Smoking Cessation Social Network: Implications for Intervention Design and Development. *Plos One.* 2014;9(9):e106603.
29. NYORONG, M. 2014. Beneficiary of Quit smoking (case study of Bone-Bone communities). *International Journal of Current Research and Academic Review,* 2(10), pp. 149-156
30. Palutturi S. *Kesehatan itu Politik.* Vol 1. 1 ed. Semarang: e-Media Solusindo; 2010.
31. Notoatmodjo S, Krianto T, Hasan A, Mamdi Z. *Promosi Kesehatan, Komitmen Global dari Ottawa-Jakarta-Nairobi Menuju Rakyat Sehat* Jakarta: Pusat Promosi Kesehatan Depkes. RI dan Departemen Pendidikan Kesehatan dan Ilmu Perilaku FKM-UI; 2009.
32. Israel BA, Schulz AJ, Parker EA, Becker AB. *Key Principles of Community-Based Research.* Vol 19: Annual Review of Public Health; 1998.
33. Eng E, Parker E. Measuring Community Competence in The Mississippi Delta: The Interface Betwee Program Evaluation and Empowerment. *Health Education Quarterly.* 1994;21:199-220.
34. Patrick DL, Wickizer TM. Community and Health. In Amick BC, Levine S, Tarlov AR, Waish DC, eds. Society and Health. New York, NY: Oxford University Press; 1995:46-92.
35. Varcoe C, Bottorff JL, Carey J, Sullivan D, Williams W. Wisdom and Influence of Elders: Possibilities for Health Promotion and Decreasing Tobacco Exposure in First Nations Communities. *Canadian Journal Public Health.* 2010;102(2):154-158.

Dental Hygienist Awareness Level and Preference Image on Health and Non-Health College Students

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ABSTRACT

The aim of this study was to investigate the perception level of dental hygienists by health (HRC) and non-health related college (NHRC) students. The data collection was conducted using the questionnaire tool in the web for HRC and NHRC students. The data were analyzed by frequency and x^2-test using SPSS statistical program to verify the significance. There were 62.6% for NHRC students and 37.6% were HRC students. As a result of the perception of dental hygienists t, 94% of HRC students knew dental hygienists and their main task is prevention of dental hygiene. However, 74.1% of NHRC students knew them and their main task is dental assistant work ($p<0.05$). The preferred external image of dental hygienist were responded as 50.7% for 'neat image' in HRC students, and 50.0% for 'bright facial expression' in NHRC students, but there was no statistically significant difference. In the important qualification that a dental hygienists should have internally was answered as 'expertise' by both HRC and NHRC students. Our findings suggest to provide efficient and better medical services for patients and to establish for recognizing dental hygienists properly, and the legal institutional arrangements, administrative support and diverse efforts are needed.

Keywords: *perception level of dental hygienist, prevention of dental hygiene*

Introduction

As the standard of living and consciousness of the people increases, the demand of customers for high quality medical care is getting higher and the demand for medical service is also strengthened as the expected level of medical service is increased accordingly[(1)]. It is necessary to improve the quality of medical services in order to meet the demand for such services. It will be necessary to refine patients according to patient characteristics and to provide appropriate services to them in order to reconsider patient satisfaction through the quality of medical services and recommend the hospital to other patients[(2)]. Therefore, in dental clinics and hospitals, various methods are being sought to increase the satisfaction of medical consumers. Among them, dental hygienist is one of the important factors that determine the quality of dental services[(3)].

The reason for this is that dentists can no provide dental health services that the public needs, and they also demand the role of professionals who combine expertise, technology, and service concepts[(4)]. A desirable dental hygienist identity is to establish a dental hygienist is able to provide patients with dental treatment services based on their expertise, skills and experience in a positive manner so that the dental hygienist continues to grow and the patient develops a correct perception of the dental hygienist[(5)].

An image is generally a picture, reflection, a physical similarity, an expression or a symbol of a visible person·animal·object, or a concept that influences an individual's attitude and behavior[(6).] In detail, the image suitable for the job is called 'professional image'. A professional image of a job is needed to give the core members, who interact in the course of an individual's job role, a belief that he or she will outperform the average[(7)]. Also, considering that the image of a profession generally has a significant influence on the

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development of the professionalism, image research is inevitably required in the development of dental hygienist professions[8].

However, research on the image of dental hygienists is limited to the image of the uniform, and there is insufficient research on the preference of the specific image desired by the patient by analyzing the dental hygienist in detail. The purpose of this study is to investigate the preference of dental hygienists by health related (HRC) and non-health related college (NHRC) students, and to compare the image preference difference between students who have basic medical knowledge and students who do not by comparing images and services.

Material and Method

Subject and Period: The subjects of this study were college students from HRC and NHRC residing in Busan from April 14th to May 12th, 2018. The questionnaires were collected using the Naver Office form for mobile to HRC and NHRC students. A total of 207 subjects were surveyed by self-filling questionnaire and within the survey, 28 were excluded which was not respond in good faith and 179 were analyzed.

Research Method: The questionnaire used in the survey was based on the degree of recognition of the dental hygienist and the image survey[9] questionnaire. The questionnaire consisted of 30 questions, 15 items on gender, age, and sequence, and 15 questions on dental hygienist awareness and preference.

Statistical Analysis: The study data were analyzed using the SPSS 24.0 program. The general characteristics of the subjects were analyzed, and the general characteristics and dental hygienist preference survey items were cross-categorized and verified by chi-square.

Findings

General Characteristics of the Subjects: Table 1 shows the general characteristics of the subjects. As a result of gender, male and females were 42.5% and 57.5%, respectively. By age, 21.8% were under 20 years old, 64.8% were between 21-25 years old, 12.3% were between 26-30 years old, and 1.1% were over 31 years old.

37.4% of the students were in the HRC and 62.6% of the students were in the NHRC. Among them, 26.3% were freshman, 26.8% were sophomore, 13.4% were junior, and 33.5% were senior year of the college. The recent dental experience from these students were as follows: 38.5% have visited within 6 months, 21.8% have visited within 12 months, 7.3% have visited within 18 months, 10.1% have visited within 24 months, and 22.3% have not visited dental clinic.

Table 1: General characteristics

	Sort	No. of People	Percentile(%)
Gender	Male	76	42.5
	Female	103	57.5
Age	Under 20	39	21.8
	21-25 year old	116	64.8
	26-30 year old	22	12.3
	Above 31 year old	2	1.1
Affiliated Department	Health related	67	37.4
	Non-health related	112	62.6
Year	Freshman	47	26.3
	Sophomore	48	26.8
	Junior	24	13.4
	Senior	60	33.5
Recent dental Experience	Within 6 months	69	38.5
	Within 12 months	39	21.8
	Within 18 months	13	7.3
	Within 24 months	18	10.1
	None	40	22.3

Recognition of Dental Hygienists: As shown in Table 2, about the name of 'dental hygienist', 94.0% of the students in the HRC answered 'I do know' and 6.0% answered 'I do not know'. Whereas 74.1% of the NHRC students answered 'I do know' and 25.9% said 'I do not know'. There was a statistically significant difference between the groups ($p<0.05$).

Table 2: Recognition of dental hygienist

Sort	Health related	Non-health related	Total	P
I know	63(94.0)	83(74.1)	146(81.6)	p=0.001
I do not know	4(6.0)	29(25.9)	33(18.4)	

(Number of subjects (%))

Dental Hygienist's Main Task Recognition: As shown in Table 3, about the dental hygienists' perception of their main duties, 41.8% of the students in the HRC students have answered as 'preventive duties' and 50.9% of the NHRC students have answered as 'dental assistant work' and it shows a statistically significant difference ($P<0.05$). Overall, 38.5% answered as 'dental assistant work', 25.1% answered as 'preventive duties', 17.3% answered as 'oral health education', 15.6% answered as 'oral radiography and treatment', 2.3% answered as 'scaling', and 1.2% answered as 'others'.

Table 3: Perceived dental hygienist's main duties (Number of subjects (%))

Sort	Health related	Non health related	Total	P
Oral health education	18(26.9)	13(11.6)	31(17.3)	p<0.001
Preventive duties	28(41.8)	17(15.2)	45(25.1)	
Dental assistant work	12(17.9)	57(50.9)	69(38.5)	
Consultation on oral radiography and treatment	8(11.9)	20(17.9)	28(15.6)	
Scaling	0(0.0)	4(3.6)	4(2.3)	
Others	1(1.5)	1(0.9)	2(1.2)	

Preferred External Image of Dental Hygienist: In the preferred image of dental hygienist according to the affiliated department, 50.1% of the HRC students answered 'Neat image' whereas 50.0% of the NHRC students answered 'Bright facial expression', but there was no statistically significant difference ($p>0.05$). Overall, 'Bright facial expression' was the most answered by 45.8% of the respondents, followed by 41.3% of 'Neat images' and 6.7% of 'intelligent images' respectively.

Table 4: Preferred external image of dental hygienist by affiliated department (number of subject (%))

Sort	Health related	Non-health related	Total	P
Neat image	34(50.7)	40(35.7)	74(41.3)	p=0.129
Bright facial expression	26(38.8)	56(50.0)	82(45.8)	
Intelligent image	5(7.5)	7(6.3)	12(6.7)	
Stylish image	2(3.0)	3(2.7)	5(2.8)	
Others	0(0.0)	6(5.4)	6(3.4)	

Whether the external appearance of a dental hygienist affects confidence or stability: As shown in Table 5, 86.2% of HRC students and 78.6% of NHRC students were affected by whether the external appearance of the dental hygienist had an influence on the confidence or stability, and there was a slight difference of approximately 11.0% but there was no significant difference ($P>0.05$).

Table 5: Whether the external appearance of a dental hygienist affects confidence or stability

Sort	Health Related	Non-health related	Total	P
Does affects	56(86.2)	88(78.6)	144(81.4)	p=0.236
Does not affect	9(13.8)	24(21.4)	33(18.6)	

Important qualifications that a dental hygienist should have internally: The question about the important qualifications that a dental hygienist should have internally was answered as 'Expertise' by both HRC and NHRC students with 43.9% and 44.6% respectively, but there was no statistically significant difference (p>0.05). Overall, expertise was 44.4%, sincerity and responsibility was 28.1%, kindness was 15.2%, and personality and cultivation was 12.4%.

Table 6: Important qualifications that a dental hygienist should have internally

Sort	Health related	Non-health related	Total	P
Expertise	29(43.9)	50(44.6)	79(44.4)	p=0.107
Personality and cultivation	4(6.1)	18(16.1)	22(12.4)	
Kindness	9(13.6)	18(16.1)	27(15.2)	
Sincerity and responsibility	24(36.4)	26(23.2)	50(28.0)	

Conclusion

As the medical environment changes, demand for oral health increases and competition among hospitals is accelerating. As a result, dental hygienists are increasingly playing a role in providing dental hygienists with access to high-quality medical services which is becoming very important because doctors and dentists cannot provide all the oral services that customer wants. In order to fulfill this role, it is important to learn about the image of dental hygiene that customers want. Therefore, this study aims to provide better medical services by examining the perception level of dental hygienists and the preference of image dental hygienists by HRC and NHRC students as well as by constructing and comparing images and services corresponding to them to provide better medical services.

In the present study, 94.0% of the students in the HRC and 74.1% of the NHRC students were aware of the dental hygienist's perception level. This is consistent with the findings of Kim et al.[10] that 100.0% of the health department, 87.8% of the non-health department, 84.1% of civil society, and 80.0% of the natural engineering department. In addition, according to additional survey data, from 81.9% of the respondents answered 'Yes', only 39.9% are aware of the dental hygienist's occupation exactly. About 40 percent of people know exactly what a dental hygienist is, and about 20 percent of people do not even know about it, so it is thought that active publicity and efforts are needed to inform dental hygienists.

In the main task recognition of dental hygienists, prevention work was the highest with 41.8% in the HRC, while the dental assistant work in the NHRC was the highest with 50.9%. Moreover, 38.5% of the respondents said that the duties of the dental assistant work were the main tasks, and the second was 25.1% of the preventive duties. In the study of Kim at el.[10] in 2016, 43.6% were in the first place for the dental diagnosis assistant work, 30.1% were in the second place for the plaque removal, and 25% were in the third place for the dental consulting. In addition, in the study of Choi at el[11] and Yoo at el[12] in 2004 and in 2002, 53.3% and 71.8% responded the dental hygienist's main task were dental assistant work respectively.

Although the percentage of dental hygienists' perceptions of dental hygienists is decreasing as the years go by, the perception of dental assistant work is stronger than prevention, education and scaling work especially in NHRC students[13]. In order to improve this, it is necessary to take measures to publicize dental hygienists' work to the general public.

In the preferred images of dental hygienists, 50.7% answered 'neat image' and 38.8% of 'bright facial expressions' in HRC students and 50.0% answered 'bright facial expressions' and 35.7% answered 'neat image' in NHRC students so that both groups preferred 'neat image' and 'bright facial expressions'. In addition, 86.2$ and 78.6% for both HRC and NHRC students responded the external image influences to the trust and

stability of dental hygienists so that it is important to have good image and bright expression in order to give confidence and stability to the dental hygienist.

Dental hygienists' internal qualities of qualification were responded as 'expertise' with 43.9% and 44.6% for both HRC and NHRC, respectively. This is because the expert knowledge is one of the most important factors in the modern service, and it is one of the qualities that should be equipped.

The purpose of this study is to analyze the perception level and preference image of dental hygienists and to provide opportunities for those working in dental related services to think about the qualities of qualifications which should be considered and prepared for the future and this study can be supportive material for them. Through these efforts, it is believed that the dental hygienist's social status will be enhanced by providing more efficient medical services and increasing awareness and role of dental hygienists in the intensified medical competition.

This study is based on the research conducted on some part of HRC and NHRC students, so it may be insufficient to generalize it. Through this study, it is possible to contribute the basic data and to establish a role as a medical professional by arranging measures to inform the general public about the dental hygienists' work in order to provide better service and improve the patient with proper recognition of dental hygienist and formation of desirable image. Therefore, it will be necessary to carry out concrete and systematic research with a wider age group through future research.

Conflict of Interest: The authors declare no conflict of interest.

Source of Funding: This work was supported by Dongseo University, "Dongseo Cluster Project" Research Fund of 0000 (DSU-4868282)

Ethical Clearance: There were no ethical clearance

REFERENCES

1. Kim CA. Employee Training Program on Employee Satisfaction and Patient Revisit. Seongnam: Kyungwon University Graduage school of business administration; 2009.
2. Lee KH. The effect of perceived service quality by dental patients on satisfaction and hospital recommendation. Seoul: Korea University Graduate school of public health; 2012.
3. La SY. A Study on the Cognition for Dental Hygienist of University Students in Seoul, Korea. Seoul: Dankook University; 2005.
4. Choi JS. A study on the patient expectation for quality care of dental service. Seoul: Seoul University Graduate school of public health; 2002.
5. Choi SS, Choi MS. An Investigation for the Recognition of the Course of Dental Hygiene by Specific Junior High School Students in Gyenog-Ju. Journal of Dental Hygiene Science. 2007;7(4):235-241.
6. Mendez D, Louis M. College students' image of nursing as a career choice. Journal of Nursing Education. 1991;30(7):311-319.
7. Yoo H, Choi SH. A Study on the Clothing Image of Highly Effective Worker and Professional Image. Journal of Korea Society of Design Trend. 2012;34(-):183-196.
8. Lee EJ, Choi JM. The Effect of the Dental Patients`Perception about Dental Hygienist on the Social Demand of Dental Hygienist. Journal of Dental Hygiene Science. 2012;12(4):392-403.
9. Shin KS. Study on the Recognition and image of Dental Hygienist : Comparative analysis on the patient and the general. Seoul: Dankook University; 2009.
10. Kim CT, Yoon HS. Level of Dental Hygienist Awareness and Image Preference. Asia-pacific Journal of Multimedia Services Convergent with Art, Humanities, and Sociology. 2016;6(9):623-634.
11. Choi EM, Song YS, Lee SH. A Study on Dental Hygienist Recognition and Preference of Inhabitants in Seoul and Kyunggi-do. Kyung Bok College. 2004;8(-):399-414.
12. Yoo MS. Study on the Perception and Preference of Dental Hygienist. JeonJu: Chonbuk National University Graduate school of public health; 2003.
13. Lee BY, Lee JY, Lim BM, Koo HJ. A Study of University Students' Perception on Dental Hygienists. The Journal of The Korean Academy of Dental Hygiene. 2011;13(4):277-286.

Effects of Biomass Fuel Smoke on Pulmonary Functions in Rural Women of Southwest Ethiopia

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ABSTRACT

Introduction: Biomass fuel is used commonly for domestic cooking by most of the rural Ethiopian housewives, in an enclosed space with poor ventilation. Incomplete combustion of biomass produces harmful products which may exerts various adverse effects on lung functions.

Aim: To assess the adverse effects, if any, on pulmonary functions and respiratory symptoms in rural women using biomass fuel for cooking and compared to housewives who were not exposed.

Materials and Method: A comparative cross-sectional study was conducted with a total of 132 study participants (66 women exposed to biomass fuel smoke and 66 controls), from September 5 to October 5, 2018. Anthropometric and spirometric measurements were carried out. SPSS version 20.0 was used for data analysis. Frequencies, means, percentage and chi-square were used for descriptive analysis. Independent sample t-test, Bivariate and multivariate logistic regression was used to compare mean and relevant associations.

Results: The mean age of biomass fuel smoke exposed and non-exposed group were 29.12 ± 8.40 and 29.21 ± 6.51 respectively. The mean of BMI among exposed group was 22.90 ± 2.47 while 23.37 ± 2.55 was in non-exposed group. Among biomass fuel smoke exposed group mean of 3.56 ± 0.70 for FVC, 2.87 ± 0.77 for FEV1, 80.40 ± 11.36 for FEV1 %, 3.77 ± 1.09 for FEF25-75% and 6.60 ± 1.90 for PEFR was recorded while 3.95 ± 0.77 for FVC, 3.33 ± 0.68 for FEV1, 84.38 ± 9.19 for FEV1 %, 4.33 ± 1.15 for FEF25-75 % and 7.55 ± 2.31 for PEFR was recorded among controls. A significant reduction was found in pulmonary function parameters among biomass fuel smoke exposed group compared to non-exposed. The prevalence of abnormal lung function is 37.9% and 15.2% among exposed and controls respectively. Biomass fuel smoke exposed women for greater than 5 years were six times (AOR=6.321; 95%CI=2.100, 19.022; P=0.035) more likely to have pulmonary function impairment compared to those exposed for less than or equal to 5 years. The prevalence of cough, phlegm, wheeze, breathlessness and chest pain was 39.4%, 22.7%, 30.3%, 19.7% and 16.7% for exposed group respectively while 21.2%, 13.1%, 15.2%, 6.1% and 12.1% for non-exposed respectively.

Conclusion: This study concluded that biomass fuel smoke exposed women are at greater risk of pulmonary function impairment than non-exposed group. The prevalence of adverse respiratory symptoms was higher among biomass fuel smoke exposed compared to non-exposed.

Keywords: *Pulmonary function test, Body mass index, Respiratory symptoms, Indoor biomass cooking.*

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Introduction

Biomass fuel is derived from plants or animals and humans from very beginning of civilization. Most common is wood, but the use of animal dung and crop residues is also used widely[1]. Half of the domestic energy demand is fulfilled by biomass fuel in most developed countries and more than 90% in developing

countries. Low combustion efficiency of biomass fuel leads to incomplete combustion and production of harmful substances which may induce various harmful effects on the lung function[2]. In sub-Saharan Africa, where the majority of women rely on biomass fuel, burden of affiliated respiratory diseases has not been well documented. The studies conducted on the effects of indoor air pollution in African countries are very rare in available literature[3]. Ethiopia, one of the country in East Africa having more than 100 million people, is one of the poorest country in the world. Majority of the population in Ethiopia lives in a rural environment[4].

The biomass fuel is widely used as a primary source of cooking fuel in every part of Ethiopia. Available literature reveals that 80% of housewives having indoors cooking environment and using biomass as fuel in rural northern Ethiopia[5] moreover, are using inappropriate devices in pitiful ventilated kitchen resulting in high exposure to toxicants[6].

Indoor air pollution because of biomass fuels is ranked 10th amongst most preventable risk factors globally and among developing countries it ranked fourth[7]. In communities with poor access to green fuels in rural setting of developing countries, burden of disease is high and it constitute a 2.7% of overall health risks[8].

Epidemiological studies have shown that pulmonary functions are decreased with long term/short term exposure to polluted air[9]. Therefore, the current study was carried out to evaluate the effects of biomass fuel combustion on pulmonary function in the women of Alemyehu Mecha village and compared the pulmonary function between biomass fuel users and non-users i.e. those using clean fuels like liquefied petroleum gas or electricity for cooking.

Materials and Method

Study setting: This study was conducted in Alemyehu Mecha kebele which is located 15 km to Jimma town, south west Ethiopia. Approximately 2500 people live in the Village.

Study design and participants: A comparative cross-sectional study was employed from September to October 2018. The sample size was calculated using the method of Dupont & Plummer[10], where the confidence interval was set as 95%. The study was conducted with 66 subjects in each group which was greater than computed sample size, subjects were randomly selected for the study using systematic sampling methods. Eligibility criteria for exposed group were being greater than18 years old and responsible for household cooking. Convenient sampling technique was used to select control group. 66 women with same age, BMI, and educational status were selected from residents of Jimma University apartments who used electricity, LPG and had separate ventilated room for cooking. The purpose of the study was explained clearly in local language to all potential participants and informed consent was also obtained. Each subject filled up one questionnaire to record their personal demographic data, health status and consent to participate in the study[11].

The subject's height measured in standing position without shoes in centimeters and weight measured in kg were taken as continuous variables.

Using the digital spirometer, Forced vital capacity (FVC), Forced Expiratory Volume in one second (FEV_1), FEV_1/FVC ratio, $FEF_{25-75\%}$ and Peak Expiratory Flow Rate (PEFR) were measured. All pulmonary function tests were carried out from 8:00-10:30pm as per guidelines of American Thoracic Society[12].

Data Analysis Procedures

Data were analyzed using the SPSS Version 20. Descriptive statistics were used to summarize socio-demographic characteristics and anthropometric measurements of subjects. Chi-square test was used to compare the prevalence of respiratory symptoms among exposed and non-exposed group. Independent sample t-test was used to compare the mean respiratory scores of exposed and non-exposed groups. Logistic regression was used to evaluate relationship between respiratory function test and independent variables.

Ethical Consideration: This study was approved by Institute of Health Science Ethical Review committee of Jimma University vide Ref. No. IHRPGD/587/2018 dated 14/05/2018.

Results

A total of 132 (66 from each exposed and control group) study participants were involved in this study. Age of study participants ranged from 19 to 60 years with a mean age of 29.12 ± 8.40 for biomass fuel smoke

exposed women and 29.21 ± 6.51 for controls. Regarding educational status, 47% and 53% of exposed; 42.4% and 57.6% of controls educated to primary school level and high school and above respectively. Majority of the participants from both study groups were not married. Cooking experience among exposed participants ranged from 1 to 19 years. 62.1% of cases were having 1-5 years of exposure to biomass fuel smoke while the remaining 37.9 % were having greater than 5 years of exposure. Matched variables for age, BMI, and Educational Status showed that there was no significant difference among exposed and their matched controls [Table/Fig-1].

Table/Fig-1: Characteristics of respondents

Variables	Exposed N (%)	Non-exposed N (%)
Age		
≤25 year	25(37.9)	23(34.8)
26-29 year	22(33.3)	18(27.3)
>30 year	19(28.8)	25(37.9)
Marital status		
Single	41(62.1%)	47(71.2%)
Married	25(37.9%)	19(28.8%)
Educational status		
Primary school	31(47%)	28(42.4%)
High school &above	35(53%)	38(57.6%)
Cooking experience		
≤5 years	41(62.1%)	47(71.2%)
>5 years	25(37.9%)	19(28.8%)

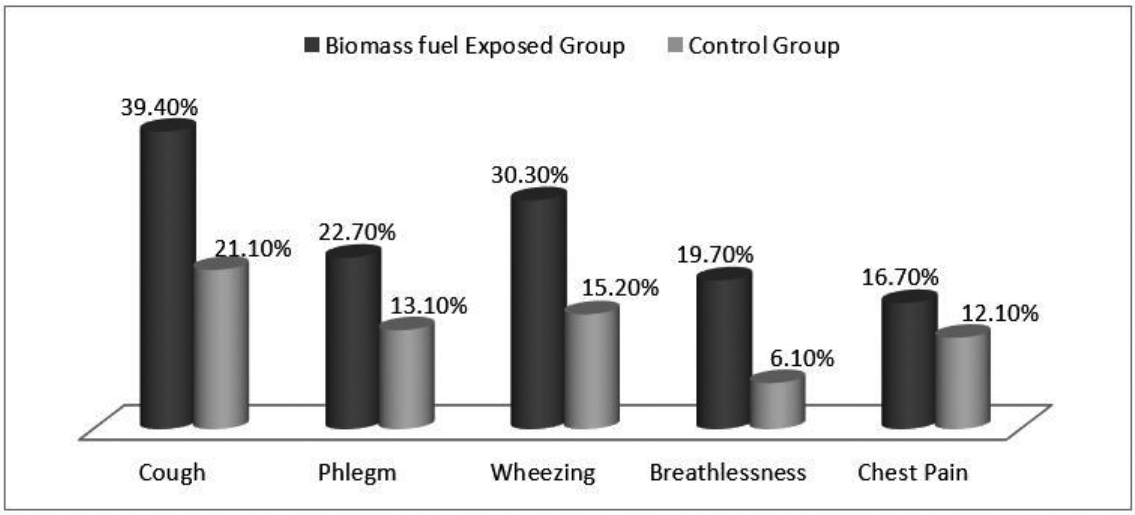
Pulmonary Function Test: An independent sample t-test was used to compare Spirometric measurement of pulmonary function (FVC, FEV1, FEV1%, $FEF_{25-75\%}$ and PEFR) of exposed and non-exposed group. Accordingly, FVC, FEV1, FEV1%, PEFR and $FEF_{25-75\%}$ were higher in control respondents than exposed respondents and the mean difference was found to be statistically significant ($p<0.05$) [Table/Fig-2].

Table/Fig. 2: Comparisons of Spirometric measurements

Parameters	Exposed Mean ± SD	Non- exposed Mean ± SD	t-value	P value
FVC(L)	3.56 ± 0.70	3.95 ± 0.77	-3.034	0.003*
FEV_1(L)	2.87 ± 0.77	3.33 ± 0.68	-3.640	0.000**
FEV_1/FVC(%)	80.40 ± 11.36	84.38 ± 9.19	-2.207	0.029*
$FEF_{25-75\%}$(L/s)	3.77 ± 1.09	4.33 ± 1.15	-2.883	0.005*
PEFR(L/s)	6.56 ± 1.90	7.55 ± 2.31	-2.603	0.010*

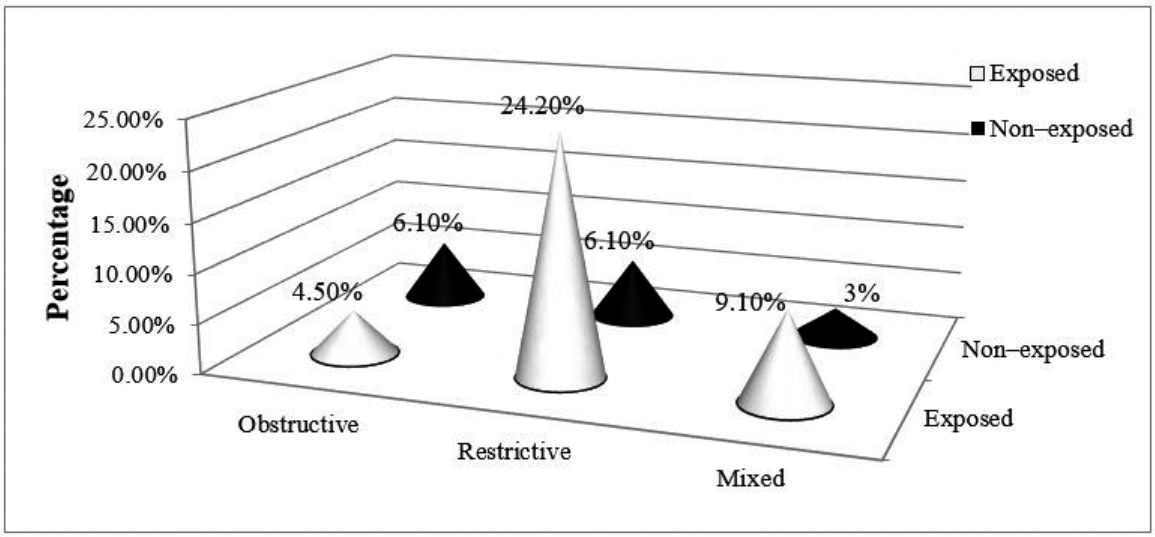
SD: Standard Deviation, CI: Confidence Interval, * p value < 0.05, **p value < 0.001

Respiratory Symptoms: The self-reported prevalence of respiratory symptoms were analyzed among the study participants. Cough was the most prevalent respiratory symptom among biomass fuel smoke exposed (39.4%) participants. Prevalence of respiratory symptoms was compared using chi-square test between exposed and controlled. The result showed significant difference ($p< 0.05$) for cough, wheezing and breathlessness with p-value of 0.023, 0.038 and 0.019 respectively [Table/Fig-3].



Table/Fig. 3: Respiratory symptoms among exposed and control group

Pulmonary Impairments: The prevalence of abnormal lung function is 37.9% and 15.2% among biomass fuel smoke exposed women and controls respectively. The type of lung disorder mostly evident in biomass fuel smoke exposed women was restrictive. About 3(4.5%), 16(24.2%), 6(9.1%) and 4(6.1%), 4(6.1%), 2(3%) develop obstructive, restrictive and mixed type of lung disorder in exposed and controls respectively. FVC and FEV1 were affected in all three lung disorders but FVC and FEV1 were more affected in restrictive and obstructive impairment respectively [Table/Fig-4].



Table/Fig. 4: Ventilatory impairment among exposed and non-exposed participants

Factors associated with pulmonary function: The variables that showed statistically significant association ($p<0.25$) in the bivariate analysis were transferred and further analyzed in multivariable logistic regression to adjust for potential confounders and to identify factors associated with pulmonary function. In multivariable logistic regression, variables with $p<0.05$ were considered as factors for pulmonary function. The model was tested for multicollinearity (VIF=1.012-1.799 for exposed and VIF=1.083-2.036 for non-exposed) and goodness of fit was tested by Hosmer-Lemeshow test (p=0.678 for exposed and p=0.443 non-exposed). The model was fit and no multicollinearity existed. The result of multivariable logistic regression indicated that cooking experience was the only variable independently associated with pulmonary function. Women who cooked with biomass fuel for greater than 5 years were six times (AOR=6.321; 95%CI=2.100, 19.022; P=0.035) more likely to have lung function impairment compared to those who worked for less than or equal to 5 years [Table/Fig-5].

Table/Fig. 5: Factors associated with pulmonary function pattern

Variable		Lung function pattern		COR (95%CI)	AOR	p-value
		Abnormal	Normal			
Age	<=25 years	6(24)	19(76)	1		
	26- 29 years	6(27.3)	16(72.7)	6.861[1.808, 26.033]	2.423[0.387,15.152]	0.344
	>=30 years	13(68.4)	6(31.6)	5.778[1.501, 22.234]	2.942[0.573, 15.118]	0.196
BMI	<=24.9	17(32.7)	35(67.3)	1		
	>=25	8(57.1)	6(42.9)	2.745 [0.821,9.175]	1.617[0.350, 7.471]	0.538
Cooking experience	<= 5 years	11(25.6)	32(74.4)	1		
	>5 years	14(60.9)	9(39.1)	4.525 [2.100, 19.022]	6.019[1.131, 32.018]	**0.035***
Average time spent per day	4 hours	18(46.2)	21(53.2)	1		
	> 4 hours	7(25.9)	20(74.1)	0.408 [0. 141, 1.186]	0.307 [0.078, 1.203]	0.090
Educational status	Primary school	8(25.8)	23(74.2)	0.368 [0.130, 1.044]	0.282[0.073, 1.091]	0.067
	High school & above	17(48.6)	18(51.4)	1		

* Statistically significant at 95% CI, P- value ≤ 0.05; 1.00-reference; COR- Crude odds ratio; AOR-Adjusted odds ratio

Discussion

The effect of biomass fuel on pulmonary functions in current study showed that, FVC, FEV1, FEV1%, FEF25-75% and PEFR values in the exposed group were significantly decreased ($p<0.05$) when compared to that of control. This finding is in line with study conducted in Karnataka India and Cameroon. Authors observed that the pulmonary function parameters were significantly lesser in the study subjects as compared to group exposed to biomass fuel[13]. Recently another study on pulmonary function in rural women exposed to biomass fumes also conducted which reported that pulmonary function parameters {FEV1 in liters (1.44 ± 0.36), FVC in litres (1.62 ± 0.38), PEFR in liters/second (3.11 ± 1.05), MVV in litres/minute (49.70 ± 14.11)} were significantly reduced in biomass fuel subjects as compared to green fuel users. The mean exposure in hours was 3.5 hours/day with duration of exposure ranging from 8 to 30 years in the above-mentioned study[14]. Similarly, other studies show FEV1, FEV1/FVC%, FEF 25-75%, PEFR values were decreased statistically among the biomass affected subjects[15]. This attribute may be due to exposure of high concentration of pulmonary toxicants emitted during incomplete biomass fuel combustion and poorly ventilated environment. These alteration in pulmonary function parameters in biomass fuel exposed women may be avoided by improving adequate household ventilation, by improvement in stoves and change of the fuel type for cooking and heating.

The present study revealed the prevalence of respiratory symptoms of cough (39.4% vs. 21.1%), phlegm (22.7% vs. 13.1%), wheeze (30.3% vs. 15.2%), and breathlessness (19.7% vs. 6.1%) in biomass fuel affected group and controls, respectively. In this study, the higher prevalence of respiratory symptoms in biomass fuel exposed group may be due to unhygienic conditions, and poorly ventilated workplaces of the study areas as compared to the controls.

A study conducted in India reported cough as the common presenting symptom[16], similar results was reported in Port Adelaide Australia[17], where the presence of wood heaters at home was significantly associated with increased prevalence of respiratory symptoms in females.

Even if a study conducted in India shows obstructive pattern of pulmonary dysfunction in biomass fuel exposed females[18], the present study indicates restrictive pulmonary dysfunction as the most evident lung disorder in biomass fuel smoke exposed women. The alteration in pulmonary function could be due to chronic inhalation of high concentration of respiratory toxicants present in biomass fumes. There are plenty of studies which reported ill effects of biomass fuel smoke on quality of life[19].

Limitations of the Present Study: This was an interviewer administered cross sectional study which may be subjected to error in interpretation of terms by the interviewer and accurate recall by the participants. The study was unable to measure indoor emissions, indoor concentrations, outdoor concentration of air pollutants and amount of smoke exposure of the individual.

Conclusion

The findings of this study suggest the deteriorating effects of biomass fuels on the various pulmonary function parameters. High prevalence of abnormal lung function (37.9%) was indicated among biomass fuel smoke exposed women. Our study also indicates negative health consequences due to exposure from biomass smoke and other solid fuels in Ethiopia. These negative effects should not be ignored because such fuels will continue to be used by a large number of rural households in the predictable future in Ethiopia. Further research is recommended to investigate the biochemical and molecular mechanism if any, responsible for various pulmonary alterations due to biomass smoke.

Acknowledgments

We greatly extend our sincere thanks to local health authorities and the community female health extension workers of Alemayehu Mecha district who helped to collect data.

Conflict of Interest: The authors declare no conflict of interests.

Source of Funding: Jimma University College of Health Sciences

REFERENCES

1. De Koning HW, Smith KR, Last JM. Biomass fuel combustion and health. Bulletin of the World Health Organization,1985; 63:11–26.
2. World Resources Institute, UNEP, UNDP, World Bank. 1998–99 world resources: a guide to the global environment. Oxford, Oxford University Press, 1998.
3. Kurmi OP, Lam KB, Ayres JG. Indoor air pollution and the lung in low- and medium-income countries. Eur Respir J. 2012;40(1):239–54.
4. Central Intelligence Agency: Ethiopia. Central Intelligence Agency: The World Fact Book. 2007.9-7-2007.
5. Edelstein M, Pitchforth E, Asres G, Silverman M, Kulkarni N. Awareness of health effects of cooking smoke among women in the Gondar Region of Ethiopia: a pilot survey. BMC International Health and Human Rights. 2008;8, article 10
6. Balakrishnan K, Ramaswamy P, Thangavel G, Mukhopadhyay K, Venugopal V, Thanasekaraan. Air pollution from household solid fuel combustion in India: an overview of exposure and health related information to inform health research priorities. Global Health Action 2011;4(5638):1-9.
7. Duque CT, Maldonado D, Padilla RP, Ezatti M, Viegi G. Biomass fuels and respiratory diseases: Forum of International respiratory societies report. Proc Am Thorac Soc. 2008;5:577-90.
8. Alvis N, De la Hoz F. Home air pollution and respiratory illnesses (low sharp respiratory infection, COPD, lung cancer and asthma): evidences of association. Rev Fac Med. 2008;56 (1):54-64.
9. Bergdahl IA, Toren K, Eriksson K, Hedlund U, Nilson T, Flodin R, et al. Increased mortality in COPD among construction workers exposed to inorganic dust. Eur Respir. J. 2004; 23:402-406.
10. Dupont WD, Plummer WD, Jr Power and sample size calculations for studies involving linear regression. Control Clin Trials. 1998;19:589–601.
11. American Thoracic Society. Standard questionnaires on respiratory symptoms, tests of pulmonary function, and chest radiographs. Am Rev Respir Dis. 1978;118: 10–23.
12. Miller MR, Hankinson J, Brusasco V, Burgos F, Casaburi R, Coates A, et al; ATS/ERS Task Force. Standardisation of Spirometry. Eur Respir. J.2005; 26:319–38.
13. Revathi M, Kutty TK, Annamalai N. Pulmonary Function in Rural Women Exposed to Biomass Fuel. J Pulmon Resp Med. 2012;2(7):1-4.
14. Agarwal A, Patil SN. Pulmonary function tests in rural women exposed to biomass fumes. Indian J Basic Appl Med Res. 2013;2(7):673-8.

15. Saha A, Rao NM, Kulkarni PK, Majumdar PK, Saiyed HN. Pulmonary function and fuel use: a population survey. Respir Res.2005;6:127.

16. Sharath Chandra et al. Prevalence of respiratory symptoms among nonsmoking women using biomass fuels for cooking in sonatti village, Belagavi. Int J Recent Sci Res.2015; 6:4019-4022

17. Pilotto LS, Smith BJ, Nitschke M, Ruffin RE, Mitchell R. Industry, air quality, cigarette smoking and rates of respiratory illness in Port Adelaide. Aust N Z J Public Health.1999;23:657–660.

18. Arora P, Gupta R, Chopra R, Gupta A, Mishra N, Sood S. Effect of chronic exposure to biomass fuel smoke on pulmonary function test parameters. Int J Res Med Sci.2014; 2:1488-1494.

19. Ramírez-Venegas A1, Sansores RH, Pérez-Padilla R, Regalado J, Velázquez A, Sánchez C, Mayar ME. Survival of patients with chronic obstructive pulmonary disease due to biomass smoke and tobacco. Am J Respir Crit Care Med.2006;173:393-7.

Level of Type L Metacrylate Acid Copolymer as Microparticle Matrix Improves *Lactobacillus casei* Protection against Gastric Acid

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ABSTRACT

Background: *Lactobacillus casei* is a probiotic that has an ability to protect the intestine, but is damaged due to the acid pH in the stomach. A system is needed to provide protection. Probiotic microencapsulation can provide protection against *Lactobacillus casei* by increasing the levels of methacrylic acid copolymers.

Objective: The aim of this study is to determine the effect of type L methacrylic acid copolymers as microparticle matrix on the protection system of *Lactobacillus casei* against acidic atmosphere.

Method: *Lactobacillus casei* probiotic microparticles were made from three formulas using matrix type L methacrylic acid copolymers with levels in formulas I, II, and III, each of which was 0.50%; 0.75%; and 1.00% by spray drying technique at 120°C inlet temperature.

Results: Moisture content decreased with the increasing levels of methacrylic acid copolymers from formulas I, II and III with 10.05% ± 0.49; 9.77% ± 0.19 and 7.45% ± 0.11 respectively. In determining particle size, the results increased simultaneously with the increasing levels of methacrylic acid copolymers in formulas I, II and III, which were 3.29 ± 0.07; 3.79 ± 0.06 and 4.34 ± 0.13 respectively.

Conclusion: Increasing the level of L type methacrylic acid copolymer as a matrix can increase the protection capability of *Lactobacillus casei* microparticles against gastric acid.

Keywords: *Probiotics, Lactobacillus casei, spray drying, capolymer.*

Introduction

Probiotics is possible to change the microbial balance in the intestine as a first aid for hosts [(1)]. Probiotic bacteria can maintain intestinal health, help absorb food, produce vitamins, prevent the growth of pathogenic bacteria, and increase host immunity [(2)]. Probiotics must be able to get through stomach acid and reach intestine in the amount of 106-107 cfu/ml in order to provide benefits for the host [(3,4)]. *Lactobacillus casei* is a lactic acid bacteria that has antibacterial effects, immunomodulatory effects, and can be beneficial for the health of the digestive system [(5,6)]. *Lactobacillus casei* has an action target area in intestine, but can be damaged by an atmosphere of stomach acid [(7)]. The development of drug delivery systems aims to minimize the occurrence of drug degradation, prevent harmful side effects of drugs, and increase bioavailability and accumulation of drug fractions in desired body parts [(8)]. One development of drug delivery systems is to use microparticles as carriers of active ingredients. The process of making microparticles is by using microencapsulation [(9)].

Type L methacrylic acid copolymer is an anionic polymer which has been commercially used as an enteric coating for delivery of oral drugs, in which the drug will be released into the intestine that has an alkaline environment [(10)]. Matrix levels are related to the

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density and wall thickness of the formed microparticles. In addition, the high matrix content has an effect on increasing the viscosity of the matrix solution and will increase the thickness of the microparticle wall. The density and wall thickness of the microparticles increase the protection power of the microparticles against stomach acid [3,6,11].

Spray drying technique is a technique of forming microparticles by dissolving or suspending probiotics into a solution or melt polymer and trapped in the form of particles [9]. Formation of microparticles from spray drying is done by hot air flowing resulted in water evaporation that occurs faster [9,12]. The research using spray drying with an inlet temperature of 98º C resulted in the morphology of the microparticles which did not meet and the water content was still high. Based on the description above, a study was conducted to obtain the right type L methacrylic acid copolymer which can provide protection power from the *Lactobacillus casei* microparticles to an optimal gastric acid atmosphere. In this study the spray drying method was used at an inlet temperature of 120ºC.

Method

This was a laboratory experimental study. The materials used were *Lactobacillus casei* from the Center for Food and Nutrition Studies at Gajah Mada University, Yogyakarta, Indonesia, type L methacrylic acid copolymers, Sodium hydroxide (NaOH), de Man Ragosa Shorpe (MRS), Agar medium, sterile Phosphate Buffer Saline (PBS), Potassium phosphate (KH2PO4), Potassium chloride (KCl), Aquadem free of CO2 and sterile Aquadem.

Identification of type L methacrylic acid copolymers: Examination of L-type methacrylic acid copolymers with FTIR spectrum was carried out using KBr pellet technique. As much as 1 mg of the substance with 100 mg KBr was mashed homogeneously, then put into a vacuum dryer, then molded with a hydraulic press until a thin translucent plate was obtained. From the results of the examination, the specific wave number values of the compounds analyzed were obtained. Specific wave numbers obtained stated the presence of certain groups of structures of compounds analyzed [13].

Preparation of *Lactobacillus casei* Probiotic Bacteria Starters: Ingredients of de Man Ragosa Shorpe (MRS) medium of 5.22 grams of broth were weighed and dissolved into 100 ml sterile aquadem, then stirred until homogeneous. The solution was heated by slowly heating to boil, for one or two minutes. After being homogeneous, the solution poured into a test tube container of 10 ml and sterilized at 121ºC for 15 minutes. *Lactobacillus casei* from main stock culture was bred by taking one Ôse of bacteria and then put in 1 ml of sterile saline and vortexed until it was cloudy. Then, put in 10 ml of MRS sterile broth and dishwasher at 37ºC for 48 hours. Furthermore, it was taken as much as a few Ôse and swiped on a sterile slant and incubated at 37ºC for 48 hours to become a starter of *Lactobacillus casei* which was ready for use. Culture of probiotic bacteria can be used for a maximum of 1 month at 4ºC storage. If the culture stored more than 1 month, probiotic bacteria need to be rejuvenated.

Optimization of *Lactobacillus casei* Growth Time: As much as 5.22 grams of MRS broth were weighed and dissolved in 100 ml sterile aquadem, and then stirred until homogeneous. Once it become homogeneous, the solution was poured into an erlenmeyer container and sterilized at 121ºC for 15 minutes. The MRS medium of sterile broth was added with one Ôse starter of *Lactobacillus casei* and incubated at 37ºC. Samples were taken at 0, 4, 6, 8, 12, 16, 18, 24 and 48 hours to check pH and the number of *Lactobacillus casei* colonies by determining the Total Plate Count (TPC) of each growth time.

Examination of pH of *Lactobacillus casei* suspension carried out by *Lactobacillus casei* culture in MRS broth was taken for 10 ml at each time of growth. Then, the measurements were carried out using a calibrated pH meter using standard buffer solutions. Determination of TPC was carried out by 1 ml *Lactobacillus casei* suspension mixed with 9 ml sterile phosphate buffer saline (PBS with pH = 7.4) and vortexed. A 1:10 dilution was carried out in 10 series dilutions using sterile PBS, each dilution was piped as much as 1 ml to be inserted into a tube containing 10 ml MRS so that the sterile was then vortexed and poured into a plate. The plate was shaken until the sample was evenly dispersed. After the MRS medium solidified, the plate was incubated at 37ºC for 48 hours.

***Lactobacillus casei* Microparticle Formulation**

Table 1. Design of Lactobacillus casei microparticle formula

No.	Materials	Function	FI	FII	FIII
1.	Bacterial Suspension: *Lactobacillus casei*	Active ingredients	109 *cfu*/ml	109 *cfu*/ml	109 *cfu*/ml
	Sterile aquadem	Solvent	ad 250 ml	ad 250 ml	ad 250 ml
2.	Matrix solutions:				
	Acid copolymers type L methacrylate	Matrix	5 grams	7.5 grams	10 grams
	MRS *broth*	Nutrition	5 grams	5 grams	5 grams
	Sterile aquadem	Solvent	ad 750 ml	ad 750 ml	ad 750 ml

Note:

F I: Formula with 0.50% type L methacrylic acid copolymer

F II: Formula with 0.75% type L methacrylic acid copolymer

F III: Formula with 1.00% type L methacrylic acid copolymer

Levels of type L methacrylic acid copolymers on F I, II, and III were made from a total of 1000 ml.

Protection Test of *Lactobacillus casei* Microparticles against Gastric Acid: Test solution was prepared, i.e. acid solution of pH of 1.2 and pH of 7 of phosphate buffer saline solution. Acidic solution of pH of 1.2 was made by mixing 50 ml of 0.2 M KCl solution with 85 ml 0.2 M HCl solution and added aquadem to volume of 200 ml. Phosphate buffer saline of pH of 7 was then made with a composition of 50 ml 0.2 M KH2PO4 mixed with 25 ml 0.2 M NaOH solution and added aquadem to volume of 200 ml. In addition, the calculation of viable bacteria using the Total Plate Count method was incubated at 37ºC for 48 hours. Three-time replications were performed for each formula.

Results

Optimization of Lactobacillus casei Growth Time: The results of *Lactobacillus casei* pH and ALT log tests showing the amount of viability of germs at each incubation time are presented in Table 2.

Table 2: Results of *Lactobacillus casei* pH and ALT log examination at each incubation time

Period (hours)	Replication I	Replication II	Replication III	Mean ± SD
pH				
0	5.66	5.66	5.65	5.65 ± 0.01
4	5.55	5.55	5.55	5.55 ± 0.00
6	5.73	5.74	5.73	5.73 ± 0.01
8	5.05	5.05	5.05	5.05 ± 0.00
12	4.48	4.53	4.53	4.51 ± 0.03
16	4.89	4.89	4.88	4.89 ± 0.01
18	4.74	4.75	4.74	4.74 ± 0.01
24	5.38	5.37	5.37	5.37 ± 0.01
48	6.98	6.97	6.98	6.98 ± 0.01
ALT log				
0	8.87	9.5	9.49	9.29 ± 0.36
4	8.62	9.85	8.97	9.15 ± 0.63

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6	11.28	11.56	9.42	10.75 ± 1.16
8	9.66	9.36	9.47	9.50 ± 0.15
12	12.54	11.07	12.76	12.12 ± 0.92
16	11.17	11.58	11.73	11.49 ± 0.29
18	10.48	10.71	10.55	10.58 ± 0.12
24	10.09	10.72	9.99	10.27 ± 0.40
48	9.48	10.49	9.46	9.81 ± 0.59

From the pH test results, it was found that there was a decrease in pH from the growth time of 0 hours until the growth time of 12 hours. In 12 to 18 hours, the pH was stable and then an increase in pH was occurred. Based on the results of these tests, it can be seen that the optimum time for *Lactobacillus casei* (the end time of the exponential phase or the beginning of the stationary phase) occurred for 12 hours.

Protection power Test Results of *Lactobacillus casei* Probiotic Microparticles on Gastric Acid Atmosphere

Table 3: Test of Protection power Test of *Lactobacillus casei* Probiotic Microparticles on Gastric Acid Atmosphere

Formula	Replication I	Replication II	Replication III	Mean ± SD
ALT log after Spray Drying				
I	6.45	7.06	7.04	6.85 ± 0.35
II	6.35	7.49	6.89	6.91 ± 0.58
III	7.68	7.30	6.83	7.27 ± 0.45
ALT log of *Lactobacillus casei* in a microparticle after being exposed to an acidic atmosphere				
I	6.46	6.19	6.25	6.30 ± 0.14
II	6.68	6.72	6.45	6.62 ± 0.15
III	7.05	7.22	7.14	7.14 ± 0.09
Protection of *Lactobacillus casei* in microparticles against acidic atmosphere (%)				
I	94.31	90.36	91.24	91.97 ± 2.07
II	96.72	97.30	93.39	95.80 ± 2.11
III	96.97	99.31	98.21	98.17 ± 1,17

From these data, it can be seen that the increase in matrix levels of type L metacrylate acid copolymers (0.50%, 0.75%, and 1.00%) can increase the percentage of protection power in the *Lactobacillus casei* microparticles.

Discussion

Increased matrix levels used can cause an increase in the thickness and density of the matrix wall. The higher methacrylic acid copolymer causes more hydrogen bonding carboxylic groups to be formed and will increase the density of the microparticle wall [(14)]. The density and wall thickness of a high microparticle causes an increase in the protection power of the microparticle against stomach acid [(3)].

The mixture of *Lactobacillus casei* suspension with matrix solution and MRS was carried out by microencapsulation using spray drying method and the pre-adaptation process was firstly carried out. [(15)]. The three microparticle formulas produced had a moisture content (MC) higher than the required content of probiotic microparticles which was not more than 4% [(16)]. The moisture content of spray drying microparticles can be influenced by the inlet temperature. An increase in inlet temperature can cause a decrease in moisture content [(17)].

The difference in matrix levels will affect the characteristics of the probiotic microparticles that are formed. Probiotic microparticles that meet the characteristics of probiotic microparticles range from

1-1000 µm, ideally less than 100 µm. [3,18]. Entrapment efficiency is carried out to determine the amount of probiotics coated in microparticles and show the content of probiotics as active ingredients [19]. Factors that influence entrapment efficiency are include solubility of the polymer in solvents, matrix content, and solvent removal rate. [1]. High matrix levels will increase the protection of probiotics against temperature.

Spray drying is a single closed system process that can be used for a variety of materials. The medicinal ingredients are dissolved or suspended into suitable solvents containing polymers. The solution or suspension is atomized into the drying chamber and the microparticles are formed as atomization droplets which are dried by hot air. The results are highly influenced by the nature of the material. Microparticle parameters, such as particle size and solvent residue levels, are influenced by instrument settings, such as inlet temperature, feed flow rate, air spray flow, and aspirator flow. Parameter optimization is done through trial and error [19]. The use of spray drying in the probiotic industry is limited because of the high temperatures during the process can reduce the viability of probiotics.

The size of probiotic microparticles of formula I, II and III increased with the increase in the matrix content of type L methacrylic acid copolymers used. This can occur because the increase in matrix levels causes an increase in wall thickness so that the size of the microparticles is larger [3]. Increased levels of L-type methacrylic acid copolymers on each formula showed significant differences in the particle size of the *Lactobacillus casei* microparticles formed. The protection power of probiotic microparticles against acids is the ability of probiotics in the form of microparticles to survive during the acidic atmosphere of the stomach.

Conclusion

Increased levels of type L methacrylic acid copolymers from 0.50%; 0.75%; and 1.00% as a matrix can cause an increase in the protection power of *Lactobacillus casei* microparticles against stomach acid. The formula with 1.00% type L metacrylate acid copolymer was a formula with the highest protection power for *Lactobacillus casei* microparticles against stomach acid.

Ethical Clearance: The research process involves participants in the survey using a questionnaire that was accordant with the ethical research principle based on the regulation of research ethic committee. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, nonmaleficence, and justice.

Conflict of Interest: The author reports no conflict of interest of this work.

Source of Funding: This study is done with individual funding.

REFERENCES

1. Cook MT, Tzortzis G, Charalampopoulos D, Khutoryanskiy V V. Microencapsulation of probiotics for gastrointestinal delivery. J Control Release. 2014;162(1):56–67.
2. Hardiningsih R, Nonta R, Napitupulu R, Yulinery T. Isolasi dan Uji Resistensi Beberapa Isolat Lactobacillus pada pH Rendah Isolation and resistance test of several isolates of Lactobacillus in low pH. 2006;7:15–7.
3. Barros JMS De, Charalampopoulos D, Khutoryanskiy V V, Edwards AD. Enteric coated spheres produced by extrusion/spheronization provide effective gastric protection and efficient release of live therapeutic bacteria. Elsevier BV. 2015
4. Arslan S, Erbas M, Tontul I, Topuz A. LWT - Food Science and Technology Microencapsulation of probiotic Saccharomyces cerevisiae var. boulardii with different wall materials by spray drying. LWT - Food Sci Technol. 2015;63(1):685–90.
5. Taylor P, Huq T, Khan A, Khan RA, Riedl B. Encapsulation of Probiotic Bacteria in Biopolymeric System Encapsulation of Probiotic Bacteria in Biopolymeric System. (June 2013):37–41.
6. Hassanzadazar H, Ehsani A, Mardani K, Hesari J. Investigation of antibacterial, acid and bile tolerance properties of lactobacilli isolated from Koozeh cheese. 2012
7. Xu M, Gagné-bourque F, Dumont M, Jabaji S. Encapsulation of Lactobacillus casei ATCC 393 cells and evaluation of their survival after

freeze-drying, storage and under gastrointestinal conditions. J Food Eng. 2016;168:52–9.

8. Reddy PD, Swarnalatha D. Recent Advances in Novel Drug Delivery Systems. 2010;2(3):2025–7.
9. Roy SD, Nandy S, Banerjee S, Science P. International Journal Of Pharmacy & Life Sciences Microencapsulation : Convenient mode of drug delivery in novel drug delivery system. 2012;3(3):1555–62.
10. El-Sayed SJG, H. Me. Stimuli-Sensitive Particles For Drug Delivery. 171-190
11. Shi L, Li Z, Li D, Xu M, Chen H, Zhang Z, et al. Encapsulation of probiotic Lactobacillus bulgaricus in alginate – milk microspheres and evaluation of the survival in simulated gastrointestinal conditions. J Food Eng. 2013;117(1):99–104.
12. Vidhyalakshmi R, Bhakyaraj R, Subhasree RS. Encapsulation " The Future of Probiotics " -A Review. 2009;3:96–103.
13. M.Silverstein R, Webster FX, Kiemle DJ. Silverstein - Spectrometric Identification of Organic Compounds 7th ed.pdf. seventh ed. New York: John Wiley & Sons, INC; 2005.
14. Lemon MT, Jones MS, Stansbury JW. Hydrogen bonding interactions in methacrylate monomers and polymers. 2007;
15. Iravani S, Korbekandi H. Technology and potential applications of probiotic encapsulation in fermented milk products. 2015;52:4679–4696.
16. Teanpaisan R, Piwat S, Dahle G. Inhibitory effect of oral Lactobacillus against oral pathogens. 2011;452–9.
17. Madhusmita I, Brahmeshwar I. Formulation Optimization and Characterization of Spray Dried Microparticles for Inhalation Delivery of Doxycycline Hyclate. 2011;131(12):1813–25.
18. Rathore S, Desai PM, Liew CV, Chan LW, Wan P, Heng S. Microencapsulation of microbial cells. J Food Eng. 2013;116(2):369–81.
19. Kumar BP, Chandiran IS, Bhavya B, Sindhuri M, Pharmaceutics D, Krishna G. Indian Journal of Pharmaceutical Science & Research Microparticulate Drug Delivery System : A Review. 2011;1(1):19–37.

The Influence of Tell Show Do Method Based on Individualized Educational Program (IEP) to the Tooth-Brushing Behavioural Change among Slow Learner Children in Bukittinggi, Indonesia

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ABSTRACT

Objectives: Slow learner children are the largest population of children with special needs in Indonesia, including 80.64% have poor oral hygiene caused by inappropriate tooth-brushing. An advance learning method needs to take behavioural change of children's tooth brushing habit. This study aims to investigate the Tell Show Do Method based on Individualized Educational Program (IEP) affected the behavioral changes of tooth brushing among slow learner children in elementary school Bukittinggi, Indonesia.

Method: This was a quasy experimental study with one group pre-test and post-test design. Total of 32 slow learner children, grade 4-6 were included in this study. Data was analyzed by using Paired McNemar test.

Results: The latest behavioural change on cognitive, affective and psychomotor became different into good category. Hence, there is significant difference before and after counselling (p=0,000). So, it is concluded that Tell Show Do Method based on Individualized Educational Program (IEP) affect behavioural changes regarding tooth brushing among slow learner children in elementary school Bukittinggi, Indonesia.

Keywords *: Counselling, Tell Show Do, IEP, Slow Learner, Behavioural Change*

Introduction

Dental Caries is one of the most common oral hygiene issue in the world, including in Indonesia. One of the main factor is inappropriate of tooth brushing technique. According to RISKESDAS 2013, only 2,3% people in Indonesia use correct method of tooth brushing.[1] It may affect oral hygiene neither healthy person nor children with spesial needs. This study concerned about slow learner children.[4] Slow learner children are a group of children with IQ of 70-90 (slightly below average) without mental retardation. Fourteen percent children in Indonesia are slow learner and 80,64% of them have poor oral hygiene.[1]

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Education and counselling could improve children oral hygiene.[3] There is a need of early counselling with proper method according to their ability, mainly in children with special needs. Slow learner children are categorized into children with special needs, but they can learn something as long the given method is a proper method. So thus proper education and counselling method for this population is needed.

One of the method of pediatric dentistry is Tell Show Do method.[6] Tell Show Do is the most effective non-pharmalogical techniques use by pediatric dentist.[7] This method is done by telling, introducing, and showing dental hygiene procedure to children. Information can be delivered verbally with language that easy to understand, and also by giving the children opportunity to observe and apply the given information.[6,8] Study by Arun Sharma and Rishi Tyagi in India in 2011, suggested that Tell Show Do method showed positive impact and very effective to modify children behavior.[9]

Slow learner children need special technique, unlike normal children.[10] Individualized Educational Program (IEP) is a program made to serve children with special needs. This program is adjusted for each individual, according to their ability, method, and learning speed so one can understand the given subject. In other word, this learning technique gives children chance to learn based on their ability so thus we can maximize their ability as well.[10] In Indonesia, this program was commonly used as an educational program to serve children with spesial needs including slow learner children. Whereas combination of Tell Show Do method to IEP is a new innovation that was never been done before. So, this study aims to investigate Tell Show Do based on IEP with behavioural changes on tooth brushing, among slow learner children.

Materials and Method

This was a quasy experimental study with one group pre test- post test design. Pre test was done at the beginning of the study by using a questionnaire, and respondents were given treatment using Tell Show Do based on IEP. Before counselling, first step to do was recognized the characteristics of slow learner children and grouped based on the results of that assessment. Then, counselling given individually with Tell Show Do method. At the end, evaluated the effect of counseling using post test with the same questionnaire. This study took place in Al Azhar Elementary School Bukittinggi, West Sumatera, Indonesia on February 2018. Fourth-sixth grade slow learner students were recruited. Data was analysed using Paired McNemar to investigate signification of each behavioural domain including cognitive, affective, and psychomotor, and considered significant if $p < 0,05$.

Results

Tabel 1: Differences of behaviour domain before and after counselling using Tell Show Do method based on IEP (n = 32)

Behavior Domain	Before Counselling				After Counselling				P value
	Good		Poor		Good		Poor		
	n	%	n	%	n	%	n	%	
Cognitive	12	37,5	20	62,5	30	93,75	2	6,25	0.000
Affective	11	34,37	21	65,63	30	93,75	2	6,25	
Psychomotor	10	31,25	22	68,75	29	90,63	3	9,37	

Based on table 1, frequency distribution of good categories increased after counselling. Before counselling, almost respondent had poor category to use tooth-brushing technique in cognitive, affective and psychomotor domain (62.5%, 65.63%, 68.75%) respectively. On other hand, cognitive, affective and psycomotor domain decreased in poor category after counselling with 93.75%, 93.75%, 90.63% respectively. So, there were significant difference of behaviour change before and after counselling using Tell Show Do method based on IEP with p value 0,000.

Discussion

Study showed that there were behavioural changes of tooth brushing among slow learner children after counselling using Tell Show Do method based on IEP observed by behavioural domain including cognitive, affective, and psychomotor. Firstly, counselling with the method of Tell Show Do based on IEP was done by recognizing the characteristics of slow learner children. Secondly, children with the same characteristics were classified into the same group. Then, they were given counselling on each group by using the Tell, Show and Do method gradually. Counselling in each group was different, depending on the level of children's ability, so it can be absorbed quickly or even takes a long time. Hence, this method is called by IEP.

The cognitive level was changed significantly due to counselling design according to the level of children's ability. The results of this study similar to the theory by the American Academy of Pediatric Dentistry (AAPD) claimed that the Tell Show Do method can changes children's knowledge of dental health care because of clearly explanations to children about the dental health

procedures at the "Tell" stage and shown the procedure to make them easier to understand at the "Show" and "Do" stage.[11] The significant change of the cognitive level in this research was also caused by appropriate service education to slow learner children with IEP. The results of this study is similar to Budiyanto et al in 2013 stated that the IEP is an efficient program to provide knowledge in children with special needs and can be absorb well. The program is implemented individually on each slow learner children according to the level of ability.[12]

In affective level category after counselling, there were significant changes to better affection than before counselling caused by education process of knowledge could produce good attitude. It also supported by Notoatmodjo 2010, respondent with good cognitive level also had good affective level too.[3]

Significant change of psychomotor level toward to good category because the counselling not only giving raw material at Tell and Show stage, but also giving opportunity to practice direct knowledge among slow learner children. Meanwhile, Do stage can stimulate their motor skills in brushing action. The children's motor skills can be stimulated by practical activities of their knowledge. Its supported by the AAPD in 2015 stated that the Tell Show Do method can give children the opportunity to try out their own procedures more precisely at the Do stage, so it more easily to understand and implement the procedure.[11]

Thus, the behavioural improvement was due to children's awareness to change their behaviour through health counseling.[1] Tell Show Do method can be used in behavioral management in pediatric dentistry.[6,8,13] This study similar to Arun Sharma and Rishi in India, suggested that Tell Show Do method had positive effect and can be used on behavioural management in pediatric dentistry.[9] Tell Show Do also can be used to explain oral hygiene to children with special needs. Not only verbal information and easy language, but also method enables children to observe and apply their knowledge under supervision.[14]

Tell Show Do method in this study was done through IEP. Study showed learning through IEP increased behavioural changes of tooth brushing among slow learner children. This was in accordance with theory by the ministry of education and cultural in 2013, suggested IEP could serve children with special needs.[13] Blackwell et al in United States argued that IEP was an appropriate and an effective program for children with special needs because it was adjusted with individual needs.[15] Ruble et al from United States also argued that IEP was the only program compatible to treat children with special needs due to children's needs and education based on their interested and understanding.[16]

Conclusion

Tell Show Do method based on Individualized Educational Program (IEP) has significant correlation with behavioural change on tooth brushing among slow learner children in elementary school Bukittinggi, Indonesia.

Ethical Clearence: Taken

Conflict of Interest: There is no conflict of interest of this study.

Source of Funding: This study was counducted by self-funding.

REFERENCES

1. Riskesdas. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. Jakarta; 2013.
2. Arianto, Shaluhiyah Z, Nugraha P. Perilaku Menggosok Gigi pada Siswa Sekolah Dasar Kelas V dan VI di Kecamatan Sumberejo. Jurnal Promosi Kesehatan Indonesia. 2014; 9 (2).
3. Notoatmodjo. Ilmu Perilaku Kesehatan. Jakarta: Rineka Cipta; 2010
4. Sutijan. Mengajar Peserta Didik Lambat Belajar di Sekolah Dasar. Jurnal Rehabilitasi dan Remediasi. 2011; No 2 ISSN 0854-0020.
5. Sugiarti R dan Pribadi AG. Analisis Faktor yang Mempengaruhi Keberhasilan Belajar Siswa Slow Learner di Sekolah Luar Biasa Semarang. Jurnal Psikologi Proyeksi. 2012; 6(2): 1.
6. Singh H, et all. Techniques for the Behaviors Management in Pediatric Dentistry. International Journal of Scientific Study. 2014; 2(7).
7. Sharma K, Malik M, Sachdev V. Relative efficacy of Tell-Show-Do and live modeling techniques on

suburban Indian children during dental treatment based on heart rate values: a clinical study. Journal of Dental Spesialities. 2016; 4(2): 178-182.

8. AAPD. Guideline on Behavior Guidance for the Pediactric Dental Patient. Reference Manual. 2015; 17 (6).
9. Sharma A and Tyagi R. Behavior Assesment of Children in Dental Settings: A Restrospective Study. International Journal of Clinical Pediatric Dentistry. 2011; 4(1): 35-39.
10. Rahman, M. M. Memahami Prinsip Pembelajaran Anak Berkebutuhan Khusus. Elementary. 2014; 2 (1).
11. American Academy of Pediatric Dentistry. Guideline on Behavior Guidance for the Pediactric Dental Patient. Reference Manual. 2015;17 (6).
12. Budiyanto, et all. Modul Pelatihan Pendidikan Inklusif. Jakarta: Kemendikbud 2013.
13. Farhat MH, Hafouche A dan Souaid P. Techniques for Managing Behavior in Pediatric Dentistry: Comparative Study of Live Modelling and Tell-Show-Do based on Children's Heart Rates During Treatment. Journal Canadian Dental Association 2009; 75(4): 283.
14. Vinodhini BJ, Asokan S, Priya PR dan John B. It's Lame to Tame-Children with Spesial Health Care Need. Journal of Academy of Dental Education. 2014; 39-44.
15. Blackwell WH, dan Rossetti ZS. The Development of Individualized Educational Programs. Sage Journals. 2014; 1-15.
16. Ruble LA, McGrew J, Dairymple N dan Jung LA. Examining the Quality of IEPs for Young Children with Autism. Jurnal Autism Dev Disord. 2011; 40 (12): 1459 – 1470.

Hyperglycemic and Hypertension are Major Component of Metabolic Syndrome that Caused Circulatory Morbidity in Hajj Pilgrims

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ABSTRACT

Hajj is a community that needs special attention, the series of worship activities during in the holy places in Makkah and Madinah must be supported by physical and mental prime. One of the health problems has related to circulatory disease. This study presents the impact of metabolic syndrome (hyperglycemic, hypertension, and obesity) that caused circulatory morbidity in Indonesian Hajj Pilgrims. The design study is Retrospective Cohort, conducted on 152,429 Indonesian pilgrims departing in the Hajj season 2016/1437H sourced from The Siskohatkes data of the Ministry of Health of the Republic of Indonesia. The prevalence of metabolic syndrome (hyperglycemic, hypertension, and central obesity) on Indonesian pilgrims 1.6% and significant differences were found in all characteristic: sex, age, employment, and education, BMI, istitha'ah, and smoking behaviour. Hyperglycemic had greater HR than hypertension and central obesity with HR of 2.06 (1.63-2.60) adjusted by BMI, smoking, age, and sex as a risk of inpatient care. While, hypertension had greater HR than hyperglycemic and central obesity with HR 2.04 (1.99-2.09) adjusted by smoking, age, and sex as a risk of outpatient care in the holy places in Makkah or Madinah. Regulation for additional history of drugs consumed on screening of pre-existing disease before departure is needed.

Keywords: *hyperglycemic, hypertension, Mets, hajj, morbidity*

Introduction

Metabolic syndrome (MetS) is a complex disorder characterized by abdominal obesity, impaired glucose metabolism, atherogenic dyslipidemia and hypertension.[1,2] A systematic review of epidemiologic data from the Middle East reports a prevalence of MetS in men of 20.7-37.2% and 32.1-42.7% in women. Increasing trend of circulatory disease followed by ignored active health policies to control the risk factors, but studies are available that discusses the risk factors of circulatory disease has not been found, especially that associated with metabolic syndrome. [1,3, 4]

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Circulatory disease, which is customarily defined as those causes of mortality and morbidity with International Classification of Diseases 10th revision (ICD10) codes I00-I99 (or equivalently the International Classification of Diseases 8th or 9th revision (ICD8, ICD9) codes 390–459). Major types of circulatory disease are Arteriosclerosis, Cardiac valve diseases, Cardiac arrhythmias, Cardiomyopathy, Cerebrovascular disease (CeVD), Hypertensive disease, Ischemic heart disease (IHD), Pericarditis.[3]

Hajj is a community that needs special attention. the series of worship activities during in holy places in Makkah and Madinah must be supported by physical and mental prime. One of the health problems facing the congregation is related to circulatory disease. Blood glucose, triglyceride, HDL, LDL, cholesterol, blood pressure, and physical anthropometry such as weight and height and abdominal circumference are some of the variables that can be an indicator of cardiometabolic risk and have been measured before pilgrims leave. Hajj

pilgrims who are large populations are expected to become populations representing the community in providing predictive values related to metabolic syndrome and their impact on circulatory morbidity that are major problems and causes of major deaths worldwide.

Method

Study Design and Study Protocol: This study used secondary data SISKOHATKES 2016 with Retrospective Cohort Study design, conducted on all Indonesian pilgrims departing on the Haj season 2016/1437H. The target population of all Indonesian pilgrims departing during the Hajj season 2016 and recorded in the initial examination SISKOHATKES 2016. Population study has 152,429 pilgrims in 2016 who conduct medical tests.

Measurements and Calculations: Before departure, all Indonesian pilgrims are required to visit a government health facility for a medical examination and to receive a pocket book that outlines their health condition. Clinical identification of patients with the features of MetS was based on the criteria proposed by the NCEP-ATPIII (National Cholesterol Education Program Adult Treatment Panel III). Patients were considered to have MetS when three of the following five criteria were met: 1) waist circumference ≥ 102 cm in men and 88 cm in women; 2) fasting hyperglycemic ≥ 110 mg/dL or using diabetes medications; 3) triglycerides ≥ 150 mg/dL or taking triglyceride lowering agents; 4) HDL cholesterol < 40 mg/dL for men; < 50 mg/dL for women or taking cholesterol-lowering agents; and 5) hypertension (systolic blood pressure ≥130 diastolic blood pressure ≥85) or using antihypertensive medication. Body mass index (BMI) was calculated as weight (kg) divided by height (m) squared (kg/m^2). The criteria used to define overweight were underweight (<18.5); Normal weight (18.5 -24.9kg/m^2); Overweight (25.0-29.9kg/m^2); Obesity Grade I (30.0-34.9kg/m^2); Obesity Grade II (35.0-39.9kg/m^2); and Extreme Obesity as BMI of ≥40 kg/m^2. Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 15 of 2016 on Istitha'ah explained that the ability to perform the pilgrimage physically, mentally and provision.

Statistical Analysis: Processing and analysis were performed using statistical program STATA 15. Univariate analysis was performed to see the distribution of each variable and parameter estimation of the variables presented in tables, and bivariate analysis using Chi Square test. Multivariate analysis using Cox Regression to determine the hazard ratio of cardiometabolic factors on the impact of morbidity from cardiovascular disease. Before the variable entered in multivariate analysis, first tested proportional hazard. The test is conducted to determine whether the candidate variables has a proportional hazard over time or not.

Findings

All 15,429 Indonesian pilgrims were aged 18 years or more. where the prevalence of metabolic syndrome was 1.6% (2,450 pilgrimages). Most pilgrims had metabolic syndrome were female 1.8% and aged 50-59 years (Table 1). The prevalence of Mets (hyperglycemic, hypertension, and central obesity) on Indonesian pilgrims 1.6% and significant differences were found in all characteristic: sex, age, employment, and education, BMI, istitha'ah, and smoking behavior. Majority pilgrims with Mets were female (1.8%), aged 50-59 years (2.15%), military/police (2.0%), low education (1.7%), extreme obesity (3.0%), not qualified temporarily of istitha'ah (2.8%), and did not smoking (1.7%).

Table 1: Indonesian Hajj Pilgrims Characteristic and Metabolic Syndrome

Variables	Mets		Total	P-value
	Yes (n = 2,450)	No (n = 149,979)	(n = 152,429)	
Sex				
Female	1,563 (1.8%)	83,156 (98.2%)	84,719	0.000
Male	887 (1.3%)	66,823 (98.7%)	67,710	
Age				
<40 years	42 (0.3%)	14,749 (99.7%)	14,791	0.000
40-49 years	408 (1.1%)	36,905 (98.9%)	37,313	
50-59 years	1,104 (2.1%)	51,695 (97.9%)	52,799	
>60 years	896 (1.9%)	46,630 (98.1%)	47,526	

Conted…

Employment				
Military/Police	27 (2.0%)	1,328 (98%)	1,355	0.000
Farmer	448 (1.4%)	31,882 (98.6%)	32,330	
Goverment Employment	1,021 (1.5%)	66,261 (98.5%)	67,282	
Others	954 (1.9%)	50,508 (98.1%)	51,462	
Education				
Low	958 (1.8%)	51,813 (98.2%)	52,771	0.000
Middle	870 (1.6%)	53,541 (98.4%)	54,411	
High	622 (1.4%)	44,625 (98.6%)	45,247	
BMI				
Under weight	16 (0.2%)	7,160 (99.8%)	7,176	0.000
Normal weight	827 (1.1%)	72,044 (98.9%)	72,871	
Over weight	1,136 (2.0%)	54,822 (98.0%)	55,958	
Obese grade I	370 (2.8%)	12,948 (97.2%)	13,318	
Obese Grade II	75 (3.2%)	2,235 (96.8%)	2,310	
Extreme Obesity	26 (3.3%)	770 (96.7%)	796	
Istitha'ah				
Qualified	1,034 (1.6%)	62,369 (98,4%)	63,403	0.000
Qualified with assistance	224 (2.6%)	8,241 (97.4%)	8,465	
Not qualified temporarily	1,192 (2.8%)	41,749 (97.2%)	42,941	
Not qualified	0 (0.0%)	48 (100%)	48	
Smoking				
Yes	187 (1.1%)	16,403 (98.9%)	16,590	0.000
No	2,263 (1.7%)	133,576 (98.3%)	135,839	

*Chi Square test. sig = 0.05

Table 2 from multivariate analysis with cox regression showed the results obtained that hyperglycemic had greater HR value than hypertension and central obesity with HR of 2.06 (1.63-2.60) adjusted by BMI, smoking, age, and sex. This means that pilgrims who before departure have clinical considents with hyperglycemic have a risk of 2.06 times to have circulatory disease and hospitalized (inpatient care) while performing the pilgrimage in the holy places in makkah or madinah.

Tabel 2: Multivariate Analysis of Associated Mets and Inpatient Care Caused of Circulatory Disease

Variables	Inpatient Care		Total (n=152,429)	HR 95% CI	p-value
	Yes (n = 1,847)	No (n = 150,582)			
Hyperglycemic					
Yes	80 (0.9%)	8,734 (99.1%)	8,814	2.06 (1.63-2.60)	0.000
No	593 (0.4%)	143,022 (99.6%)	143,615		
Hypertension					
Yes	315 (0.8%)	39,664 (99.2%)	39,979	1.73 (1.48-2.02)	0.000
No	358 (0.3%)	112,092 (99.7%)	112,450		
Central Obesity					
Yes	353 (0.4%)	95,845 (99.6%)	96,198	0.8 (0.65-0.95)	0.000
No	320 (0.6%)	55,911 (98.4%)	56,231		

*Adjusted HR by BMI, smoking, age, and sex.

Different results (table 3) were obtained in outpatients during the holy places in makkah or madinah, where prior to hypertension had greater HR than hyperglycemic and central obesity with HR 2.04 (1.99-2.09) adjusted by smoking, age, and sex.

Tabel 3: Multivariate Analysis of Associated Mets and Outpatient Care Caused of Circulatory Disease

Variables	Outpatient Care		Total	HR 95% CI	Sig
	Yes	No			
Hyperglycemic					
Yes	2,085 (23.7%)	6,729 (76.3%)	8,814	1.21 (1.16-1.27)	0.000
No	25,405 (17.7%)	118,210 (82.3%)	143,615		
Hypertension					
Yes	12,868 (32.2%)	27,111 (67.8%)	39,979	2,04 (1.99-2.09)	0.000
No	14,622 (13.0%)	97,828 (87.0%)	112,450		
Central Obesity					
Yes	27,490 (18.0%)	77,541 (80.6%	96,198	1.09 (1.06-1.13)	0.000
No	8,833 (15.7%)	47,398 (84.3%)	56,231		

*Adjusted HR by smoking, age, and sex.

Discussion

MetS is an increasingly common cause of morbidity and mortality and has been reported with many postulated pathophysiologic diseases. Prevalence of metabolic syndrome is high among Asians and is rising, particularly with the adoption of modernized lifestyle.[2] The most commonly associated with insulin, along with proinflammatory, prothrombotic, and low grade oxidative status.[5] In this research, age and sex has associated with Mets and in multivariable analysis, age is confounding variable. With respect to age, MetS prevalence rates were higher in older, relative to younger, elderly subjects; however, this difference was nonsignificant. In general, the prevalence of MetS increases with age.[6]

Aging is one of the diverse and functional that occurs from time to time. These terms also affect biological functions after reaching their maximum potentials. During aging, sex steroid hormone is reduced and sex hormones that bind globulin increase, the rate of decrease in free hormone levels. Therefore, the reproductive and non-reproductive actions of sexual steroid hormones decreased significantly. However, there are major differences in the prevalence, timing of onset and severity of many conditions such as metabolism and disease, which are different from men and women and protective roles. [7,8]

There is more evidence that different sex is important in epidemiology, pathophysiology, treatment and results in many diseases include hyperglycemic. Increased insulin secretion is observed in both sexes, both of which have sufficient compensation to approach the normal curve, derived from the control of normal weight on the subject. Insulin sensitivity disorders and insulin secretion are equally strong and similar in both sexes. The evidence is confirmed as well as introducing age and BMI as covariates into the entire population: that is, insulin sensitivity decreases with increasing BMI in the same rate for men and women in all categories of glucose tolerance; while insulin secretion increases with BMI on a faster rate in men, it is better to compensate for the increase insulin resistance. This trend may partly explain why, in general, women are better at insulin sensitivity than men in normoglycemic states. This may be related to sex hormones and their receptors, different body fat distributions and associated biomarkers, such as higher adiponectin. Estrogen shows a protector effect of cell apoptosis, stimulates the beta cell secretion and increased insulin sensitivity with antidiabetic effects mainly described to ERα.[9]

Meta-analysis of prospective cohort studies found in populations with MetS defined by NECP have a significantly higher risk of incident stroke than those without MetS and higher in women compared with men, which was in agreement with a few studies.[10] Proper identification of Mets in hypertension can provide better predictions of poor cardiovascular events and models that can be used for specific factors.[11]

Each component of the MetS is an independent risk factor for cardiovascular disease, together producing a wide spectrum of vascular and cardiac diseases.[12] Each component of cardiovascular disease, related to the spectrum of cardiovascular conditions including microvascular dysfunction, coronary atherosclerosis and calcification, cardiac dysfunction, myocardial infarction, and heart failure.[13]

The obesity relationship observed with hypertension makes the body work exploring the causes and effects of obesity on the heart. Chronic weight gain and adiposity can lead to significant neurohormonal changes and adaptation to the cardiovascular system. These changes include activation of the renin angiotensin-aldosterone system, changes in adipocytokines levels, and proinflammatory cytokines, and sympathetic nervous system activation. Activation of the sympathetic nervous system may contribute to increased heart rate, renal sodium retention, blood volume circulation, ventricular end (preload), cardiac output, and or blood pressure. [9,13,14]

Hajj is the largest annual religious ritual in the world, and also an obligation to be carried out at least once in the lifetime of every physically, psychologically and financially able Muslim.[14] Pilgrims with hyperglycemic should avoid exposure to heat and use protective footwear during hajj rituals. The mass-collection treatment in Hajj can be optimized by increasing the patient's knowledge of performing the pilgrimage at a younger age, doing monitoring of hypertension, blood glucose, and screening of pre-existing comorbidities. Maintaining weight, abdominal circumference, lipid profile within the optimal limit by continuing to perform regular physical activity and consumption of low-calorie foods, high fiber, and do not smoke is needed before pilgrims perform the pilgrimage.

Adherence to antihypertensive and antihyperglycemic consumption is also needed for blood pressure and blood glucose of pilgrims remain controlled before and during the pilgrimage. For healthcare providers it is necessary to immediately formulate regulation for additional history recording of drugs consumed by pilgrims during initial health check prior to departure. In order for the formulation of the drug to be consumed by the congregation appropriately to obtain blood pressure and controlled blood glucose.

Ethical Clearance: Ethical clearance and permission of this research was obtained from the Indonesian Ministry of Health with the LB.02.03/1/1429/2018 approval number.

Conflict of Interest: All the authors have disclosed no potential conflicts of interest relevant to this article.

Source of Funding: source of funding for this research and publishing this article was from Universitas Indonesia.

REFERENCES

1. K. G. M. M. Alberti *et al.* Harmonizing the metabolic syndrome international atherosclerosis society and international association for the study of obesity. *Circulation.* 2009; 120(16): (1640-1645).
2. M. K. Sharma *et al.* Prevalence of metabolic syndrome in impaired fasting glycemic subjects. *Asian Journal Pharmaceutical Clinical. Research.* 2014; 7 (6): (169–172).
3. H. Ghafouri, S. Saravani, and F. Shokraneh. Burden of circulatory system diseases and ignored barriers of knowledge translation. *Journal of Cardiovascular and Thoraric Research.* 2012; 4 (4): (89–94).
4. Little M.P. Radiation and circulatory disease. *Mutation Research.* 2016; 770: (299–318).
5. E. Mccracken, M. Uk, M. Monaghan, M. Uk, S. Sreenivasan, and F. Edin. Pathophysiology of the metabolic syndrome. *Clinical. Dermatology.* 2018; 36 (1): (14–20).
6. C. H. Orces and E. Lopez. The prevalence of metabolic syndrome among older adults in Ecuador : Results of the SABE survey. *Diabetes Metabolism Syndrome.* 2017; 11: (S555–S560).
7. V. Guarner-lans, M. E. Rubio-ruiz, I. Pérez-torres, G. Baños, and D. Maccarthy. Relation of aging and sex hormones to metabolic syndrome and cardiovascular disease. *Experimental Gerontology.* 2011; 46 (7): (517–523).
8. R. M. Mabry, M. M. Reeves, E. G. Eakin, and N. Owen. Short Report Gender differences in prevalence of the metabolic syndrome in Gulf Cooperation Council Countries : Asystematic review. *Diabetic Medicine.* 2010; 27: (593–597).

9. A. Kautzky-Willer *et al.* Sex-Specific differences in metabolic control, cardiovascular risk, and interventions in patients with type 2 diabetes mellitus. *Gender Medicine*. 2010; 7(6): (571–583).

10. X. Li *et al.* Metabolic syndrome and stroke : A meta-analysis of prospective cohort studies. *Journal Clinical Neuroscience.* 2017; 40: (34–38).

11. G. Georgiopoulos *et al.* Metabolic syndrome, independent of its components, affects adversely cardiovascular morbidity in essential hypertensives. *Atherosclerosis*. 2016; 244: (66–72).

12. J. D. Tune, A. G. Goodwill, D. J. Sassoon, and K. J. Mather. Cardiovascular consequences of metabolic syndrome. *Translational Research: The Journal of Laboratory and Clinical Medicine.* 2017; 183: (57–70).

13. A. Whaley Connell, B. S. Pavey, K. Chaudhary, G. Saab, and J. R. Sowers. Renin-angiotensin-aldosterone system intervention in the cardiometabolic syndrome and cardio-renal protection. *Therapeutic Advances in Cardiovascular Disease.* 2007; 1(1): (27–35).

14. S. M. Razavi, A. Sabouri-kashani, and H. Ziaee-ardakani. Trend of diseases among Iranian pilgrims during five consecutive years based on a Syndromic Surveillance System in Hajj. *Medical Journal of the Islamic of Iran.* 2013; 27(4): (179-185).

The Determinant Factors of Child's Immunization Status: A Cross Sectional Study on the *Dayak Pitap* Tribe in the District of Balangan Indonesia

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ABSTRACT

Background: Even if the immunization coverage in a region is high, but the unimmunized child gathered in one location, then the benefit from herd immunity developed will not be gained by the child in that location so the risk for outbreak vaccine preventable diseases is high. So in order to solve this problem, it is important to reach this under vaccinated population and increase the child's immunization status of the population. The aims of this research were to describe the immunization status and its determinant factors that influenced the child's immunization status of *Dayak Pitap* tribe in the district of Balangan Indonesia

Method: A cross sectional study conducted in May to June 2018 which included the interview using a questionnaire with the mother of 12 – 35 month old child in all house hold in *Dayak Pitap* tribe. The independent variables were the mother's education level, the mother knowledge about immunization, the history of mother immunization status during pregnancy and the childbirth attendant and the cultural determinant namely the *aruh* ritual, the *papantang* and the use of the *samban*, whereas dependent variable was the child's basic immunization status. The uni-variable analysis and logistic regression analysis employed as the research analysis method.

Result: The complete child's immunization status coverage was 48%. The determinant factors that significantly influenced on the child's immunization status were the mother immunization knowledge level (p=0.000), the history of mother immunization during pregnancy (p=0.033), the history of birth attendant (p=0.000) and the using of *samban* by the children (p=0.012).

Conclusion: In order to gain the better child's immunization status coverage of the *Dayak Pitap* tribe, it is important to develop combination interventions to give better knowledge about immunization to the mother with the tailor made material, promote birth attendant labor and reach the pregnant mother for immunization.

Keywords: *Child immunization, indigenous tribe, cultural determinant*

Introduction

One of the purposes of immunization is to develop herd immunity in the community that can make all the children get benefit from the protection, including not immunized children and children who had already immunized but failure in developing antibody that can be caused by the child condition such as virus and bacterial infection(1), the nature and condition of the vaccine itself(2) "ISBN":"1873-2518 (Electronic(3) and the abnormalities of the immune system such as the *hypogammaglobulinemia,* other genetic factors and other causes that still poorly understood (4). In order to develop the herd immunity, high uptake of fully immunized children must be obtained. The problem is every country

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has population groups that are not fully immunized that have a consequence in the risk of vaccine-preventable disease outbreak.

Actually, in case there is a child, who is getting an infection of vaccine preventable diseases, but the high uptake of immunization has been obtained and the herd immunity has been developed, the other children will be protected because the spread of the infection had already blocked. However, this only works if unvaccinated child is scattered across geographical areas. If the unvaccinated child is gathered in one location, such as in the *Dayak Pitap* tribe, diseases can cause large outbreaks – even if the region or province or national vaccination coverage is high.

In this purpose, it is important to make sure that the immunization coverage in the remote areas is also high. However, based on the preliminary study that conducted in *Dayak Pitap* on January to March 2017, the fully immunized children coverage of the *Dayak Pitap* tribe was only 34.3% and from the in depth interview conducted with the traditional leaders, the *balian* (the traditional spiritual leader/traditional healers) and other community members, the reason for this low uptake of fully immunized children was probably because of the community belief about the causes of illnesses which are natural causes (heat, cold, rain), spirit of ancestor causes, shamanism causes, breaking taboos causes and other supra natural causes. This belief, therefore has an implication on the initiatives that they use to prevent illness, namely always conducted *aruh* ritual, not violate *papantang* and the use of a *samban* for their children. So besides the factors that have commonly stated as the determinant factors of the immunization coverage, in the *Dayak Pitap* tribe, the cultural factor such as *the aruh ritual, the papantang* and *the samban* probably also has a contribution in determining the child immunization coverage.

The *aruh* ritual is a ritual that conducted regularly by the *Dayak Pitap* tribe across the human life cycle and the rise cultivation cycle. The ritual filled with many kinds of sacred activities and materials, offerings and also rhythm that accompany the spell of the mantra and dance of the *balian* as the traditional spiritual leader. The absence of conducting the *aruh* ritual believed by the community can cause misfortunes and illnesses. The *papantang* or taboo is a form of oral prohibition to do something because it's against the culture and community tradition, although there was no legal or customary sanction for the violator. The violation of *papantang* also believed by the community can cause misfortunes and illnesses. A *samban* is a kind of amulet that worn as a necklace by the child after conducting a sacred ritual and believed can protect children from illnesses.

This research conducted in the *Dayak Pitap* tribe that settles in the slope of *Meratus* highlands in *Tebing Tinggi* sub districts of *Balangan,* South Kalimantan Province, Indonesia. Although this tribe registered as Hinduism which is called *Hindu Kaharingan,* very little aspect of Hinduism exists in their everyday lives. They still maintain their belief and culture as *animism* and *dynamism* tribe.

Hence, the aim of this paper is to describe the immunization status and its determinant factors that influenced the child's immunization status of *Dayak Pitap* tribe in the district of Balangan Indonesia.

Material and Method

This analytic observational quantitative research employed by a cross sectional design. The analysis unit was the household of *Dayak Pitap* tribe that had a 12 – 35 month old child. Data collected from all households that had a 12 – 35 month old child in May to June 2018 using a questionnaire. The respondent was the mother of 12 – 35 month old child.

The independent variables were the mother's education level, the mother knowledge about immunization, the history of mother immunization status during pregnancy and the childbirth attendant and the cultural determinant namely the *aruh* ritual, the *papantang* and the use of *samban*, whereas dependent variable was the child's basic immunization status.

Data analysis using the univariable analysis to describe the distribution of frequency and proportion of independent and dependent variables and logistic regression analysis to analyze the influence of independent variables toward the dependent variable.

Results

1. **Socio-demographic characteristics of respondent and children of *Dayak Pitap* tribe:** The majority of mother in Dayak Pitap were in 20 – 29 years old interval (60%) and had primary educational level (42%) and 90% were farmer. Their immunization

knowledge level mostly was low (68%). Most of the mother had only one child (44%) with higher female distribution (54%). 66% of the mother did not complete their immunization during pregnancy and 46% assisted by the traditional birth attendant when delivered their babies.

2. Immunization Status of 12 – 35 month old child of *Dayak Pitap* tribe

Table 1: Immunization Status of 12 – 35 month old child of *Dayak Pitap* tribe

Village	Number of Child 12 s/d 35 month old age	HB0	BCG	DPT-HiB-HB			Polio				Measles	Fully Immunized Children	
				1	2	3	1	2	3	4			%
Ajung	23	14	19	18	14	11	22	15	13	11	13	8	34,8
Iyam	10	4	8	6	6	4	9	8	6	5	8	2	20,0
Kambiyain	9	9	9	9	8	8	9	9	8	8	9	8	88,9
Langkap	8	7	7	8	7	6	8	7	6	6	7	6	75,0
Total	50	34	43	41	35	29	48	39	33	30	37	24	48,0

3. Logistic Regression Analysis-Backward LR Method

Table 2: Result from Logistic Regression Analysis–Backward LR Method

Model if Term Removed

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1	educationlevel	-12,221	,110	1	,741
	knowledgelevel	-18,373	12,414	1	,000
	historyofmotherimmunization	-13,668	3,005	1	,083
	birthattendant	-18,525	12,718	1	,000
	aruh	-12,487	,642	1	,423
	papantang	-12,174	,016	1	,899
	samban	-14,944	5,556	1	,018
Step 2	educationlevel	-12,225	,101	1	,750
	knowledgelevel	-18,489	12,630	1	,000
	historyofmotherimmunization	-14,204	4,061	1	,044
	birthattendant	-19,402	14,457	1	,000
	aruh	-12,749	1,149	1	,284
	samban	-15,103	5,859	1	,015
Step 3	knowledgelevel	-19,169	13,889	1	,000
	historyofmotherimmunization	-14,241	4,033	1	,045
	birthattendant	-19,405	14,361	1	,000
	aruh	-12,810	1,172	1	,279
	samban	-15,306	6,163	1	,013
Step 4	knowledgelevel	-19,340	13,060	1	,000
	historyofmotherimmunization	-15,070	4,520	1	,033
	birthattendant	-19,405	13,189	1	,000
	samban	-16,003	6,386	1	,012

Based on the table above, the dependent variables that significantly influenced the independent variables were the mother immunization knowledge level (p=0.000), the history of mother immunization during pregnancy (p=0.033), the history of birth attendant (p=0.00) and the using of *samban* by the children (p=0.012).

Discussion

The complete child immunization coverage in the *Dayak Pitap* tribe was 48%, still far from the Indonesian Heatlh Ministry target i.e. 92.5%. The highest coverage was in Kambiyain village i.e. 88.9% and the lowest was in Iyam village i.e. 20%. The highest immunization dose coverage was Polio1 i.e. 48% and the lowest dose coverage was DPT-HiB-HB3 i.e. 29%.

Based on the data analysis conducted, the independent variables that significantly had influenced on the child immunization status of *Dayak Pitap* tribe were the mother immunization knowledge level, the history of mother immunization during pregnancy, the history of birth attendant and the cultural determinant namely the use of *samban*. Whereas the mother education level and the cultural determinant namely the *aruh* ritual and the *papantang* were not significantly influenced the child immunization status.

Many research have shown that the mother immunization knowledge correlated with the child immunization status [5][6][7] and influenced the child immunization [8][9]. Other research also shown that the mother with good immunization knowledge has 2.21 probability to fully immunized their children compare with the mother with poor immunization knowledge [10].

In this case, develop an intervention to increase the mother immunization knowledge with the combination with the other interventions still promising in order to increase the fully immunized child coverage.

The other determinant factor that significantly influenced the child immunization status in the *Dayak Pitap* tribe was the use of *samban*. Using some kind of amulet both for protection and curing not only known in *Dayak Pitap* tribe but also widely known in many traditional cultures such as in Narsinghdi district in Bangladesh [11], in Bedouin tribes of the Negev Southern Israel, Middle East [12], in Gaddis of Bharmour Himachal Pradesh, India [13] and most of tribal communities worldwide especially for the children[14].

Even if the using of *samban* significantly influenced the child's immunization status, the intervention of this cultural variable is not easily formulated and need further research. Intervention with poor knowledge about the culture itself can result in negative consequences and can lead to worse health outcome. However, based on this research, health professional known that the using of *samban* was significantly influenced the child's immunization status of the *Dayak Pitap* tribe.

The history of mother immunization during pregnancy and birth attendant also significantly influenced the child's immunization status. These two variables actually correlated with the present of the care for pregnant women and labor that usually provided by the midwife.

As states by the WHO and other references, immunization is one of the most successful and cost effective health intervention achievement, has saved countless of children's lives and increased health status in the world [15][16][17][18][19][20][21]. However, virus and bacteria do not respect border, if the disease still circulate in any part of the world the risk of outbreak still remained. In order to give all protection to all children the high uptake of fully immunized children must be obtained all over the world and to reach the under vaccinated, immunization programs need to develop tailored intervention to overcome the existing barriers.

Conclusions

The child immunization coverage of the *Dayak Pitap* tribe was 48%, lower than the Indonesian health ministry target i.e. 92.5%. The determinant factor that significantly influenced the child's immunization status of the *Dayak Pitap* tribe were the mother immunization knowledge level, the history of mother immunization during pregnancy, the history of birth attendant and the cultural determinant namely the use of *samban*.

Hence, in order to gain the better child's immunization status coverage of the *Dayak Pitap* tribe, it is important to develop combination interventions to give better knowledge about immunization to the mother with the tailor made material, promote birth attendant labor and reach the pregnant mother for immunization.

Conflict of Interest: There is no conflict of interest for all authors.

Source of Funding: This research funded by the authors themselves. No other financial support received.

Ethical Clearance: All procedures performed in studies involving human participants were in accordance with the ethical standards of the Health Research Ethics Committee Faculty of Public Health Airlangga University.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

REFERENCES

1. Maldonado Y a, Peña-Cruz V, De M, Sanchez L, Logan L, Blandón S, et al. Host and viral factors affecting the decreased immunogenicity of Sabin type 3 vaccine after administration of trivalent oral polio vaccine to rural Mayan children. J Infect Dis [Internet]. 1997;175(3):545–53. Available from: http://www.ncbi.nlm.nih.gov/pubmed/9041324
2. Heininger U, Bachtiar NS, Bahri P, Dana A, Dodoo A, Gidudu J, et al. The concept of vaccination failure. Vaccine. 2012;30(7):1265–8.
3. Tulchinsky T, Abed Y, Shaheen S, Toubassi N, Sever Y, Schoenbaum M, et al. Commentary Combination of Live and Killed Vaccines in Two Developing Areas. Am J Public Health. 1989;79(12):1648–52.
4. Holmes SJ, Granoff DM. The biology of Haemophilus influenzae type b vaccination failure. Jid. 1992;165 (suppl:s121-128.
5. Rizani A, Hakimi M, Ismail D. Correlation between Mother Knowledge, Attitude and Behavior in HB-0 Immunization in Banjarmasin City. Community Med News. 2009;25(1):12–20.
6. Jaya ST. Correlation Between Mother Knowledge about DPT and Measles Immunization and Mother Anxiety to the Side Effect of Immunization. 2012;(January).
7. Dewi AP, Darwin E. The Correlation between Mother Knowledge and the Fully Basic Immunization Coverage in Parupuk Tabing, Padang Municipallity. Andalas Heal J. 2014;3(2):114-qq8.
8. Purnama Y, Fadlyana E, Sekarwana N. The Effect of Mother Immunization Knowledge toward Mother Attitude on DT- Booster Immunization. Sari Pediatr. 2008;10(38):117–21.
9. Nisar N, Mirza M, Qadri MH. Knowledge, Attitude and Practices of mothers regarding immunization of one year old child at Mawatch Goth, Kemari Town, Karachi. Pak J Med Sci. 2010;26(1):183–6.
10. Ayubi D. The contribution of Mother Knowledge of Child Immunization Status in Seven Povince of Indonesia. Hum Dev J. 2009;7(1).
11. Bhuiyan P, Khatun Z, Jahan S, Morshed T, Rahman S, Anik N. Use of Quranic verses, amulets, numerology, and medical plants for treatmen of diseases : a casestudy of a healer in Narsinghdi district Bangladesh. Am J Sustain Agric. 2014;7(78):415–25.
12. Abu-rabia A. The Evil Eye and Cultural Beliefs among the Bedouin Tribes of the Negev, Middle East [1]. Folklore. 2005;116(December):241–54.
13. Bhasin V. Gaddis ' Folk Medicine : A Source of Healing. Etno-Med. 2008;2(1):1–27.
14. Bhasin V. Medical Anthropology : A Review. Etno-Med. 2007;1(1):1–20.
15. Barnum HN, Tarantola D, Setiady IF. Cost-effectiveness of an immunization programme in Indonesia. Bull World Health Organ. 1980;58(3):499–503.
16. Creese AL, Henderson RH. Cost-benefit analysis and immunization programmes in developing countries. Bull World Health Organ. 1980;58(3):491–7.
17. White CC, Koplan JP, Orenstein WA. Benefits, risks and costs of immunization for measles, mumps and rubella. Am J Public Health. 1985;75(7):739–44.
18. WHO. Global Vaccine Action Plan 2011–2020 [Internet]. WHO; 2013. Available from: www.who.int
19. Eskola J, Duclos P, Schuster M, MacDonald NE. How to deal with vaccine hesitancy? Vaccine [Internet]. 2015;33(34):4215–7. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0264410X15005071

20. Willems J s, Sanders CR. Cost-Effectiveness and Cost-Benefit Analyses of Vaccines Author (s) : Published by : Oxford University Press Stable URL : http://www.jstor.org/stable/30109469 Accessed : 09-03-2016 18 : 45 UTC Your use of the JSTO. OXford Journals [Internet]. 2016;144(5):486–93. Available from: Stable URL; http//www.jstor.org/stabele/30109469

21. Ghebrehewet S, Thorrington D, Farmer S, Kearney J, Blissett D, McLeod H, et al. The economic cost of measles: Healthcare, public health and societal costs of the 2012-13 outbreak in Merseyside, UK. Vaccine [Internet]. Elsevier Ltd; 2016;34(15):1823–31. Available from: http://dx.doi.org/10.1016/j.vaccine.2016.02.029

Validation of the Emotional Competency Module

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ABSTRACT

This study aims validate the Emotional Competency Module for Malaysian adolescents. Seven professionals with experience in dealing with adolescent emotional issues were recruited to validate the module using a researcher-developed rating scale corresponding to the contents of the module. Seven professionals (psychologist and Counsellors) with experience in dealing with adolescent emotional issues were recruited to validate the module. A rating scale based on the appropriateness, suitability and relevance of the Emotional Competency Module activities and contents was constructed to be evaluated by the professionals. The overall validity was calculated based on the percentage of agreement between the professionals. The Emotional Competency Module received an overall validity rating of 85.6%. There was fair agreement within the Inter-rater reliability ($\alpha = 0.706$) of professionals rating. This research results are the evidence which indicates that this Emotional Competency Module is suitable to enhance the emotional competency level of adolescents.

Keywords: *Emotion competency, Emotional Competency Module, validity*

Introduction

The transition from adolescence to adulthood is crucial for every person. This period is when most of them undergo a lot of stress and pressure. During this transition, plenty of love and care become important for them as adolescents will start exploring and learning new things. Adolescents who are not capable of dealing with their emotions become more susceptible to delinquent behaviours. A recent study on adolescent delinquency found that adolescents with better emotional intelligence had lower levels of delinquency [1]. Numerous social problems happen today that start from less serious cases such as coming late to school, skipping class, breaking rules, followed by serious cases such as disobeying teachers, smoking, participating in illegal racing, gangsterism, bullying and more serious cases such as involving in sexual activities, pregnant out of wed lock, baby dumping and rape that has been reported by the mass media almost every day [2].

From the year 2009 to 2013, the Malaysian Welfare Department revealed that there are a total of 23,950 male and 1828 female offenders [3]. The Department of Statistic Malaysia reported that Malaysian adolescent population from the age of 10 to 19 years old was estimated to be 5.5 million while the population of Malaysian youths aged 15–25 years old was estimated to be around 5.2 million and approximately 19% of the total population [4]. A statement from the Malaysian Welfare Department revealed that juvenile cases are increasing in every state with the passage of time [5]. Although, the number of delinquent juveniles are high, and it is still alarming and significant to be dismissed. In addition, this does not include the number of hotspot schools identified in Malaysia with many delinquent behaviours detected among their students. These delinquent behaviours are such as drug abuse, smoking, vandalism, bully among many others. Hence, a module is developed to help to address these issues among adolescents.

Research Background

From the year 2009 to 2013, the Malaysian Welfare Department revealed that there are a total of 23,950 male and 1828 female offenders [6]. The Department of Statistic

Malaysia reported that Malaysian adolescent population from the age of 10 to 19 years old was estimated to be 5.5 million while the population of Malaysian youths aged 15–25 years old was estimated to be around 5.2 million and approximately 19% of the total population [7]. Although, the number of delinquent juveniles is not high, the number is still alarming and significant enough to simply let this go. In addition, this does not include the number of hotspot schools identified in Malaysia with many delinquent behaviours detected among their students. These delinquent behaviours are such as drug abuse, smoking, vandalism, bully among many others. Hence, a module is developed to help to address these issues among adolescents. Many studies showed that emotional intelligence programmes or trainings were effective in many facets such as positive emotional intelligence shifts and others behaviors enhance emotional intelligence through expressive writing and deep breathing, increase emotional intelligence in adolescents with emotional and behavioral problems [8]

Problem Statement: Social problems faced by the young generations demand the governable attention of various individuals as there is a link between their current behaviour and the potential for delinquency and future involvement in criminal activities [9]. Some evidence-based studies showed that emotional intelligence trainings protect positive emotional intelligence [10], enhance emotional intelligence through expressive writing and deep breathing as well as increase emotional intelligence in adolescents with emotional and behavioral problems [11]. However, all these trainings or programs are not locally designed thus the suitability to be implemented on Malaysian adolescents may be compromised.

Research Objective: This study aims to test the validity of the module to be implemented for adolescents in Malaysia. Hence, the research objectives for the study are as stated:

i. To evaluate the content validity evidence for Strategy 1: Self-Awareness.

ii. To evaluate the content validity evidence for Strategy 2: Self-Management.

iii. To evaluate the content validity evidence for Strategy 3: Social Awareness.

iv. To evaluate the content validity evidence for Strategy 4: Relationship Management.

Literature Review

Emotional intelligence is a combination of competencies that allows an individual to be aware of, to understand and to be in control of their own emotions, to recognize and understand the emotion of others, and to use this knowledge to foster their own success and the success of others [12]. A person who can manage their behaviours, could face changes, is capable of solving problems, is capable of building good relationships with others during worrying situations and could communicate with others are those with high EQ[13]. The current study follows the Goleman's Emotional Intelligence Theory. Although Goleman's theory is more applicable within organization setting but his theory focuses on a wider area in an individual's emotional intelligence. His theory includes the four constructs of emotional competence which are self-awareness, self-management, social awareness and relationship management. Therefore, the module is mainly constructed using the Goleman theoretical framework.

Meanwhile, findings from a survey showed that many higher education students agreed that financial support lead to stress and that a module to deal with emotional problems was necessary [14]. Besides, 86% of the students at the university mentioned that a module is needed to address the emotional issues that university students are facing. Other emotional problems intervention studies managed to maintain the positive effects and prevent violence among adolescence in terms of use of aggressive strategies to resolve conflict was significantly reduced [15] whereas emotional competence were found to be significant predictors of changes in perceived stress, mental health, somatic complaints and vigour and confusion [13].

Methodology

This Module was developed based on survey research on adolescent and interviews sessions with adolescents and professional, the results of the qualitative [16] and quantities [17] research directed the outlines of module activities. The validity of the newly developed module called Emotional Competency Module was established using content validity analyses. Hence, to check for the content validity, the module was sent to be evaluated by seven professionals with experience in dealing with emotional issues among adolescents and

also in developing modules [18] [19]. Having around five to ten field experts is more suitable to measure the content validity [20].

Research Sampling

The content validity involved seven professionals with experience in handling adolescents with emotional disturbed/delinquent behaviours. Five of them were counseling or psychology lecturers from Sultan Idris Education University, National University of Malaysia, International Islamic University of Malaysia and Putra University of Malaysia. Two were counselor from a Welfare Department Assistant Officer and a psychology officer at a juvenile delinquent rehabilitation center in Perak. The experts were recruited based on their evidence and knowledge in dealing with adolescents' emotional issues.

Research Instruments: Three main criteria were employed for developing the rating scale to validate the module. They are:

a. The content measures what it is supposed to measure.
b. The items do represent the content it is required.
c. Items represent what the researcher meant to measure [21].

Data Analysis

An inter-rater reliability analysis for the 7 experts' ratings was calculated using the Krippendorf's alpha. Later, their percentage ratings were then calculated to assess for content validity using the formula below.

$$\text{Total validity (\%)} = \frac{\text{Total Expert Score}}{\text{Total Score}} \times 100$$

A descriptive analysis was conducted based on the percentage of rating for each activity as well as the overall module by the experts. The results are stated in the research findings. A validity rating of 70% for the content validity of a module is considered high [22] [23].

Research Findings: Krippendorff's alpha was calculated to analyse the inter-rater reliability. According to inter-rater reliability the = 0.706, indicate that there was fair agreement among the rater analysis on the module contents [24].

Table 1: Content validity analysis results of module activities

Activity: Theme		Total Score	Percentage of Validity (%)
Theme 1: Self-Awareness		342	81.43
1.	The Emotional Brain: Psycho-biology of emotions	55	78.57
2.	Emoticons: Understanding emotions	56	80.00
3.	ABC: Emotion rationalization	57	81.43
4.	This Is Me: Self-acceptance	57	81.43
5.	Triple Vision: Self-efficacy/Resilience	56	80.00
6.	The Best Version of Yourself: Self-esteem	61	87.14
Theme 2: Self-Management		507	80.48
1.	Emotional Map: Emotion regulation	57	81.43
2.	Breathing Technique: Controlling emotions	58	82.86
3.	POP!: Stress management	52	74.29
4.	Pressure Cooker: Stress management	59	84.29
5.	Time Flies: Stress management/Time management	55	78.57
6.	My Spiritual Coping: Stress management	56	80.00
7.	Progressive Muscle Relaxation: Stress management	57	81.43
8.	Weigh Me Up: Self-motivation	57	81.43
9.	Move It!: Self-motivation	56	80.00
Theme 3: Social Awareness		281	80.29
1.	One Day: Social responsibility	56	80.00

Conted…

2.	Empathy: Empathy	58	82.86
3.	Colourful Emotions: Empathy	59	84.29
4.	Life Tree: Social respect	55	78.57
5.	Colours of Malaysia: Social respect	53	75.71
Theme 4: Relationship Management		286	81.71
1.	Sherlocking: Communication skills	55	78.57
2.	Let's Win: Assertive skills	58	82.86
3.	Maze Runner: Teamwork	56	80.00
4.	Rabbits and Hyenas: Dealing with criticism	60	85.71
5.	Sorry Sorry: Emotion expression	57	81.43

Table 1 shows that all the module activities has a high percentage of content validity results. Overall, the 'POP!' activity in the self-management theme received the lowest percentage of validation rating which is 74.29% whereas 'The Best Version of Yourself' activity from the self-awareness theme which focuses on enhancing self-esteem received the highest rating which is 87.14%. Obtaining 70% for the content validity of a module is considered high [25] [26]. Hence, all the activities are accepted and presumed to be capable of enhancing the self-awareness, self-management, social awareness and relationship management skills of adolescents.

Table 2: Overall module validity analysis results

	Overall Module Content Validity Results	Percentage
1.	This module is suitable for the target population.	84%
2.	This module can be implemented successfully.	88%
3.	Time allocated to the individuals to complete the module is sufficient and appropriate.	80%
4.	This module is presumed to help to enhance the awareness and capability of adolescents in enhancing emotional competency.	88%
5.	This module contents are predicted to enhance the emotional competency.	88%
	Total Content Validity	85.6%

Based on Table 2, a high validity of 85.6% for the overall module was calculated. Hence, it can be concluded thus far in the research that the module developed is appropriate to be implemented to enhance adolescents' emotional competence.

Discussions, Implications and Suggestions

The present study has established that the four main emotional competency domains used to assess the emotional competency levels of adolescents is valid with an overall percentage score of 85%. The contents of the module are valid with the inter reliability of experts ($\alpha = 0.706$). Activities are most useful and inspire way to practically build up the emotional competency skills [27]

Findings provide evidence that the Emotional Competency Module is suitable to be implemented for adolescents to help enhance their emotional competence level. This is also similar to the Emotional Intelligence Module (EeiM) which also revealed good content validity [28]. Future suggestions for the research would include that testing the module on a wider scale whereby adolescents' population from different background such as juvenile delinquency center, international secondary schools and private institutions can become the participants. Besides, this module can certainly be modified for use for differently abled adolescents.

Conclusion

The Emotional Competency Module has a high validity of 85.6% for the overall module which shows that it is suitable to be used for the adolescent population in Malaysia. Hence showing evidence that the Emotional Competency Module can help enhance the emotional

competence of adolescents. Study is the evidence that the Emotional Competency Module can help enhance the emotional competence of adolescents.

Ethical Clearance: Ethical procedure and clearance was carried from the Research Management and Invocation Center of Sultan Idris University of Education.

Source of Funding: This research was supported by the Ministry of Higher Education through the Fundamental Research Grant Scheme (FRGS/1/2017/SS05/UPSI/02/6).

Conflict of Interest: There are no conflict of interest identified thus far for this research.

Acknowledgment: This Research was supported by Ministry of Education (MOE) through Fundamental Research Grant Scheme (FRGS/1/2017/SS05/UPSI/2/6) 02/5/2). We acknowledge the Ministry of Education and Research Management and Innovation Center (RMICUPSI)

REFERENCE

1. Chong AM, Lee P, Roslan S, & Baba M. Emotional intelligence and at-risk students. 2015; *SAGE Open*, *5*(1).
2. Behera A K. (2016). Understanding emotional intelligence in educational context. *International Journal of Humanities and Social Science Invention*, 2016; *5*(2), 17–28.
3. Che Mohd Nasir, & Mohd Ali Hanafiah. Individual Internal Factors and Delinquencies: A Review on Teenage Girls in Moral Morals. *Social Development Journal*, 2015; *18* (June), 185–202.
4. Kuldas S, Hashim S, & Ismail H N. Malaysian adolescent students' needs for enhancing thinking skills, counteracting risk factors and demonstrating academic resilience. *International Journal of Adolescence and Youth, 2015; 20*(1), 32-47.
5. Dolev N, & Leshem S. Developing emotional intelligence competence among teachers. *Teacher Development*, 2017; *21*(1), 21–39.
6. Syed Nong & Mohd Yusoff. The legal concept of children beyond control: A global perspective. *Pertanika Journal of Social Sciences and Humanities*, 2015; 23(SpecialIssue11), 63– 74.
7. Kuldas S, Hashim S, & Ismail H N. Malaysian adolescent students' needs for enhancing thinking skills, counteracting risk factors and demonstrating academic resilience. *International Journal of Adolescence and Youth,2015; 20*(1), 32-47.
8. Motamedi F, Ghobari-Bonab B, Beh-pajooh A, Shokoohi Yekta, & Afrooz G A. Developing an emotional intelligence program training and study its effectiveness on emotional intelligence of adolescents with emotional and behavioral problems that living in single parent families. *Journal of Education and Learning*, 2017; *6*(2), 101
9. Nareman Aly Mohamed, et al. The Effect of Emotional Intelligence Enhancement Program on Suicidal Ideations Among Attempted Suicide Adolescents. IMPACT: *International Journal of Research in Applied, Natural and Social Sciences* (IMPACT: IJRANSS), 2017; 5(11), 111–120.
10. Syed Nong, & Mohd Yusoff. The legal concept of children beyond control: A global perspective. *Pertanika Journal of Social Sciences and Humanities*,2015; *23* (SpecialIssue11), 63–74.
11. Christensen L. B, Johnson R B & Turner L A. Research methods, design, and analysis. Essex: Pearson.2015.
12. Goleman D. Emotional intelligence: Why it can matter more than IQ?. New York: Bantam Books. 1995.
13. Machera R P, & Machera P C. Emotional intelligence (EI): A therapy for higher education students. *Universal Journal of Educational Research*, 2017; 5(3), 461-471
14. Garaigordobil M, & Pena-Sarrionandia A. Effects of an emotional intelligence program in variables related to the prevention of violence. *Frontiers in Psychology,* 2015; 6 (743), 1-11.
15. Hodzic S, Ripoll P, Bernal C, & Zenasni F. The effects of emotional competences training among unemployed adults: A longitudinal study. *Applied Psychology: Health and Well-Being.* 2015; 7 (3), 275-292.
16. Perveen A, Hamzah H. Kee P, Abas, N A. H, Othman A. The Difference in Youth Emotional Competency Level BetweenGender, and

Institutes, Tunas Bakti, Secondary School and University Students. *International Journal of Education, Psychology and Counseling*, 2018; 3 (21), 108-117.

17. Perveen A, Hamzah H B, Kee P, Othman A, Abas N. A. H. Emotional Competency Issues Faced by Youths in Malaysia. *International Journal of Academic Research in Business and Social Sciences,* 2018; 8(11), 1039–1055.
18. Jasmi A T, Zakaria M, & Norwaliza A W. Validity and reliability of career exploration model. *Middle-East Journal of Scientific Research*, 2015; *23*(11), 2639–2644.
19. Sidek MN, & Jamaludin A Module building: How to build exercise module and academic module. Serdang: *University Putra Malaysia Publisher* 2005.
20. Yaghmale F. Content validity and its estimation. *Journal of Medical Education,* 2003; 3(1), 25-27.
21. Tunggak B, Ngadi S, & Abu Naim H. Students delinquency and proposed solutions through teen model of conduct/integrated muslim students. *Jurnal Hadhari*, 2015; 7 (72), 11–30.
22. Salim S S, Arip M A, Mustafa M B, Taff M A, Khairani M Z, & Yasin M H. Construction and validity testing of content specialist encouragement of emotional intelligence module (EeiM). *International Journal of Academic Research in Business and Social Sciences,* 2018; 8(4), 853–860.
23. Tuckman B W. Conducting educational research (5th Ed). Belmont Wadsworth: Thomson Learning 1999.
24. Salim S, et al. Construction And Validity Testing Of Content Specialist Encouragement Of Emotional Intelligence Module (EeiM). *International Journal of Academic Research in Business and Social Sciences*, 2018; 8(4), 853–860.
25. Tunggak B, Ngadi S, & Abu Naim H. Students Delinquency and Proposed Solutions Through Teen Model of Conduct/Integrated Muslim Students. *Jurnal Hadhari*, 2015; *7* (72), 11–30.
26. Choon L J, et al. Parental attachment, peer attachment, and delinquency among adolescents in Selangor, Malaysia. *Asian Social Science*, 2013; *9*(15), 214–219. https://doi.org/10.5539/ass.v9n15p214
27. Gayathri N, & Meenakshi K. A Literature Review of Emotional Intelligence. *International Journal of Humanities and Social Science Invention, 2013; ISSN*, *2*(3), 42–51.
28. Sidek MN, & Jamaludin A.Module building: How to build exercise module and academic module. Serdang: *University Putra Malaysia Publisher*. 2005.

The Use of Diuretic Drugs in Heart Failure Patients

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ABSTRACT

Background: Heart failure can reduce the rates of expectations and quality of life. In the last few decades, the management of this disease has developed continously, including in pharmacological therapy. Diuretic is a class of drugs that is often used as a choice for heart failure patients. The pattern of diuretics usage needs to be observed further. Because if the use of diuretics is not appropriate, it potentially leads to drug related problems that affect patient management.

Objective: This study aims to examine the pattern of use of diuretics in heart failure patients who are undergoing treatment in hospital hospitalization units.

Method: This is a descriptive and retrospective study, using medical record data for heart failure patients who received diuretic therapy in the patient room at the hospital. Sampling method used the time limited sampling.

Result: Total patients who met the inclusion criteria were 50 patients, dominated by male (68%). The age of patients, most of them were in the age group 61-70 years (32%). The most widely used diuretics were the single dose furosemide (50%) and combination dose furosemide and spironolactone (36%). There was no drug related problem (DRP) in the drug interactions and undesirable side effects.

Conclusion: Most diuretic therapies for heart failure patients who were hospitalized at the hospital, were according to the available guidelines.

Keywords *: heart failure, drug related problem, diuretics*

Introduction

Heart failure is a disease that increase a morbidity and mortality rates. This disease weakens and reduces the expectations rates and quality of life. In this era, heart failure become an important health issue. Heart failure results in 12 to 15 million outpatient visits per year. It becomes the most common reasons for hospitalization in patients over the age of 65 years. Typical symptoms in heart failure are labored breathing when the patient is in a rest and activity, fatigue, leg edema. [1–3]

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In general, it can be said that over the past 50 years, there have been three different eras related to the management of heart failure. The earliest era, known as the non-pharmacological era, focused in its treatment on fluid restriction. Then followed by the pharmacological era, that found an increasing use of inotropes and diuretics and the discovery of vasodorators, and the discovery of posterior drugs related to the neurohormonal pathway. Along with all technological developments, new drugs are approved to improve significantly the prognosis of heart failure patients. In addition, a new era also immediately gave rise to regenerative therapy. [1,4-7]

In pharmacological therapy, one of the choices is using diuretic drugs. Diuretics are drugs that can increase urine flow rates, but clinically diuretics also increase the excretion rates of Na^+ (natriueresis) and Cl-, which is the accompanying anions. Diuretics have often been used as management of the heart failure symptoms for many years. Because diuretics interfere

a sodium retention by increasing urine sodium and free water clearance. The purpose of diuretics usage is to relieve the heart failure symptoms by reducing an excess volume without causing intravascular volume depletion. Diuretic classification is based on various ideas such as workplace (loop diuretics), efficacy (high-ceilling diuretics), chemical structure (thiazide diuretics), similarity of work with other diuretics (thiazide-like diuretics), effects on potassium excretion (potassium-sparing diuretics). [8–10]

The most commonly diuretic that used for congestive heart failure is loop diuretics such as furosemide which is given IV in doses of 40 mg, followed by oral use if it takes 20-80 mg / 24 hours. In most patients with loop diuretics can achieve sufficient diuresis to relieve congestive symptoms, but when diuretic resistance arises, fluid management may be complicated and potentially damaging. The pattern of diuretic usage in heart failure patients still needs to be studied more because of the possibility of improper use of therapy and the potential of drug related problems occur that affect the management of heart failure patients. [11–14]

Method

The study that conducted was non-experimental or observational research, that was a descriptive retrospective. The study material used health medical record data in patients with a diagnosis of heart failure who received diuretic therapy in the hospital inpatient room.

Specified sample inclusion criteria were patients with heart failure and receiving diuretic therapy with or without complications. Furthermore, on the exclusion criteria, namely heart failure patients during the therapy period, the patient died, or is referred to another hospital and forced home.

Research samples were recorded on the data collection sheet, including: patient profile (name, gender, age, weight / height, address); date of hospital admission, date of hospital discharge, and medical record number; diagnostics, laboratory data, and kinetic data; Disease history, treatment history, and complaints experienced; The variables of diuretics that given to patients include type, dosage, and route of administration.

Data analysis was done by calculating the number of patients and grouping patients based on patient demographics, types of diuretics used and complications or comorbidities. In addition, it is necessary to know the use of other drugs to determine drug interactions in heart failure patients.

The sample collection was done with the time limited sampling method. Data was collected in the medical medical record room at Hospital of Bhayangkara H.S Samsoeri Mertojoso, Surabaya Indonesia. Data analysis was carried out based on data obtained from the patient's medical record. Then the data obtained from the data collection sheet was entered into the main table and then processed and analyzed descriptively in the form of tables or narratives.

This research had been reviewed by the Health Research Ethics Commission of Bhayangkara Hospital Surabaya and has been declared ethical.

Results

Based on the results of the study, it was found 50 patients who qualified the inclusion criteria and were dominated by male sex (68%). Furthermore, most of patients in the age group 61-70 years (32%). The most complaints that patients had experienced were breathing problems, chest pain and edema. In objective data, the diagnosis of heart failure was most evidenced through supporting data in the form of chest X-ray, ECHO and EKG. The history of the most comorbidities in heart failure patients was hypertension (32%) followed by coronary heart disease, diabetes mellitus with hypertension, and only diabetes mellitus.

Patterns for Usage of Heart Failure Drugs

Profile of the use of heart failure drugs: The most widely used drugs is the diuretic group, as many as 66 frequency of use.

Table 1: Profile of the use of the group of heart failure drugs

Groups of drugs	Frequency of usage
Cardiac Glycosides	5
ACE Inhibitor	18
ARB	16
B Blocker	26
Diuretics	66
Nitric	28

Note: *) One patient can receive more than one medication for heart failure during treatment

Type of Diuretics: The highest usage of diuretic drugs is furosemid with 50% a combination of furosemide and spironolactone (36%). And the the following type of diuretics mostly used are

The highest use of diuretic drugs is furosemide (50%), then followed by a combination of furosemide and spironolactone, spironolactone, combination hydrochlorothiazide and furosemid, and combination of hydrochlorothiazide and spironolactone, which their values are 36%, 10%, 2% dan 2%.

Dosage of Diuretics: The use of diuretic doses is divided into the use of single doses and combination doses which will be presented in detail in the table below.

Table 2: Single dose of diuretics

Type of diuretics	Dose regimentation	Frequency
Furosemide	2,5mg/ hour pump	2
	10mg/hour pump	9
	1x20mg IV	1
	2x20mg IV	4
	3x20mg IV	1
	1/2x40mg p.o	1
1x40mg p.o		7
Spironolactone	1/2x25mg p.o	1
	1x25mg p.o	4

Table 3: Dosage of diuretic combination

Regimentasi dosis			Frequency
Furosemide	**Spironolactone**	**Hydrochlorothiazide**	
5mg/hour pump	1/2x100mg p.o	-	2
	1x100mg p.o	-	1
	2x25mg p.o	-	1
	-	2x25mg	1
10mg/hour Pump	1x25mg p.o	-	3
1x20mg IV	1x25mg p.o	-	2
2x20mg IV	1x25mg p.o	-	1
3x20mg IV	2x25mg p.o	-	1
	1x25mg p.o	-	1
1x40mg p.o	1x25mg p.o	-	3
2x40mg p.o	1x25mg p.o	-	3
-	1x25mg p.o	1x25mg p.o	1

Diuretics Route: The most therapeutic route of diuretics is oral.

Table 4: Diuretics route

Diuretics route		Frequency	Percentage (%)
Furosemide	Intravenous pump	19	27
	Intravenous	11	16
	Per oral	14	20

Conted…

Spironolactone	Per oral	24	34
Hydrochlorothiazide	Per oral	2	3

Note: *) The number of routes given above is not the same as 50 patients, because in one patient can get a single diuretic therapy or combination diuretic therapy

Diuretic Therapy Monitoring: Monitoring of diuretic therapy is conducted with electronic serum monitoring.

Table 5: Diuretic Therapy Monitoring

Patients using diuretic therapy	Frequency	Percentage (%)
Serum electrolyte monitoring was carried out	29	58
Serum electrolyte monitoring was not carried out	21	42

Identification of Drug Related Problem (DRP)

Drugs Interaction: The percentage of possible drug interactions in heart failure patients is not equal to 100% because not all patients experience potential drug interactions.

Table 6: Drugs Interaction

Type of Drugs	Interacted with	Mechanisms of Drugs Interaction	Frequency	Percentage (%)
Furosemide	Amiodaron	Causes an increase in ventricular arrhythmias	3	6
	Digoxin	Increases digoxin toxicity	5	10
Spironolactone	Potassium chloride	Causes hyperchalemia	3	6
	ACE Inhibitor	Causes hyperchalemia	2	4

In the use of furosemide with digoxin monitoring**,** **t**herapy of furosemide with digoxin was monitored more than 4 patients (80%) rather than those who were not monitored as many as 1 patient (20%). And then heart failure patients who used spironolactone therapy with ACE-I contained 2 patients with 1 patient who did not carry out serum electrolyte monitoring (50%).

Side effects of drugs: In this study was found no drug side effects occurred in heart failure patients.

Discussion

From the data shows the heart failure patients who were undergoing hospitalization, complaints a shortness of breath and chest pain. Dyspnea or shortness of breath can result in pulmonary blockage or systemic hypoperfusion due to left ventricular failure. Patients usually experience various symptoms that associated with systemic fluid accumlation which are known to be venous blockages, associated with right ventricular failure ie peripheral edema. This usually occurs in areas that depend on the body, such as the ankle (Edema pedal) for outpatients or sacred areas to sleep in the patient's bed. Bowel or stomach blockages can also appear, but it does not lead to characteristic signs unless proven to be open ascites. In right ventricular failure it is also possible to find the pulmonary hypertension. [15]

The status of heart failure can be seen from medical support data such as echo, chest X-ray and ECG. The medical support data above is related to completing the diagnosis of heart failure, where ecocardigraphy is the most useful method in evaluating systolic and diastolic dysfunction. Chest X-ray is also an important component in diagnosing heart failure such as showing cardiomegaly. An electrocardiogram should be performed on all patients suspected of heart failure. [16]

From the results study above, patients who were diagnosed with heart failure were in the age range 61-70 years. The diagnosis of heart failure manifests most commonly in adults that over 60 years. The incidence of heart failure increases with age, and reaches 1% per year in people over 65 years old. [15,17]

The most common history of comorbidities in heart failure patients is hypertension. One factor that contributes to the development of primary hypertension is a physical disorder involving the renin-angiotype-aldosterone system (RAAS) and natriuretic hormone. Furthermore, the second most common comorbid disease is diabetes mellitus. Changes in structure that show a concentric left ventricular remodeling as a characteristic of diabetes.. [15]

The results showed the classification of drugs used in heart failure patients that mostly consumed, is a diuretic. Other classes of heart failure drugs used are glycosides, ACE inhibitors, ARB groups, β inhibitors and nitrate groups. The diuretic drugs used are hydrochlorothiazide (thiazide diuretic), furosemide (loop diuretic), and spironolactone (potassium-sparing diuretic). These uses are either single or combination doses. In this study, the single dose of furosemide was given due to its higher diuresis and natriuresis efficiency. Whereas, the combination of furosemide and spironolactone is given because potassium-sparing diuretics are weak diuretics when used singly but it cause potassium retention, so they are usually given with loop diuretics to prevent hypokalaemia. [16,18,19]

The loop diuretic is a diuretic group which has the same ability to block the symporter Na^+ -K^+ - $2Cl^-$ in the raised portion of the Henle loop diuretic. This drug is given orally to reduce peripheral edema and pulmonary edema in moderate to severe stage of heart failure. Loop diuretics are effective in patients with reduced kidney. [18.20]

In the administration route of furosemide in heart failure patients is more given by pump than by intravenous or per oral method. Continuous intravenous administration of furosemide is indeed simpler, more effective, and a method to accelerate diuresis in certain patients. The administration of furosemide to patients depends on the clinical symptoms of the patient.[21]

Problems that related to the use of potential diuretic drugs in the heart failure, one of which is related to drug interactions. In the study showed that potential drug interactions occured between furosemide and amiodarone. Concomitant administration of drugs that can cause hypokalaemia and hypomagnesemia and increase the ventricular arrhythmias, including tachycardia.[22]

Other potential interactions was a combination of furosemide with digoxin. Cardiac glycosides inhibit sodium and potassium ATP-ase, which is associated with the transport of sodium ions and potassium ions acrossing the myocardial cell membrane. This is related to an increase in the availability of calcium ions that associated with contractions from cells. The loss of calcium is caused by diuretics, exacerbates potassium loss from myocardial cells, thereby increasing the activity and toxicity of digitalis. [20]

Other potential drug interactions occur between spironolactone and KSR. The effects of spironolactone and potassium compounds are additives, which can cause hypercalemia. In addition, spironolactone and ACE inhibitor groups also has the potential to cause reactions. ACE inhibitors can inhibit aldosterone which results in potassium retention, so it is expected to maintain adosterone potassium antagonists, such as spironolactone which causes hypercalemia.[20] In many patients that use combination therapy, the serum electrolyte was monitored. However, in this study was found no actual drug interactions. Furthermore, on the issue of other potential drug interactions is drugs side effects. In this study there were not found a patient that experienced the diuretic side effects.

Conclusion

Most of the usage of diuretic therapy in heart failure patients in inpatient installations, had been in accordance with existing guidelines. In this study, there was no Drug Related Problem (DRP) of diuretics usage.

Conflict of Interest: There is no conflict of interest in this study

Source of Funding: This research was carried out by a team and funded independently

REFERENCE

1. Abou-jokh C, Alvarez B. Innovative Strategies in Heart Failure : Present and Future. 2019;
2. Long B, Koyfman A, Rdms MG. Clinical Reviews in Emergency Medicine. J Emerg Med [Internet]. 2018;55(5):635–46. Available from: https://doi.org/10.1016/j.jemermed.2018.08.002

3. Fadol AP, Mendoza TR. Addressing the Symptom Management Gap in Patients With Cancer and Heart Failure Using the Interactive Voice Response System: A Pilot Study. 2018;9(2):201–14.

4. Allen K, Madan S, Massera D, Ms C, Litwin SE. Lifestyle Modi fi cations for Preventing and Treating Heart Failure. 2018;72(19).

5. Vazir A, Cowie MR. Decongestion : Diuretics and other therapies for hospitalized heart failure. Indian Heart J [Internet]. 2015;68:S61–8. Available from: http://dx.doi.org/10.1016/j.ihj.2015.10.386

6. Isabel S, Ramos L, Araújo I, Marques F, Branco P, Gaspar A, et al. A 2018 overview of diuretic resistance in heart failure. Rev Port Cardiol [Internet]. 2018;37(11):935–45. Available from: https://doi.org/10.1016/j.repc.2018.03.014

7. Voors AA, Kremer D, Geven C, ter Maaten JM, Struck J, Bergmann A, Pickkers P, Metra M, Mebazaa A, Düngen HD, Butler J. Adrenomedullin in heart failure: pathophysiology and therapeutic application. European journal of heart failure. 2019 Feb;21(2):163-71.

8. El-seedi HR, Khalifa SAM, Taher EA, Farag MA, Saeed A, Gamal M, et al. Cardenolides : Insights from chemical structure and pharmacological utility. Pharmacol Res [Internet]. 2019;141(December 2018):123–75. Available from: https://doi.org/10.1016/j.phrs.2018.12.015

9. Simonavičius J, Knackstedt C, Brunner-La Rocca HP. Loop diuretics in chronic heart failure: how to manage congestion?. Heart failure reviews. 2019 Jan 1;24(1):17-30.

10. Chitturi C, Novak JE. Diuretics in the Management of Cardiorenal Syndrome. Adv Chronic Kidney Dis [Internet]. 2018;25(5):425–33. Available from: https://doi.org/10.1053/j.ackd.2018.08.008

11. Kazory A, Costanzo MR. Extracorporeal Isolated Ultrafiltration for Management of Congestion in Heart Failure and Cardiorenal Syndrome. Adv Chronic Kidney Dis [Internet]. 2018;25(5):434–42. Available from: https://doi.org/10.1053/j.ackd.2018.08.007

12. Skogestad J, Aronsen JM. Hypokalemia-induced arrhythmias and heart failure: new insights and implications for therapy. Frontiers in physiology. 2018;9.

13. Kuriyama A. Continuous versus intermittent administration of furosemide in acute decompensated heart failure : a systematic review and meta-analysis. 2019;1:31–9.

14. Li S, Zhang X, Dong M, Gong S, Shang Z, Jia X, et al. Effects of spironolactone in heart failure with preserved ejection fraction. 2018;0(July).

15. DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey L. Pharmacotherapy A Pathophysiologic Approach, 10e. New York, NY: McGraw-Hill Education LLC; 2017.

16. Perhimpunan Dokter Spesialis Kardiovaskular. Pedoman tata laksana penyakit kardiovaskular di Indonesia. Jakarta Perhimpun Dr Spes Kardiovask Indones. 2009;

17. Kingery JR, Yango M, Wajanga B, Kalokola F, Brejt J, Kataraihya J, et al. Heart failure, post-hospital mortality and renal function in Tanzania: a prospective cohort study. Int J Cardiol. 2017;243:311–7.

18. Neal MJ. At a glance farmakologi medis. Ed V Jakarta Erlangga. 2006;70:94–5.

19. Sica DA, Gehr TWB, Frishman WH. Use of diuretics in the treatment of heart failure in older adults. Heart Fail Clin. 2017;13(3):503–12.

20. Goodman LS. Goodman and Gilman's the pharmacological basis of therapeutics. Vol. 1549. McGraw-Hill New York; 1996.

21. Magovern JA, Magovern GJ. Diuresis in hemodynamically compromised patients: continuous furosemide infusion. Ann Thorac Surg. 1990;50(3):482–4.

22. Antonelli D, Atar S, Freedberg NA, Rosenfeld T. Torsade de pointes in patients on chronic amiodarone treatment: contributing factors and drug interactions. Sat. 2005;12:19.

The Antibacterial Activity of Kersen Leaves (*Muntingia Calabura)* Extracts against *Aeromonas Hydrophilia;* in Vitro Study

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ABSTRACT

Background: *Aeromonas hydrophila* is one of opportunistic bacteria that capable causing disease in fresh water fishes. The outbreak of diseases in fresh water fishes become an important issue in fish farming. Antibiotics can be used as therapy for those problems. But the usage of antibiotics can cause the bacterial resistance and side effects of medications. The usage of antibiotics in fish farming also can trigger the water polution.

Objective: The aim of this study was to observe the antibacterial activity of kersen leaves *Muntingia calabura* extracts against *A. hydrophila* with in vitro study and to determine the minimum concentration the extracts that inhibit the bacterial growth and its ability to kill the bacteria.

Method: There was nine group consisted the extracts with various concentration, as 50%, 25%, 12,5%, 6,25%, 3,12%, 1,56%, 0,78%, positive control group with chloramphenicol, and negative control group with dimethyl sulfoxide (DMSO) 10%. Those extract was soaked in bacterial culture and incubated for 24 hours.

Result: The young kersen leaves extracts had stronger antibacterial activity against *A. hydrophila,* compared to the old kersen leaves. Minimum Inhibition Concentration (MIC) of the extracts was at concentration of 50% and Minimum Bactericidal Concentration (MBC) was at concentration of 12,5%.

Conclusion: Kersen leaves extract has antibacterial activity against *A. Hydrophila* by in vitro study.

Keywords: *Aeromonas hydrophilia, Muntingia calabura, leaves extract, fish farming*

Introduction

Outbreak of disease is one of the obstacles that often occur in fish farming. *Aeromonas hydrophila* is an opportunistic bacterium, the cause of disease in various types of freshwater fish. These bacteria attack the internal organs of the fish through the digestive tract or the skin of fish that have not been injured. This occurs because the fish are stressed due to density or increase in extreme environmental temperatures. The bacterial infection, that caused by *A. hydrophila*, is better known as Motil Aeromonas Septicemia (MAS). The symptoms of this disease are ulceration, erythrodermatitis, hemorrhagic septicemia, red disease, and prominent scales [(1)].

One of the natural products that can be utilizded as natural medicine is kersen. Kersen is a small fruit, that well known and healthy, produced from trees that have many benefit [(2)]. Kersen plant is easily found on the roadside as shades and it has good ability in adaptation. Kersen leaves contain various bioactive compounds, such as flavonoid, saponins, triterpenes, and tannins [(3)]. The study by Fariestha (2018) shows the methanol extract of kersen leaves had antibacterial activity against gram positive bacteria, that is *Staphylococcus aureus* [(4)].

Based on some statements above, the antibacterial activity of kersen leaves extracts were tested to observe its ability to inhibit the growth and kill gram negative bacteria, *A. hydrophila*, which can threaten the success of fish farming. The experiment was done by extracting the leaves of kersen, then followed by doing an antibacterial activity test with the disk diffusion test and

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streak method to determine the antibacterial activity of kersen leaves extract to *A. hydrophila*.

Materials and Method

Equipment: The equipment that used in this experiment such as blender, digital scales, oven, reaction flasks, rotary vacuum evaorator, autoclave, test tubes, tube rack, measuring pipette, petri dish, bunsen burner, Ose needle, micropipette, glass stirrer, laboratory tweezer, and ruler.

Materials: The materials in this study were pure isolates of *Aeromonas hydrophila*, that obtained from the Juanda Quarantine Hall, Surabaya, young kersen leaves (that the leaves color is light green), old kersen leaves (that the leaves color is dark green), methanol, Whatman filter No. 1, aquadest, dimethylsulfoxide (DMSO) 10%, barium chloride (BaCI) 1%, sulfuric acid (H_2SO_4) 1%, physiological saline (NaCl), chloramphenicol, Whatman disk paper No.42, trypticase soya agar (TSA).

Preparation of Mc Farland 0,5 ($1{,}5x10^8$ sel/ml) solution: Mc Farland solution preparation was done by mixing 0.05 ml of barium chloride ($BaCl_2$) 1% and 9.95 ml of sulfuric acid (H_2SO_4) 1% in a test tube. Then it was shaken until a turbid solution formed. This turbidity is used as the standard turbidity of bacterial suspension tests

Kersen leaves extract preparation: Kersen leaves extract was diluted with dimethyl sulfoxide (DMSO) solvent 10%. DMSO solution functions as a solvent that quickly seeped into the epithelial extract without damaging the cells. DMSO solution is often used in the medical and health research [5].

Before the test tube was being used, it was labeled according to the concentration of the solution. The concentration of the solution were 50%, 25%, 12.5%, 6.25%, 3.12%, 1.56%, 0.78%. The preparation of solution with concentration 50% was done by mixing 4 grams of kersen leaves extract with 4 ml DMSO 10% in the test tube, stirred with a glass stirrer until homogeneous. For the solution with concentration 25% was carried out by mixing 2 ml of solution with concentration 50% and 2 ml DMSO 10%, then stirred until homogeneous.

The preparation of the other solution with lower concentration was done by mixing 2 ml of the solution from the previous test tube and 2 ml of DMSO 10%. After the last concentration of 0.78% was obtained, a 2 ml solution from the test tube 0.78% was taken and discarded because it was not used [6]. The positive control group was using 2 ml of chloramphenicol, while a negative control group was using 2 ml of DMSO 10%. Chloramphenicol is often used for the treatment against *A. hydrophila* and has strong efficacy in inhibiting the growth of *A. hydrophila* [7].

Minimum Inhibitory Concentration (MIC) with difusion methods: Before the Minimum Inhibitory Concentration (MIC) test of kersen leaves extract was done, the preliminary experiment was carried out to determine efficacy of young and old kersen leaves extract against *A.hydrophila* [4]. The efficacy test of antibacterial activity carried out using disk diffusion test. The extract that used in prelimenary experiment was kersen leaves extract with concentration 100%.



Figure 1: The efficacy test of antibacterial activity of young and old kersen leaves extract. Explanation: Arrow sign = inhibitory zone

Minimum Inhibitory Concentration (MIC) with disk difusion methods: The paper disks were soaked in kersen leaves extracts with various concentrations. After ± 15 minutes, paper disks were taken aseptically using laboratory tweezers, then aerated in room temperature ± 3 minutes until dried. Paper disks were placed and slightly pressed onto the surface of the bacterial media (one medium was given one disk paper). All tested media were incubated at 28º C for 24 hours and the inhibitory zones were measured using a ruler. The minimum inhibitory concentration (MIC) was measured by subtracting the overall diameter of the paper disks and inhibitory zones with the diameter of the disk paper[8].

Minimum Bactericidal Concentration with Streak Method: Minimum Bactericidal Concentration (MBC) with streak method was carried out to determine the bactericidal ability of kersen leaves extract. The test was carried out by adding 1 ml of liquid isolate of *A. hydrophila* with a density of 10^7 cells/ml into each extract solution and the control group, then it was homogenized. The mixture of bacteria colony and the solution was taken using Ose needle and streaked to TSA plates, then incubated at 28ºC for 24 hours. If the bacteria was occurred in TSA plates, it shows that the extract solution did not have ability to kill the bacteria. If there is no presence of bacteria in TSA plated, it shows the extract solution had ability to kill bacteria [9].

Results

Table 1: Minimum Inhibitory Concentration (MIC) of Kersen leaves extract

No.	Concentration of young Kersen leaves extract	Diameter of inhibitory zone (mm)
1.	0,78%	0
2.	1,56%	2
3.	3,12%	5
4.	6,25%	6
5.	12,5%	9
6.	25%	14
7.	50%	15
8.	Positive control (chloramphenicol)	20
9.	Negative control (DMSO 10%)	0

The young kersen leaves extract at concentration of 0.78% shows no inhibition zone was seen. That was meant the extract with concentration of 0.78% could not inhibit the growth of *A. hydrophila*. The antibacterial activity of young kersen leaves extract was seen at concentration of 1.56%, characterized by the presence of inhibitory zones around the disk paper. The higher concentration of young kersen leaves extract, the larger the inhibitory zone that appeared around the disk paper [10]. Chloramphenicol was used as a positive control, while the negative control using DMSO 10%. In positive control group shows a very large inhibitory zone that was 20 mm, while the negative control group did not show any antibacterial activity, so there was not found any visible inhibitory zone around the disk paper. The results shows that the minimum inhibitory concentration of young kersen leaves extract that approaching positive control was the extract at concentration 50%.

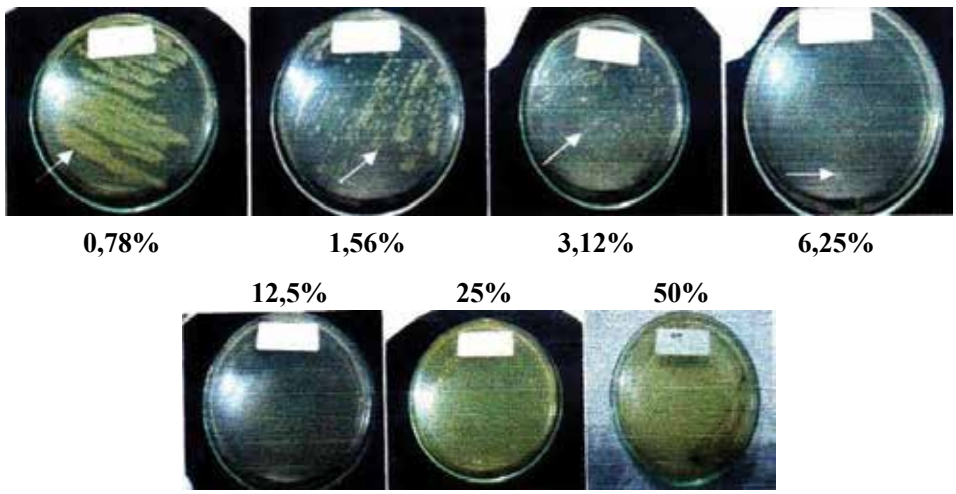


Figure 2: Minimum Bactericidal Concentration (MBC) of young kersen leaves extract. Explanation : Arrow sign = *A. hydrophila* bacterial colony

Figure 2 shows the growth of *A. hydrophila* is indicated by an arrow sign. In TSA plate with a concentration of 12.5%, 25%, and 50%, there was no bacterial growth. That shows at these concentration young kersen leaves extracts had ability to kill bacteria. It can be concluded, the minimum concentration of young kersen leave extract which can kill *A. hydrophila* is 12.5% [11].

Discussion

The results of this study shows that the bacteria that the identified bacteria are *A. hydrophila* (Table 1). In Figure 1, reddish-colored bacteria shows the bacteria is gram-negative and rod-shaped bacteria. *A. hydrophila* was gram negative bacteria, facultative anaerobes, rod shaped in 0.3-1.0 x 1.0-3.5 µm which moved with flagellum, had fermentative oxidative characteristic [12]. Catalase, H_2S, indole, β-galactosidase, oxidation occurs, but not on ornithin, decarboxylase and or phenylalanine, deaminase. There was a positive result, but it did not occur in the methyl red test[13]. In bacteria culture was done, the bacterial colonies on the media appeared creamy on agar media.

Table 1 shows the higher of concentration of kersen leaves extract, the greater its ability to inhibit bacteria growth. The positive control group used chloramphenicol

treatment, because it is often used for the treatment of infection caused by *A. hydrophila* and very strong inhibits the growth of *A. hydrophila* [13]. The negative control group used DMSO, because its properties are neutral and does not damage cells [5].

Raho and Benali (2012) states in their research that the provisions that indicate the antibacterial strength of chloramphenicol as followed the inhibitory zone <12 mm indicated weak, 13-17 mm indicated medium, and > 18 mm indicates as very strong [11]. The results in this study shows the chloramphenicol had antibacterial strength that very strong, it resulted in 20 mm of diameter inhibitory zone. Whereas the MIC test results of kersen leaves extract when compared to chloramphenicol were included in medium categoriy, it resulted in 15 mm of diameter inhibitory zone. Young kersen leaves extract at the concentration of 0.78% shows no inhibitory zone, because the concentration was very low, so it was not able to inhibit the growth of *A. hydrophila* [14].

The content of flavonoids on the extracts resulted in inhibition bacterial growth. The action of flavonoids as antibacterial is by releasing transduction energy towards the cytoplasmic membrane of bacteria and inhibiting bacterial motility. In addition, tannin compounds also play a role in inhibiting bacterial growth. Tannin compounds can interfere cell permeability because it has ability to shrink cell walls or cell membranes [15].

The Minimum Bactericidal Concentration (MBC) is defined as the lowest concentration that capable of killing bacteria. It determines the concentrations of the extracts that provide clear zones without microbial growth in the agar media by visual observation [16]. In this study, that was not found any bacterial growth in agar media with the extract at a concentration of 12.5%. Tannin and saponin compounds increase antibacterial effect.

The extract at concentration < 6.25% did not have the ability to kill bacteria, but only inhibit the bacterial growth, as evidenced by the presence of colonies that weee still growing. The smaller concentration of the extracts, there were more colonies that appeared. Saponin compounds have the ability of lowering the surface tension of the cell walls. So when the surface tension is disturbed, the antibacterial substances will enter easily into the cell and disrupt the cell metabolism until the bacterial death occurs [17].

Conclusion

The kersen leaves extract had antibacterial activity against *A. hydrophila,* by in vitro study. The minimum inhibitory concentration of kersen leaves extract that approaching the positive control group was 50%, with a 15 mm of diameter inhibitory zone, in 24 hours incubation period. The minimum bactericidal concentration of kersen leaves extract against *A. hydrophila* bacteria was 12.5% in 24 hours incubation period.

Ethical Clearance: The research process did not involve any participants for object, instead only use diffusion method with kersen leaves and aeromonas bacteria. The process of research has been following principle based on the regulation of research ethic committee. This study implemented the basic principle ethics of respect, beneficence, nonmaleficence, and justice.

Conflict of Interest: The author reports no conflict of interest of this work.

Source of Funding: This study is done with author's funding only,

REFERENCE

1. Cahill MM. A Review Virulence factors in motile Aeromonas species. J Appl Bacteriol. 1990;69(1):1–16.
2. Zakaria ZA, Mohamed AM, Jamil NSM, Rofiee MS, Hussain MK, Sulaiman MR, et al. In vitro antiproliferative and antioxidant activities of the extracts of Muntingia calabura leaves. Am J Chin Med. 2011;39(01):183–200.
3. Sulaiman ZM, Somchit ZM, Thenamutha M, Kasthuri D. The in vitro antibacterial activity of Muntingia calabura extracts. Int J Pharmacol. 2006;2(4):439–42.
4. Fariestha GAK, Andayani S, Yanuhar U. Analysis of The Secondary Metabolite of Kersen Leaf Extracts (Muntingia calabura L.) and Its Potential as Anti-Bacteria to Inhibit Aeromonas hydrophila. Res J Life Sci. 2018;5(2).
5. Alfath CR, Yulina V, Sunnati S. Antibacterial Effect of Granati fructus Cortex Extract on Streptococcus mutans In Vitro. J Dent Indones. 2013;20(1):5–8.

6. Pradopo S, Sinaredi BR, Januarisca BV. Pandan Leaves (Pandanus Amaryllifolius) Aromatherapy and Relaxation Music to Reduce Dental Anxiety of Pediatric Patients. J Int Dent Med Res. 2017;10(3):933–7.

7. Chung J-G. Purification and characterization of an arylamine N-acetyltransferase from the bacteria Aeromonas hydrophilia. Curr Microbiol. 1998;37(1):70–3.

8. Liang C-C, Park AY, Guan J-L. In vitro scratch assay: a convenient and inexpensive method for analysis of cell migration in vitro. Nat Protoc. 2007;2(2):329.

9. Watanabe T, Katayama S, Matsubara M, Honda Y, Kuwahara M. Antibacterial carbohydrate monoesters suppressing cell growth of Streptococcus mutans in the presence of sucrose. Curr Microbiol. 2000;41(3):210–3.

10. Tanjung M, Tjahjandarie TS. Dihydroflavonols from the leaves of Macaranga recurvata and their cytotoxic and antioxidant activities. J Chem Pharm Res. 2014;6(7):90–5.

11. Zakaria ZA, Hazalin NAMN, Zaid SNHM, Ghani MA, Hassan MH, Gopalan HK, et al. Antinociceptive, anti-inflammatory and antipyretic effects of Muntingia calabura aqueous extract in animal models. J Nat Med. 2007;61(4):443–8.

12. Larka U-B, Ulett D, Garrison T, Rockett MS. Aeromonas hydrophilia infections after penetrating foot trauma. J Foot Ankle Surg. 2003;42(5):305–8.

13. Li W, Sun WX, Hu JF, Hong DW, Chen SL. Molecular characterization, polymorphism and expression analysis of swamp eel major histocompatibility complex class II B gene, after infection by Aeromonas hydrophilia. J Anim Plant Sci. 2014;24(2):481–91.

14. Tjahjandarie TS, Pudjiastuti P, Saputri RD, Tanjung M. Antimalarial and antioxidant activity of phenolic compounds isolated from Erythrina crista-galli L. J Chem Pharm Res. 2014;6(4):786–90.

15. Sibi G, Naveen R, Dhananjaya K, Ravikumar KR, Mallesha H. Potential use of Muntingia calabura L. extracts against human and plant pathogens. Pharmacogn J. 2012;4(34):44–7.

16. Lim TK. Muntingia calabura. In: Edible Medicinal And Non Medicinal Plants. Springer; 2012. p. 486–92.

17. Nirwana I, Rianti D, Soekartono RH, Listyorini RD, Basuki DP. Antibacterial activity of fig leaf (Ficus carica Linn.) extract against Enterococcus faecalis and its cytotoxicity effects on fibroblast cells. Vet world. 2018;11(3):342.

Could the Severity of Infected Gingiva in Pregnant Woman Affect the Quality of Life?

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ABSTRACT

Background: Observation carried out in early 2016 to a number of pregnant women in Community Health Center Surabaya found that more than 80% of pregnant women had infected gingiva or gingivitis. Pregnant women are susceptible to oral and dental disease. Oral heath problem could impact on oral health-related quality of life, includes physical pain, physical disability, psychological discomfort, functional limitation, and social disability.

Objective: The aim of this study was to analyze the influence of severity level of infected gingiva on oral health-related quality of life of pregnant woman.

Method: A cross-sectional study was conducted in 10 Community Health Centers Surabaya and involved 106 pregnant women. All of participants were examined regarding their severity level of infected gingiva, also answered the quality of life questionnaire.

Result: Lower quality life of pregnant woman were observed in woman presenting more severe infected gingiva level.

Conclusion: Oral health-related quality of life of pregnant woman were influenced by the severity level of infected gingiva.

Keywords: *gingivitis, pregnancy, quality of life, woman*

Introduction

Pregnant women have higher prevalence of gingivitis than non-pregnant women[1]. Pregnancy gingivitis affects 25-100% of pregnant women and occurs during 2nd to 8th month of pregnancy[2]. Indonesian Dental Association has recorded prevalence of pregnancy gingivitis 75-90% worldwide, meanwhile in Indonesia it is up to 5-10%[3,4]. In early 2016, initial survey upon pregnant women conducted at Community Health Center Surabaya found that more than 80% pregnant women had gingivitis. During pregnancy, progesteron level in body could be 10 fold higher than normal level. This kind of condition potentially increases certain pathogenic bacteria growth that lead to gingivitis[5].

There are several factors which could influence susceptibility of pregnant woman to gingivitis, such as gestational age, nutritional status and the presence of systemic disease i.e diabetes mellitus. Gestational age is associated with susceptibility of pregnancy gingivitis because of hormonal change such as an increase of estrogen and progesterone as gestational age increases[6]. Poor nutritional status of pregnant woman could decrease immunity against various diseases, particularly infectious disease. Malnutrition or poor nutritional status has synergistic relationship with infection, which means malnutrition deteriorates infectious disease, and infection deteriorates malnutrition[7]. Any changes in immune system and estrogen and progesterone level in 40% of pregnant women lead to gingivitis during pregnancy[5,8,9].

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Chronically and untreated pregnancy gingivitis could increase risk of premature birth and low birth weight (LBW) [10]. This is emphasized by National Health Survey 2002 which showed that 77% of pregnant women with gingivitis have preterm labor. In addition, in a study reported by Retroningrum 2006 carried out in Kariadi Hospital Semarang showed that pregnancy gingivitis had risk factor of low birth weight (LBW) as 8,75 times higher than those without gingivitis[11].

Gingivitis as oral health problem frequently occurs during pregnancy could impact on individual well-being such as physical pain, physical limitation and psychological discomfort. Impact of oral health condition on quality of life is evaluated and defined as Oral Health-Related Quality of Life (OHRQoL). United States Surgeon General's report defined oral health-related quality of life as a multidimensional concept that describe oral health–related comfort during eating, sleeping and involving in social interaction. Acharya et al stated that periodontal disease in pregnant woman lead to poor oral health-related quality of life[12].

According to previous study, it has been found impact of gingivitis during pregnancy on oral health-related quality of life, but the lack of available data about that in Indonesia is the underlying reason to investigate correlation between severity level of pregnancy gingivitis and oral health-related quality of life of pregnant woman.

Material and Method

This study was analytical observational quantitative study with cross sectional study design, aiming to investigate correlation between risk factors and effect. The samples were chosen using cluster random sampling method, resulting of 106 pregnant women as respondents in 10 Community Health Center Surabaya. All the procedures in this study were conducted according to the approval of Ethical Commission.

This study had inclusion and exclusion criteria. Inclusion criteria included: (1) pregnant woman without dental calculus; (2) never have gingivitis before pregnancy; (3) without systematic disease, such as diabetes mellitus; (4) pregnant woman on early first trimester, late first trimester, early second trimester, late second trimester, early third trimester, and late third trimester; (5) regularly consuming high-fiber containing food (vegetables and fruits). Exclusion criteria of study included: (1) pregnant woman with dental calculus; (2) with history of gingivitis before pregnancy. (3) with systemic disease, i.e diabetes mellitus. (4) irregular high-fiber containing food (vegetables and fruits) consumption.

This study employeed questionnaire form as instrument to know respondents data and Oral Health Impact Profile (OHIP-14). Also, gingival index form to assess severity level of gingivitis. Oral Health Impact Profile (OHIP-14) questionnaire form have been modified spesifically to know level of oral health-related quality of life of pregnant woman. Before questionnaire modification, translation of instrument had been done first. After translating instrument of oral health-related quality of life of pregnant woman, researcher did validity and reliability test. During validity and reliability test, questionnaire instrument was distributed with cluster random sampling to pregnant women in Maternal and Child Health (MCH) Clinic, Community Health Center Surabaya.

Questions in questionnaire of oral health-quality of life consisted of 7 dimensions, as follows: 1. Dimension of functional limitation; 2. Dimension of physical pain; 3. Psychological discomfort; 4. Physical disability; 5. Psychological disability; 6. Social disability; 7. Handicap. In that questionnaire, respondent would be asked how frequent they had gum impairment during pregnancy using Likert scale. The choices of answer of questions in oral health-related quality of life of pregnant woman questionnaire were "very often", "fairly often", "sometimes", and "vever" with score as 1, 2, 3, and 4, respectively. The higher the score, the better the quality of life.

Selected pregnant women were given informed consent as their approval to participate as study sample. After that, intraoral examination was done using periodontal probe and mouth mirror to see the severity level of gingivitis in respondents, and recorded on gingival index. This study received ethical approval from Ethics Committee Faculty of Dental Medicine, Universitas Airlangga. For analysis, distribution table was used with percentage as confirmation. Present study employeed correlation test to analyze correlation between pregnancy gingivitis and oral health-related quality of life of pregnant woman.

RESULT

In this study, characteristics of pregnant women in Community Health Center Surabaya had been known, such as: age, level of education, employement status, monthly income, gestational age and maternal mid-

upper arm circumference (MUAC). In terms of age, mean age of pregnant woman was 28 years, most of them aged 24-32 years (59.5%). Majority of respondents had ever attended level of education minimum Senior High School (67.9%). Most of them (68.9%) were unemployeed. Monthly income of respondents was under five million rupiahs (97.2%). Most respondents examined in Community Health Center belonged to low and moderate economic class, and 50.9% had third trimester of gestational age with mean age approximately 24 years. Majority of MUAC were 23.5 cm (88.7% of total respondents), and mean MUAC was 28 cm. It showed that most pregnant women in Community Health Surabaya had good nutritional status.

Oral hygiene level of pregnant women (68.9% of total respondents) was classified as moderate with mean score by 2.4. Also, 47.2% of total respondents had moderate severity level of gingivitis, and mean score of gingival index was 1.3. Moderate level of gingivitis possibly could decrease oral health-related quality of life of pregnant woman, thus results in low OHIP-14 score.

Table 1: Value of correlation coefficient and significance level of pregnancy gingivitis on each item of Oral Health Impact Profile-14

Dimension	Item	Correlation coefficient (r)	Significance level (p)
Functional limitation	Difficulty in pronouncing any words	- 0.047	0.631
	Sense of taste impairment	- 0.226*	0.020
Physical pain	Painful aching on gum	- 0.187	0.055
	uncomfortable to eat any foods	- 0.134	0.171
Psychological discomfort	Feeling self conscious	- 0.175	0.073
	Feeling tense	- 0.082	0.405
Physical disability	Unsatisfactory diet	- 0.199*	0.041
	Interrupted meal	- 0.283*	0.003
Psychological disability	Difficult to relax	- 0.253*	0.009
	A bit embarrassed	- 0.078	0.428
Social disability	Difficulty in doing usual jobs	- 0.197*	0.043
Handicap	Totally unable to function	- 0.167	0.086

Tabel 2: Value of correlation coefficient and significance level of pregnancy severity on oral health-related quality of life of pregnant woman

Variable	Correlation coefficient (r)	Significance level (p)
Quality of life score (OHIP-14)	- 0.327*	0.001

Table 1 shows that there is correlation between severity level of pregnancy gingivitis and oral health-related quality of life of pregnant woman particularly in dimension of functional limitation, physical disability, psychological disability, and social disability.

Table 2 shows that there is significant correlation between severity level of pregnancy gingivitis and oral health-related quality of life of pregnant woman. This is negative correlation which means the higher the severity level of gingivitis, the lower the quality of life, and vice versa.

Discussion

As presented on study result, the severity level of pregnancy gingivitis in Surabaya according to Loe & Silness gingival index was moderate, and oral hygiene status was classified as moderate. On third trimester of pregnancy, estrogen and progesterone level increases, thus vascularization and blood vessel permeability of gingiva is also increased[13]. The presence of debris and calculus is overresponded by gingiva that leads to gingival inflamation, redness and easily bleeding. It shows that hormonal factor could worsen plaque bacteria as local factor[14].

Pregnancy gingivitis is one of oral diseases that frequently affects pregnant woman particularly on 2nd to 8th month of pregnancy[2]. This is confirmed by present study result that demonstrated 54 of 106 pregnant woman had gingivitis on third trimester of pregnancy. Pregnancy

gingivitis could present some clinical manifestations which may influence daily activities and quality of life[15]. One of instruments used to assess oral health-related quality of life is *Oral Health Impact Profile* 14 (OHIP – 14). OHIP – 14 is a multidimensional concept which describes comfort during eating, sleeping, and socially interacting[16]. According to the present study result, mean score of oral health-related quality of life of pregnant woman in Community Health Center Surabaya was fairly good.

The presence of oral health impairment may impact significantly on physical, psychological and social well-being, thus influences quality of life. Impairment in oral cavity such as periodontal disease e.g life-threatening impairment on gingiva may contribute to preterm birth and low birth weight, influence respiratory disease, gastrointestinal, stress and decrease immune system againts infection[17,18]. The presence of gingival problems may lead to stress, therefore it could make patient afraid, anxious, having painful aching and discomfort. If it is untreated, quality of life will be influenced[17].

In this study, the severity level of pregnancy gingivitis had influence on quality of life particularly in dimension of functional limitation, physical disability, psychological disability, dan social disability. Dimension of functional lmitation includes sense of taste impairment, thus appetite is decreased. Decreased appetite will infuence intake of vitamin A and fiber which is highly required by pregnant women, particularly fruits and vegetables, consequently in addition to promote gastrointestinal disorder, of course it will impact on comprehensively maternal and fetal health[17].

Dimension of physical disability includes discomfort in eating any foods, which means the higher the severity level of pregnancy gingivitis, the more uncomfortable in eating any foods, and vice versa. Beside physical disability, severity level of pregnancy gingivitis also impact on meal process, which could lead to interrupted meals. It shows that the higher the severity level of pregnancy gingivitis, the more frequent they have interrupted meals. Impairment in dimension of functional limitation and physical disability is caused by clinical manifestation of pregnancy gingivitis such as gingival enlargement on papilla of one or two teeth that may interfere mastication[19]. It is crucial for pregnant woman to maintain oral health in order to masticatory function keep maintained, thus nutrition intake, dental and overall health of pregnant woman are maintained in good condition[20].

Dimension of psychological disability includes being difficult to relax, which means the higher the severity level of pregnancy gingivitis, the more difficult pregnant woman relaxed. Bleeding gingiva is one of discomfort that commonly occur during pregnancy. This condition is normal and not life-threatening, but for most of pregnant women it may cause anxiety so that they are difficult to relax[21]. Gingival enlargement particularly in anterior region as clinical manifestation of gingivitis may also impact on psychological aspect[22]. Gingival problems will impact on communication process because oral structure is the important part of verbal and non-verbal communication, hence it may influence self image and ability to survive and build social relation[17].

Dimension of social disability includes difficulty to do usual jobs, which means the higher the severity level of pregnancy gingivitis, the more difficult pregnant woman to do usual jobs. Gingival problems may cause pain and discomfort during activities, thus it could decrease work productivity[17]. The severity level of pregnancy gingivitis has significant correlation with oral health-related quality of life of pregnant woman. Therefore, if the severity level of pregnancy gingivitis is high, oral health-related quality of life of pregnant woman will be low, and vice versa.

Conclusion

Based on study result and discussion, it has been known that there is negative correlation between the severity level of pregnancy gingivitis and oral health-related quality of life of pregnant woman, which means the higher the severity level of gingivitis, the lower the quality of life and vice versa.

Conflict of Interest: No potential conflict of interest was reported by the authors.

Source of Funding: The current research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical Clearance: All the procedures in this study were conducted according to the approval of Ethical Commission.

REFERENCES

1. Mital P, Amit, Raisingani D, Mital P, Hooja N, Priyanka. 2013. Dental Caries and Gingivitis in Pregnant Women. *Scholars Journal of Applied Medical Science*; (6): 718-723.
2. Rieken SE & Terezhalmy GT. 2006. The Pregnant and Breast-feeding Patient. *Quintessence International*; 37(6): 457-9.
3. Kartiningrum ED. 2014. Kesehatan Gigi Ibu Hamil di Puskesmas Kedungsari Kabupaten Mojokerto. *Medica Majapahit*; 6(1): 99.
4. Soulissa AG. 2014. Hubungan Kehamilan dan Penyakit Periodontal. *Jurnal PDGI*; 63(3): 72.
5. Gürsoy M, Pajukanta R, Sorsa T, Könönen E. Clinical changes in periodontium during pregnancy and post-partum. J Clin Periodontol 2008;35:576-83.
6. Atmosukarto K & Rahmawati M. 2003. Mencegah Penyakit Degeneratif dengan Makanan.*Cermin Dunia Kedokteran*;(140): 41-45.
7. Siagian, A., 2010. *Epidemiologi Gizi.* Erlanggga. Jakarta.
8. Laine MA. Effect of pregnancy on periodontal and dental health. Acta Odontol Scand 2002;60:257-64.
9. Barak S, Oettinger-Barak O, Oettinger M, Machtei EE, Peled M, Ohel G. Common oral manifestations during pregnancy: A review. Obstet Gynecol Surv 2003;58:624-8.
10. Newman MG, Takei H, Klokkevold PR and Carranza FA. 2012. *Carranza's Clinical Periodontology.* 11th ed. China: Elsevier health service. pp. 414-6.
11. Hartati, Rusmini, Waluyo BT. 2011. Analisis Faktor-Faktor Yang Berhubungan Dengan Kejadian Gingivitis Pada Ibu Hamil Di Wilayah Kerja Puskesmas Talang Tegal. *Jurnal Ilmiah Kesehatan Keperawatan*; 7(3): 171-172
12. Acharya S, Bhat PV, Acharya S. 2009. Factor Affecting Oral Health-Related Quality Of Life Among Pregnant Women. *Int J Dent Hygiene*; 7: 102-107.
13. Perry DA, Beemsterboer PL. 2007. *Periodontology for the Dental Hygienist*. 3rd ed.St. Louis, Missouri: Saunders Elsevier. pp. 103, 108-109.
14. Little JW, Falace DA, Miller CS, Rhodus NL. 2008. *Dental Management of the Medically Compromised Patient*. Philadelphia: Mosby Elsevier. p. 276.
15. Barbosa TDS, Gaviao MBD, Mialhe FL. 2015. Gingivitis and oral health – related quality of life : a systematic literature review. *Brazilian Dental Science*; 18 (1): 7 – 15.
16. Simona G, Silvia M, Carina B. 2014. Quality of Life Regarding Patient with Periodontal Disease in Iasi, Romania. *Procedia – Social and Behavioral Science;* 127 : 15- 20.
17. Larasati R. 2012. Hubungan Kebersihan Mulut dengan Penyakit Sistemik dan Usia Harapan Hidup. *Jurnal Skala Husada;*9(1) : 97 – 104.
18. Wangsahardja K, Dharmawan OV, Kasim E. 2007. Hubungan Antara Status Kesehatan Mulut dan Kualitas Hidup Pada Lanjut Usia. *Universa Medicina;* 26(4) : 186 -193.
19. Bimo R. 2009. *Kebersihan Mulut Mempengaruhi Adanya Gingivitis Pada Ibu Hamil*. Fakultas Kedokteran Gigi Universitas Airlangga : 1 – 9.
20. Kemenkes. 2012. *Pedoman Pemeliharaan Kesehatan Gigi dan Mulut Ibu Hamil Dan Anak Usia Balita Bagi Tenaga Kesehatan di Fasilitas Pelayanan Kesehatan.* Hlm. 15 – 16.
21. Ummah F. 2014. Ketidaknyamanan Pada Sistem Pencernaan Ibu Hamil Berdasarkan Trimester Kehamilan Di BPM Hj. Siti Murtiningsih Desa Babat Kecamatan Babat Kabupaten Lamongan. *Surya;*3(12) : 1 – 6.
22. Zanatta, FB, Ardenghi, TM, Antoniazzi, RP, Pinto, TP, &Rösing, CK 2012, Association between gingival bleeding and gingival enlargement and oral health-related quality of life (OHRQoL) of subjects under fixed orthodontic treatment: a cross-sectional study. *BMC Oral Health* 12(1) :53-62.

Age and Education Distribution Patterns of Working Mothers on Dental Health Behavior in Preschool Children in Mid-Class Society

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ABSTRACT

Background: Dental caries is a common disease in children which if left untreated, it may affect weight, growth and the quality of life in childhood. The behavior of parents, especially mothers, affects the children's oral health, because mothers aside of being the decision maker for the children, they also have careers.

Objective: This study aimed to analyze the relationship between age and education of working mothers on dental health behaviors in pre-schooled children aged 5-6 years.

Method: This was a cross-sectional study, involving working mothers who have children aged 5-6 years in Banjarbaru, South Kalimantan. The number of respondents was 101 working caregivers, that was chosen by means of a cluster random sampling technique. The data were obtained through interview and questionnaire. The results were analyzed statistically using logistic regression test with a significance value of $p<0.05$.

Results: There was no significant relationship between age and education of working mothers on dental health behaviors in preschoolers.

Conclusion: The age and education of working mothers are not related to dental health behavior in preschool children in Banjarbaru South Kalimantan.

Keywords: *age, education, mother behavior*

Introduction

The World Health Organization (WHO) stated that 60-90% of school children worldwide suffered from caries[1], a common disease which if untreated, it may affect weight, growth, and quality of life, especially in childhood[2]. Basic Health Research in 2013 stated that dental and oral health in Indonesia remained quiet apprehensive. The high prevalence of dental and oral health problems was found in South Kalimantan Province (36.1%), making it the second highest after South Sulawesi (36.2%)[3]. Previous research, analyzing the relationship of dental caries with the quality of life in school children aged 5-7 years in Landasan Ulin Sub-district, Banjarbaru, South Kalimantan proved the average of primary tooth suffering dental caries as many as 9 teeth per children[4]. Parents have main role in providing the information and encouraging a healthy living. The knowledge, beliefs, and attitudes of parents affect oral health, eating habits and the health behaviors of children[5]. Parental behavior, especially mothers, affects the oral health of children because mother acts as a primary caregiver and the ultimate decision maker[6,7]socioeconomic status, oral health behaviors of children and their parents. Oral health status of children was examined. The parent and their children oral health relationship were tested using regression and correlation analysis. Results. About 222 parents and

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children participated in the study. There was a significant relationship between history of having dental problems in parents and dmft index in their children (P = 0.01.

The Central Bureau of Statistics in Banjarbaru, South Kalimantan, stated that in 2015, 62.45% of women worked as a bureaucrat. Women working in the public sphere for economic and social motivation; to increase family income and not depend on husband[8], while the social motivation are education level, free time, seeking for experience and self-actualization[9]. The socio-economic status of the family greatly affects the family's need compliance to achieve a prosperous standard of living and maximum health[10].

Working women in Banjarbaru are classified to middle-class society for having a fixed income and well educated. Middle-class society is a social class with occupation and fixed income, modern society which is economically prosperous, and well-educated and considered as an important person by the surrounding society[11]. Health behavior is formed by three main factors; predisposing factors, namely knowledge, attitude, belief, values, age, education, occupation, and family economic status. The second are supporting factors are the physical environment, health facilities and infrastructure and health program. The last is supporting factor of the attitudes and actions of health workers or others who become role models[12].

The purpose of this study was to analyze the relationship between age and education of working mothers on the dental health behavior of preschool children aged 5-6 years in Banjarbaru, South Kalimantan.

Method

The study was approved by the Medicine Health Research Ethical Clearance Commission (016/HRECC. FODM/III/2018). Each respondent who participated in the study had consented to voluntary informed consent. Respondents in this study were educated working mothers aged 21-40 years.

Research Design: This cross-sectional study was conducted on 101 working mothers in Banjarbaru. Sampling was done by cluster random sampling. Sample criteria were mothers who worked and had preschool children aged 5-6 years. Data was obtained using questionnaires. Instrument behavior consisted of 6 statements that contained the behavior of mothers in the dental health of preschool children aged 5-6 years. Each answer was given with a score of 0-1.

Statistical Analysis: Data were analyzed using SPSS 16 for Windows. Nonparametric Descriptive Statistics used logistic regression with the level of significance value was <0.05.

Results

There were two independent variables, age and education, and one dependent variable, the behavior of the dental health of the mother. All variables can be seen in Table 1. There were 33 (32.7%) working mothers aged 21-30, 68 persons with age 31-40, 22 persons (21.8%) with low education, and 79 persons (78.2%) with high education. Analysis using SPSS version 16 Software for Windows showed that there was no significant relationship between educated working mothers' age on dental health behaviors of a preschooler. The results can be seen in Table 2.

Table 1: Distribution of age and education of working mothers in Banjarbaru

Variables	Category	Total	Percentage
Age of caregiver	21-30 years	33	32.7
	31-40 years	68	67.3
Education of caregiver	Low	22	21.8
	High	79	78.2
Total		101	100

Table 2: Cross-tabulation of the relationship between age and education of working mothers on dental health behavior in preschool children aged 5-6 years in Banjarbaru

Mother behavior		Age				Education			
		21-30	31-40	OR	Sig.	Low	High	OR	Sig.
		%	%			%	%		
Telling children to clean their teeth after meal	Bad	78.8	77.9	0.963	0.945	81.8	77.2	1.348	0.647
	Good	21.2	22.1			18.2	22.8		
Having their children clean their teeth before going to bed at night	Bad	60.6	51.5	1.297	0.574	63.6	51.9	1.647	0.468
	Good	39.4	48.5			36.4	48.1		

Conted…

Cleaning teeth every morning after breakfast and night before bed	Bad	48.5	39.7	1.313	0.550	50	40.5	1.320	0.591
	Good	51.5	60.3			50	59.5		
Allowing children to eat snacks every day	Bad	36.4	42.4	0.802	0.635	36.4	41.8	0.869	0.791
	Good	63.6	57.4			63.6	58.2		
Telling children to use toothbrushes and toothpaste every day	Bad	9.1	17.6	0.75	0.684	0	19	0.000	0.998
	Good	90.9	82.4			100	81		
Having their children rinse after eating	Bad	78.8	60.3	2.678	0.063	68.2	65.8	0.758	0.625
	Good	21.2	39.7			31.8	34.3		

Mother's behavior in telling children to clean teeth after every meal had no significant relationship with age (p = 0,945, OR = 0.963) and education (p = 0,647, OR = 1,348). At the age of 21-30 years old, mother's behavior on dental health was mostly bad as much as 78.8% with low level of education equal to 81.8%, whereas at age 31-40 years old, mother's behavior on dental health was mostly bad as much as 77.9% with high education level of 77.2%. Mother's behavior in telling children to clean teeth before bedtime had no significant relationship with age (p = 0.574, OR = 1.294) and education (= 0.468, OR = 1.467). At the age of 21-30 years old mother's behavior toward dental health was mostly bad as much 60,6% with low education level equal to 63.6%, whereas at age 31-40 years old, mother's behavior to the dental health of child was mostly bad as much 51,5% with the higher education level of 51.9%. The behavior of mothers to clean the teeth every morning after breakfast and the night before bed had no significant relationship with age (p = 0.55, OR = 1.313) and education (p = 0.591, OR = 1.32). At the age of 21-30 years old, mother's behavior toward dental health of children was mostly good as much as 51.5% with low education level of 50%, whereas, at age 31-40 year, majority of mother behavior to dental health of child was mostly good as much as 60.3% with education level high of 59.5%. The behavior of mothers who let children eat a snack every day had no significant relationship with age (p = 0.635, OR = 0.802) and education (p = 0.869, OR = 0.998). At the age of 21-30 years old, mother's behavior toward dental health of children was mostly good as much as 63.6% with low education level equal to 63.6%, whereas at age 31-40 years old, mother's behavior to dental health of child was mostly good as much as 57,4% with high education level of 58.2%. Mother's behavior in telling children to use toothbrush and toothpaste every day had no significant relationship with age (p = 0.684, OR = 0.75) and education (p = 0.999, OR = 0.000). At the age of 21-30 years old, mother's behavior toward dental health of children was mostly good as much as 90.9%, although they had low education, Whereas, at age 31-40 years old, mother's behavior to dental health of children was mostly good as much as 81% with high education level equal to 58.2%. The mother's behavior of having a mouthwash after eating had no significant relationship with age (p = 0.063, OR = 2.676) and Education (p = 0.625, OR = 0.758). At the age of 21-30 years old, mother's behavior toward dental health was mostly bad as much as 78.8% with a low level of education equal to 68.2%. Whereas, at age 31-40 years old, mother's behavior to the dental health of children was mostly good as much as 60.3% with the high education level of 65.8%.

Discussion

According to the literature, behavior building is affected by attitude and knowledge, which can be gained from both formal and non-formal education[13]. Previous studies stated that education level reflect knowledge and skills to make health behavior choices[14,15]. The mothers' dental health behavior is an important factor in building the children's dental health behavior[6,14]socioeconomic status, oral health behaviors of children and their parents. Oral health status of children was examined. The parent and their children oral health relationship were tested using regression and correlation analysis. Results. About 222 parents and children participated in the study. There was a significant relationship between history of having dental problems in parents and dmft index in their children (P = 0.01. Education may have various impact on individual, depend on personality, social environment, culture, and perception. Besides, education also increase the career opportunity. The working environment in public sector has high pressure that may induce stress, and affecting a person behavior, hence, behavior is more influenced by personality of a person than the level of

education[16,17]. The result is in accordance with previous research which showed that the level of education does not affect the working mother's behavior toward the dental health of preschool children aged 5-6 years. Education is a program to develop personality and abilities that last a lifetime. The higher education, the easier the person to receive information. The more information that comes in, the more the knowledge gained. Knowledge is very close to education, so it is expected that someone with higher education will have better knowledge, including health care[12,18].

Table 2 showed that the mother's behavior toward child's dental hygiene is not correlated to education. Lack of knowledge and access to information, causing a person to have limited knowledge about the hazard of unhealthy behavior so less motivation to adopt healthy behavior[16]. Learning process may enhance professional skills and specific knowledge that are still relevant to general knowledge[19]. Education plays an important role in caries prevention. Parents with higher education had more concern to the oral health of children, that make them have a better oral health behavior[20,21]. Behavior is the biggest factor affecting one's health. Developmental psychology states that the age of 18-40 years is an early adulthood. As getting older, the maturity and strength of a person will be more mature in thinking and work[22]. Danang and Irdawati stated that age is one of the factors that influence mothers to be able to run the role of optimal care. The age of the mother or the parent who has reached maturity in thinking and being able to properly educate and nurture the child will be able to reach the stage of development according to his time[23,24].

Working mother's behavior towards spending more time at work than at home. This causes the mother to have little time with the children so that the oral hygiene practice of children is sometimes neglected because of the activities. Based on the data obtained, it was shown that the mother who worked in the city of Banjarbaru, South Kalimantan aged 21-40 years old had high education. Supposedly, with age, a person has better knowledge about dental and mouth health, so that the practice of oral hygiene is also good. However, in this study different things were obtained that the age and level of education had no relationship with the behavior of working mothers on the dental health behavior of preschool children aged 5-6 years in Banjarbaru, South Kalimantan. Working mothers have high stress because of their work[16,17]. Exhaustion after work tends to make mothers do not care about the dental and oral health of children. This is in accordance with the results of a study that states that good knowledge was not always directly proportional to the pattern of parenting[6,24–26]socioeconomic status, oral health behaviors of children and their parents. Oral health status of children was examined. The parent and their children oral health relationship were tested using regression and correlation analysis. Results. About 222 parents and children participated in the study. "There was a significant relationship between history of having dental problems in parents and dmft index in their children (P = 0.01", meaning that although the mother has a good knowledge about oral health, it does not necessarily make her have a good attitude to apply the knowledge.

Conclusion

Age and education of working mothers do not affect dental health behaviors in preschool children aged 5-6 years in healthcare prevention and maintenance efforts. However, the personality of the caregiver affects this behavior. Caregivers who work tend to have a high level of stress so that after coming home from work, the behavior that appears is the behavior as it is, meaning not so concerned about the dental health of children.

Conflict of Interests: None declared

Source of Funding: This research is self-funded.

REFERENCES

1. Cheng C, Huang K, Chen C, IJ Y. Correlation Between Dental Caries and Diet, Oral Hygiene Habits, and Other Indicator among Elementary School Students in Xiulin Township, Hualien County, Taiwan. Tzu Chu Med J. 2011;26:176–81.
2. Wigen I, Wang N. Parental Influence on Dental Caries Development in Preschool Children an Overview with Emphasis on Recent Norwegia Research. Nor Epidemiol. 2012;22:13–9.
3. Kemenkes RI. Riset Kesehatan Dasar 2013. Minist Heal Repub Indones. 2013;(1):1–303.
4. Nurwati B. Hubungan Karies Gigi Dengan Kualitas Hidup Pada Anak Sekolah Usia 5-7 Tahun Di Kecamatan Landasan Ulin Kota Banjarbaru Kalimantan Selatan. 2015.

5. Shetty D, Rat S, Tamkar. Influence of mother oral health care knowledge on the oral health status of their child. Saudi J Oral Sci. 2016;3(1):12–5.

6. Bozorgmehr E, Hajizamani A, Malek Mohammadi T. Oral health behavior of parents as a predictor of oral health status of their children. ISRN Dent [Internet]. 2013;2013:741783. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi? artid = 3664493 & tool = pmcentrez & rendertype = abstract

7. Talekar RG, Slade D, Ennet. Parental Perception of Their Preschool-aged children's Oral Health. J Am Dent Assoc. 2005;136:364–72.

8. MLEE R, T M, Sumarlan. Wanita Dalam Dunia Kerja. Bandung: Alfabeta; 2012.

9. Ardilla F, Ellyn N, Hastuti P. Motivasi Wanita Pekerja di Industri Kecil dan Rumah Tangga (IKRT) Kain Sasirangan Kelurahan Seberang Mesjid Kecamatan Banjarmasin Tengah Kota Banjarmasin. J Pendidik Geogr. 2015;2(5):1–14.

10. Julaiha. Pengaruh Status Sosial Ekonomi Keluarga Terhadap Minat Melanjukan Ke Perguruan Tinggi. 2015.

11. Program Studi Bimbingan Konseling FKIP Universitas Islam Kalimantan Muhammad Arsyad Al Banjary Banjarmasin. J Mhs Bk An-Nur. 1(1):45–51.

12. Zhu D. Understanding Middle-Class Consumers from The Justification of Taste a Case Study of Beijing. J Chinese Sociol. 2016;3:4.

13. Budiharato. Pengantar Ilmu Perilaku Kesehatan Dan Pendidikan Kesehatan Gigi. Jakarta: EGC; 2013. 6 p.

14. Notoadmodjo. Promosi Kesehatan dan Ilmu Perilaku. Jakarta: Rinneka Cipta; 2005. 77-82 p.

15. Holley M S, Boganin S, Kilpatrick. Parental influence and development of Dental caries in Children Age Years: a Systematic Review of literature. J Dent. 2012;40:873–85.

16. Manna A, Carlen A, Lingstrom. Dental caries and Associated Faktor in Mother and Their Preschool and School Children A Cross-Sectional study. J Dent Sci. 2013;8:101–8.

17. Pampel F, Krueger P, Denney J. Socioeconomic disparities in health behaviors. Annu Rev Sociol. 2010;36:349–70.

18. Kawachi I, Subramanian S. Neighborhood influences on health. J Epidemiol Community Health. 2007;61(1):3–4.

19. Budiman, Riyanto A. Pengetahuan dan Sikap dalam penelitian Kesehatan. Kapita Selekta Kuesioner. Jakarta: Salemba Medica; 2013.

20. Pradono J, Sulistyowati N. Correlation between Education Level, Knowledge of Environmental Health, Healthy Behavior with Health Status Correlation Studi on People Aged 10-24 in Jakarta Pusat. Bull Penelit Kesehat. 2013;1:89–95.

21. Tamimi A, Pani C. Dietary and Geographic and Culture Factor as a Predictor of Dental Caries risk among Children in Saudi Arabia-A Systematic Review. Prim Heal Care. 2015;5(2):1000195.

22. Jain R, Oswal C, Chiguppi R. Knowledge, Attitude, and Practice of Mother toward Their Children's Oral Health: A questioner survey among subpopulation in Mumbai (India). J Dent Res Sci Dev. 2014;1(2):40–5.

23. Hurlock E. Psikologi Perkembangan. 5th ed. Jakarta: Erlangga; 2002.

24. Danan S, Irdawati. Hubungan antara Pola Asuh Orang Tua dengan Kemandirian Anak Usia Pra-Sekolah di Tk Aisyiyah Mendungan Sukoharjo. J Komun Kesehat. 2012;3(1):1–7.

25. Amin M, Nyachhyon P, Elyasi M, Nuami M. Impact of an Oral Health Education Workshop on Parents Oral Health Knowledge, Attitude and Perceived Behavioral Control Among African Immigrants. J Oral Dis. 2014;

26. Sanders M, Morawska A. Can Changing Parental Knowledge, Dysfunctional Expectations, and Attribution, and Emotion Regulation Improve outcomes for Children. Parenting Skill. 2014.

Relationship between Behavior and the Use of Personal Protective Equipment to Pesticide Consumer Farmers in Tonrong Rijang Village Baranti District Sidenreng Rappang District

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ABSTRACT

Agriculture is one of the most important areas. However agricultural life is closely related to the use of pesticides that can cause health problems. To minimize health problems is one effort that can be done with the use of a complete Protective Tools. The type of research used is an analytical survey with Cross Sectional approach with the population of rice farmers in Tonrong Rijang Village Baranti Subdistrict Sidenreng Rappang Regency as many as 334 HH with sample 67 HH. Determination of the number of samples in this study was determined by using Cluster method and data retrieval was done using Random Sampling Method. Data processing is done by using *Chi Square test* with SPSS 25, Microsoft excel, and Microsoft word. The results of this study explain that farmers with high knowledge level of 44 people (66%), who have high Protective toolsusage as many as 21 people (31%) and who have the use of PPE while as many as 23 people (34%). Farmers with a moderate level of knowledge of 23 people (34%), who had high Protective toolsusage of 7 people (11%) and those with PPE were 16 (24%). Farmers who have a high attitude (good) as many as 55 people (82%) who use high Protective toolsas many as 21 people (31%), while those using PPE were as many as 34 people (51%). Farmers who have moderate attitude (less good) as many as 12 people (18%) who use high Protective toolsas many as 7 people (10%) and who use PPE while as many as 5 people (8%). Based on result of chi square test that obtained is *p value* 0,173 (p value> 0,05) on knowledge and *p value* 0,2 (p value> 0,05) at attitude. So it can be concluded that there is no relationship between behavior with the use of personal protective equipment on pesticide user farmers in Tonrong Rijang Village Baranti Sub-District Sidenreng Rappang.

Keywords: *Farmer, Personal Protective Equipment, Knowledge, Attitude*

Introduction

Agriculture is one of the most important fields in fulfillment of a need for a society where Indonesia is an agricultural country that is predominately live in agriculture. The number of farmers reached 40% of the total workforce in Indonesia or about 46.7 million. With the growing population every year, people start to think to improve the results of its production in the agricultural sector, one of the ways they are the pesticide use to decrease the disruptor factors of production such as pests. [6].

Massive use of pesticides can cause health problem mainly on farmers sprayers. One of the impacts caused due to the use of pesticides are poisoning on rice farmers. One of the efforts to prevent pesticide poisoning on farmers is by the use of complete Protective self tools, such as masks, work clothes, boots, and gloves. [8]

The World Health Organization (WHO) said that the negative impact of pesticides for public health is highly toxic and dangerous. Direct contact with this acute toxicity risk pesticides or chronic. Headache, nausea, vomiting and so forth even irritation on the skin and blindness are symptoms of acute poisoning from pesticides. Data from the World Health Organization

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(WHO), 1-5 million cases of pesticide poisoning occur in workers in the agricultural sector where the majority of cases occur in developing countries that 20,000 inhabitants got fatal effect due to the use of pesticides[3].

Materials and Method

1. **The location of the research:** The location of the research conducted in the village of Tonrong Sub-district Baranti Flint District Sidenreng Rappang. The area of Tonrong village of Flint around 340 ha/m² with 1,318 inhabitants with 338 families.
2. **Population and Sample:** The population in this research is the entire rice farmers in the village of Tonrong Sub-district Baranti Flint District Sidenreng Rappang which is 334 Family. Determined using the method of Cluster and Data retrieval is performed using a Random Sampling Method based on the Joseph Muri Suharsimi Arikunto method[1] [4]. Sample were taken from 20% of the total population. Because the population is more than 100 people in the village of Tonrong Flint with calculation as follows:

- Dusun Mattonrong Salo : 191 KK
- Dusun Tonrong Rijang : 143 KK
  - 191 KK x 20 % : 38 KK
  - 143 KK x 20 % : 29 KK +

67 KK

3. **Data Analysis:** Data analysis was done using the table along with the discussion and concluded by using the Chi Square test using SPSS with 25, Microsoft excel, and Microsoft word.

Finding

1. The relationship between knowledge of the farmers with the use of protective self

Table 1: Distribution of Respondents based on knowledge of the Protective tools

Knowledge	Amount	Percentage(%)
High	44	66
Moderate	23	34
Low	0	0
Total	**67**	**100**

Source: Primary Data 2018

Table 2: The relationship between knowledge of the farmers with the use of the Protective Tools

		Penggunaan Protective Tools			Amount	P Value
		Low	Moderate	Higt		
Knowlege	High	0	23	21	44	0.173
	Moderate	0	16	7	23	
	Low	0	0	0	0	
Total		0	39	28	67	

Source: Primary Data 2018

2. The relationship between the attitudes of Farmers with the use of protective self

Table 3: Distribution of Respondents based on their attitude to Protective Tools

Attitude	Amount	Percentage (%)
High	55	82
Moderate	12	18
Low	0	0
Total	**67**	100

Source: Primery Data 2018

Tabel 4: Relation between attitude with the us of Protective tools

		Protective toolsuses			Amount	P Value
		Low	Moderate	High		
Attitude	High	0	34	21	55	0.2
	Moderate	0	5	7	12	
	Low	0	0	0	0	
Amount		0	39	28	67	

Source: Primary Data 2018

Table 5: Respondent distribution base on the use of protective tools

Protective toolsuses	Amount	Percentage (%)
High	28	42
Moderate	39	58
Low	0	0
Total	**67**	**100**

Source: Primary Data 2018

Discussion

1. **The relationship between knowledge of the farmers with the use of protective tools:** Based on the results of the study indicate that there is no significant relationship between knowledge with the use of protective toolson farmers in the village of Tonrong Sub-district Baranti District Sidenreng Rappang. It is based on the results of a test of chi square p is the value obtained 0.173 (p value 0.05 >). The results of this research shows that most farmers had a high level of knowledge 44 people (66%) and moderate level of knowledge are 23 people (34%). Where a Farmer has a high level of knowledge as much as 44 people (66%), which have a high use of Protective toolsas many as 21 people (31%) and who have moderate use of the Protective toolsare 23 people (34%). Farmers who have a moderate level of knowledge as much as 23 people (34%), which have a high use of Protective toolsas much as 7 persons (11%) and who have the use of the Protective toolsare as much as 16 people (24%).

   The results of this study are inconsistent with research Faris Khamdani [5] about the relationship between Knowledge and attitudes with the use of the tool of self protector Spray Pesticides on farmers in the village of Angkatan Kidul 2009 obtained a result that respondents who have less knowledge and do not wear full personal protection as much as 32 people or 94.1%, while respondents who have a knowledge of good and simply not wearing full personal protection a number of 13 people or 28.3%. Respondents with less knowledge and wear full personal protection is 2 persons or 5.9% while the respondents had the good knowledge and enough wearing Protective toolspeople or 71.7%.

   The results of this research in line with the Shobib research[7] about the relationship between knowledge and attitudes with the practice of using Protective toolsthemselves at the peasant pesticide users in the village Curut Penawangan Kec years 2013 from Grobogan Regency the results of statistical tests knowledge with practice obtained p value 0,658 (p > 0.05) showed no meaningful relationship between knowledge with practice of using Protective toolson farmers users of pesticides. Behavior or practices of farmers in the use of the Protective toolsinfluenced many factors, although the good farmer's knowledge of the use of Personal Protection when interacting with pesticides, but in practice it may not be appropriate, the availability of the protective tools, comfort, season and weather that did not allow, and it because follows the behavior of people or fellow farmers, so knowledge is not necessarily influential or relate to a person's behavior or practices.

   In this study the majority of farmer > 50 year old with working period of >10 years and most of the farmers did not finish Elementary School and some of them have to high school education level. Farmers who did not finish elementary school most have moderate knowledge levels, while farmers who had education up to secondary school have a high knowledge. Farmers who

have moderate knowledge are (farmers who did not finish elementary school) most of them do not use the complete self protective tool, whereas farmers who have the knowledge are farmers who have high education up to Secondary School Upper Intermediate mostly use Protective toolsthemselves. This shows that formal education provides a major influence in the open insight and understanding of the new values that exist in the environment. Someone with a high level of education will be easier to understand the changes that occur in their environment and the person will absorb those changes if the feel is beneficial for him. Someone who never attended formal education estimated will more easily accept and understand about health messages through this extension as well as the mass media [5].

Farmers ' knowledge need to be improved in order to pay more attention to the use of protective self, especially about the negative effects or dangers that can be caused from pesticides if they do not use Protective toolsthemselves, provide guidance and simulation about the use of Protective toolsthemselves with good and true, such as hats, masks, gloves, long sleeve shirt, long pants and boots and danger from not using protective tools and the need for protective about the posters themselves at the peasant must be used in order to remind farmers and farmers ' awareness of the importance of safety and health in the work.

2. **The relationship between Attitude with the use of Protective toolsfrom Pesticide Users in the village Tonrong Rijang:** Based on the results of the study indicate that there is no significant relationship between the attitude to the use of protective tools to pesticide users on farmers in the village of Tonrong Rijang Sub-district Baranti District Sidenreng Rappang. It is based on the results of a test of chi square p is the value obtained by 0.2 (p value 0.05 >). The results of this research shows that most of the farmers have a high attitude that as many as 55 people (82%) and moderate were 12 people (18%). Where a Farmer has a high attitude towards the use of the protective tools. Protective toolshigh user by as much as 21 people (31%), while the use of moderate user as many as 34 people (51%). Farmers who have an attitude of moderate (less good) that uses high protective toolsas much as 16 people (10%) and the use of the protective toolsas many as 5 people (8%). Although most farmers have high attitude towards the use of protective tools, they still don't use protective toolsthemselves in action. There is still lacking of using protective tools. So it can be seen that attitude does not necessarily reflect one's actions or the actions of someone often at odds with his attitude.

The results of this research are consistent with 2013 Shobib research [7] about the relationship between knowledge and attitudes with the practice of wearing Protective toolsin the village of Curut Penawangan Kec years 2013 from Grobogan Regency the results of statistical tests attitude with practice obtained p value 0,902 ($p > 0.05$) showed no meaningful relationship between attitude with the practice of wearing protective toolsto farmer that is pesticide users.

The results of this research are also in line with the research of Usman Rifai [6] about factors associated with compliance with the use of Protective toolsthemselves at the rice farmer in Dukuh Sodong Village Semarangtahun Town Mijen Subdistrict Purwosari 2017. From the statistics, there is no relationship between the attitude of compliance with the use of Protective toolsbecause in Dukuh Sodong.They assume that the wearing of protective tools can be interfere with work as well as the uncomfortable feeling while using protective tools.

Attitude is a tendency to hold actions against an object, with a way of stating the existence of signs for enjoying or not enjoying the object. Attitude is just part of human behavior. Attitude is a reaction or response is still closed from someone's response to a stimulus or object. The attitude shows in the real connotation of congruency reaction to certain stimuli in everyday life is the emotional nature of the reaction against the social stimulus[5].

This research show that the attitude of farmers in using protective tools is good, but despite the attitude of farmers already well there are several factors that affect the use of Protective Tools, such as comfort in work. Most of the farmers are not using protective gloves namely self as much as 59 respondents or 88% because farmers feel

uncomfortable while working (mix and spray) wear gloves. The hand is one of the important aspects that need to be protected because farmers use the hands to take, mixing and spraying of pesticides, the use of gloves may also reduce the risk of entry of pesticides from the skin, as many as 54 respondents or 81% do not use boots in the works because it feels uncomfortable, besides the weather factor also affects the rainy season will be very hard work by wearing boots, and as many as 51 respondents or 76% did not wear a mask because it feels stuffy or difficulty breathing when spraying pesticides and the unavailability of the mask should be used.

In this study the majority of farmers have time work > 10 years and some farmers have time work ≤ 10 years. Farmers work with > 10 years have a high attitude (good) on the use of protective tools so well with farmers who have working period ≤ 10 years also has a great attitude towards the use of protective tools themselves. However, both farmers with a working period of >10 years or farmers with work that has ≤10 years high attitude in the use of protective tools themselves mostly have usages that are self protective tool in terms of are not use protective tools themselves. This shows that although the farmer who has a long working period though, that have experience in doing his job has not been able to implement the full use of Protective tools in protecting himself when doing spraying.

Conclusion

There is no relationship between the behavior with the use of protective tools themselves on rice farmers in the village of Tonrong rijang Sub-district Baranti District Sidenreng Rappang, where p value = 0.173 (p value 0.05 >) on knowledge and p value = 0.2 (p value 0.05 >) on attitude.

Conflict of Interest: In this study between researchers and research subjects did not have a conflict of interest, because subjects did not have personal or informal relationships with researchers.

Source of Funding: The source of funds in this study came from self funding in 2018.

Ethical Clearance: The ethics of this study were obtained from the Ethics Commission for Health Research, Health Polytechnic of Ministry of Health in Makassar, Indonesia.

REFERENCE

1. Arikunto, Suharsimi. A Research Procedure Approach to Practice [Internet]. PT Rineka Copyright. 1996. [cited 3 January 2018] Available from: repository.usu.ac.id.
2. Cecep T, and Erlisya PM. Environmental Health and Safety. Yogyakarta: Nuha Medika: 2013.
3. Frity. Pesticide Exposure Risk Factors On Horticultural Crops In Farmers Plantation Wawo Tomohon 2017. Ejournalhealth 2017. [Cited 23 November 2017].Available online: https://ejournalhealth.com/index.php/kesmas/article/view/41.
4. Joseph M. Research Methods, Jakarta: PT Interpratama Mandiri Dawn; 2017.
5. Khamdani, Faris. The Relationship Between Knowledge and Attitudes with the Use of the Tool of self Protector Spray Pesticides on Farmers in the Village of Force compelled the Starch of the year 2009. Semarang 2009. [cited 23 November 2017] Avaiable from: lib.unnes.ac.id/123/6094.pdf
6. Rifai, Usman. Factors Associated With Compliance With the Use of Protective Tools Themselves at the Peasant Rice In Dukuh Subdistrict (kecamatan) Sodong Purwosari Mijen Semarang year 2017. 2017 [cited 23 November 2017] Available from: eprints. dinus. ac.id/22506.
7. Shobib, Muhammad N, et al. The Relationship Between Knowledge and Attitudes with the Practice of Wearing (Protective Tools) Tool is a Self Protective Pesticide Users on Farmers in the Village of Curut Excl. Penawangan Kab Grobogan Year 2013. 2013 [cited 2017 November 23]. Available from: Eprints.dinus.ac.id,
8. Wismaningsih, Endah RD and Ias O. Factors Associated with the Use of Self Protector (Protective Tools) on Sprayers Farmers in district Ngantru Tulungagung District. 2015 [cited 23 november 2017]. Available from: https://ojs.iik.ac.id.

Level of Type L Metacrylate Acid Copolymer as Microparticle Matrix Improves *Lactobacillus casei* Protection against Gastric Acid

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ABSTRACT

Background: *Lactobacillus casei* is a probiotic that has an ability to protect the intestine, but is damaged due to the acid pH in the stomach. A system is needed to provide protection. Probiotic microencapsulation can provide protection against *Lactobacillus casei* by increasing the levels of methacrylic acid copolymers.

Objective: The aim of this study is to determine the effect of type L methacrylic acid copolymers as microparticle matrix on the protection system of *Lactobacillus casei* against acidic atmosphere.

Method: *Lactobacillus casei* probiotic microparticles were made from three formulas using matrix type L methacrylic acid copolymers with levels in formulas I, II, and III, each of which was 0.50%; 0.75%; and 1.00% by spray drying technique at 120°C inlet temperature.

Results: Moisture content decreased with the increasing levels of methacrylic acid copolymers from formulas I, II and III with 10.05% ± 0.49; 9.77% ± 0.19 and 7.45% ± 0.11 respectively. In determining particle size, the results increased simultaneously with the increasing levels of methacrylic acid copolymers in formulas I, II and III, which were 3.29 ± 0.07; 3.79 ± 0.06 and 4.34 ± 0.13 respectively.

Conclusion: Increasing the level of L type methacrylic acid copolymer as a matrix can increase the protection capability of *Lactobacillus casei* microparticles against gastric acid.

Keywords: *Probiotics, Lactobacillus casei, spray drying, capolymer.*

Introduction

Probiotics is possible to change the microbial balance in the intestine as a first aid for hosts [(1)]. Probiotic bacteria can maintain intestinal health, help absorb food, produce vitamins, prevent the growth of pathogenic bacteria, and increase host immunity [(2)]. Probiotics must be able to get through stomach acid and reach intestine in the amount of 106-107 cfu/ml in order to provide benefits for the host [(3,4)]. *Lactobacillus casei* is a lactic acid bacteria that has antibacterial effects, immunomodulatory effects, and can be beneficial for the health of the digestive system [(5,6)]. *Lactobacillus casei* has an action target area in intestine, but can be damaged by an atmosphere of stomach acid [(7)]. The development of drug delivery systems aims to minimize the occurrence of drug degradation, prevent harmful side effects of drugs, and increase bioavailability and accumulation of drug fractions in desired body parts [(8)]. One development of drug delivery systems is to use microparticles as carriers of active ingredients. The process of making microparticles is by using microencapsulation [(9)].

Type L methacrylic acid copolymer is an anionic polymer which has been commercially used as an enteric coating for delivery of oral drugs, in which the drug will be released into the intestine that has an alkaline environment [(10)]. Matrix levels are related to the

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density and wall thickness of the formed microparticles. In addition, the high matrix content has an effect on increasing the viscosity of the matrix solution and will increase the thickness of the microparticle wall. The density and wall thickness of the microparticles increase the protection power of the microparticles against stomach acid [3,6,11].

Spray drying technique is a technique of forming microparticles by dissolving or suspending probiotics into a solution or melt polymer and trapped in the form of particles [9]. Formation of microparticles from spray drying is done by hot air flowing resulted in water evaporation that occurs faster [9,12]. The research using spray drying with an inlet temperature of 98º C resulted in the morphology of the microparticles which did not meet and the water content was still high. Based on the description above, a study was conducted to obtain the right type L methacrylic acid copolymer which can provide protection power from the *Lactobacillus casei* microparticles to an optimal gastric acid atmosphere. In this study the spray drying method was used at an inlet temperature of 120ºC.

Method

This was a laboratory experimental study. The materials used were *Lactobacillus casei* from the Center for Food and Nutrition Studies at Gajah Mada University, Yogyakarta, Indonesia, type L methacrylic acid copolymers, Sodium hydroxide (NaOH), de Man Ragosa Shorpe (MRS), Agar medium, sterile Phosphate Buffer Saline (PBS), Potassium phosphate (KH2PO4), Potassium chloride (KCl), Aquadem free of CO2 and sterile Aquadem.

Identification of type L methacrylic acid copolymers: Examination of L-type methacrylic acid copolymers with FTIR spectrum was carried out using KBr pellet technique. As much as 1 mg of the substance with 100 mg KBr was mashed homogeneously, then put into a vacuum dryer, then molded with a hydraulic press until a thin translucent plate was obtained. From the results of the examination, the specific wave number values of the compounds analyzed were obtained. Specific wave numbers obtained stated the presence of certain groups of structures of compounds analyzed [13].

Preparation of *Lactobacillus casei* Probiotic Bacteria Starters: Ingredients of de Man Ragosa Shorpe (MRS) medium of 5.22 grams of broth were weighed and dissolved into 100 ml sterile aquadem, then stirred until homogeneous. The solution was heated by slowly heating to boil, for one or two minutes. After being homogeneous, the solution poured into a test tube container of 10 ml and sterilized at 121ºC for 15 minutes. *Lactobacillus casei* from main stock culture was bred by taking one Ôse of bacteria and then put in 1 ml of sterile saline and vortexed until it was cloudy. Then, put in 10 ml of MRS sterile broth and dishwasher at 37ºC for 48 hours. Furthermore, it was taken as much as a few Ôse and swiped on a sterile slant and incubated at 37ºC for 48 hours to become a starter of *Lactobacillus casei* which was ready for use. Culture of probiotic bacteria can be used for a maximum of 1 month at 4ºC storage. If the culture stored more than 1 month, probiotic bacteria need to be rejuvenated.

Optimization of *Lactobacillus casei* Growth Time: As much as 5.22 grams of MRS broth were weighed and dissolved in 100 ml sterile aquadem, and then stirred until homogeneous. Once it become homogeneous, the solution was poured into an erlenmeyer container and sterilized at 121ºC for 15 minutes. The MRS medium of sterile broth was added with one Ôse starter of *Lactobacillus casei* and incubated at 37ºC. Samples were taken at 0, 4, 6, 8, 12, 16, 18, 24 and 48 hours to check pH and the number of *Lactobacillus casei* colonies by determining the Total Plate Count (TPC) of each growth time.

Examination of pH of *Lactobacillus casei* suspension carried out by *Lactobacillus casei* culture in MRS broth was taken for 10 ml at each time of growth. Then, the measurements were carried out using a calibrated pH meter using standard buffer solutions. Determination of TPC was carried out by 1 ml *Lactobacillus casei* suspension mixed with 9 ml sterile phosphate buffer saline (PBS with pH = 7.4) and vortexed. A 1:10 dilution was carried out in 10 series dilutions using sterile PBS, each dilution was piped as much as 1 ml to be inserted into a tube containing 10 ml MRS so that the sterile was then vortexed and poured into a plate. The plate was shaken until the sample was evenly dispersed. After the MRS medium solidified, the plate was incubated at 37ºC for 48 hours.

***Lactobacillus casei* Microparticle Formulation**

Table 1: Design of Lactobacillus casei microparticle formula

No.	Materials	Function	FI	FII	FIII
1.	Bacterial Suspension: *Lactobacillus casei* Sterile aquadem	Active ingredientsSolvent	109 *cfu*/ml ad 250 ml	109 *cfu*/ml ad 250 ml	109 *cfu*/ml ad 250 ml
2.	Matrix solutions:				
	Acid copolymers type L methacrylate	Matrix	5 grams	7.5 grams	10 grams
	MRS *broth*	Nutrition	5 grams	5 grams	5 grams
	Sterile aquadem	Solvent	ad 750 ml	ad 750 ml	ad 750 ml

Note:

F I: Formula with 0.50% type L methacrylic acid copolymer

F II: Formula with 0.75% type L methacrylic acid copolymer

F III: Formula with 1.00% type L methacrylic acid copolymer

Levels of type L methacrylic acid copolymers on F I, II, and III were made from a total of 1000 ml.

Protection Test of *Lactobacillus casei* Microparticles against Gastric Acid: Test solution was prepared, i.e. acid solution of pH of 1.2 and pH of 7 of phosphate buffer saline solution. Acidic solution of pH of 1.2 was made by mixing 50 ml of 0.2 M KCl solution with 85 ml 0.2 M HCl solution and added aquadem to volume of 200 ml. Phosphate buffer saline of pH of 7 was then made with a composition of 50 ml 0.2 M KH2PO4 mixed with 25 ml 0.2 M NaOH solution and added aquadem to volume of 200 ml. In addition, the calculation of viable bacteria using the Total Plate Count method was incubated at 37ºC for 48 hours. Three-time replications were performed for each formula.

Results

Optimization of Lactobacillus casei Growth Time: The results of *Lactobacillus casei* pH and ALT log tests showing the amount of viability of germs at each incubation time are presented in Table 2.

Table 2: Results of *Lactobacillus casei* pH and ALT log examination at each incubation time

Period (hours)	Replication I	Replication II	Replication III	Mean ±SD
pH				
0	5.66	5.66	5.65	5.65 ± 0.01
4	5.55	5.55	5.55	5.55 ± 0.00
6	5.73	5.74	5.73	5.73 ± 0.01
8	5.05	5.05	5.05	5.05 ± 0.00
12	4.48	4.53	4.53	4.51 ± 0.03
16	4.89	4.89	4.88	4.89 ± 0.01
18	4.74	4.75	4.74	4.74 ± 0.01
24	5.38	5.37	5.37	5.37 ± 0.01
48	6.98	6.97	6.98	6.98 ± 0.01
ALT log				
0	8.87	9.5	9.49	9.29 ± 0.36
4	8.62	9.85	8.97	9.15 ± 0.63
6	11.28	11.56	9.42	10.75 ± 1.16

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8	9.66	9.36	9.47	9.50 ± 0.15
12	12.54	11.07	12.76	12.12 ± 0.92
16	11.17	11.58	11.73	11.49 ± 0.29
18	10.48	10.71	10.55	10.58 ± 0.12
24	10.09	10.72	9.99	10.27 ± 0.40
48	9.48	10.49	9.46	9.81 ± 0.59

From the pH test results, it was found that there was a decrease in pH from the growth time of 0 hours until the growth time of 12 hours. In 12 to 18 hours, the pH was stable and then an increase in pH was occurred. Based on the results of these tests, it can be seen that the optimum time for *Lactobacillus casei* (the end time of the exponential phase or the beginning of the stationary phase) occurred for 12 hours.

Protection power Test Results of *Lactobacillus casei* Probiotic Microparticles on Gastric Acid Atmosphere

Table 3: Test of Protection power Test of *Lactobacillus casei* Probiotic Microparticles on Gastric Acid Atmosphere

Formula	Replication I	Replication II	Replication III	Mean ±SD
ALT log after Spray Drying				
I	6.45	7.06	7.04	6.85 ± 0.35
II	6.35	7.49	6.89	6.91 ± 0.58
III	7.68	7.30	6.83	7.27 ± 0.45
ALT log of *Lactobacillus casei* in a microparticle after being exposed to an acidic atmosphere				
I	6.46	6.19	6.25	6.30 ± 0.14
II	6.68	6.72	6.45	6.62 ± 0.15
III	7.05	7.22	7.14	7.14 ± 0.09
Protection of *Lactobacillus casei* in microparticles against acidic atmosphere (%)				
I	94.31	90.36	91.24	91.97 ± 2.07
II	96.72	97.30	93.39	95.80 ± 2.11
III	96.97	99.31	98.21	98.17 ± 1,17

From these data, it can be seen that the increase in matrix levels of type L metacrylate acid copolymers (0.50%, 0.75%, and 1.00%) can increase the percentage of protection power in the *Lactobacillus casei* microparticles.

Discussion

Increased matrix levels used can cause an increase in the thickness and density of the matrix wall. The higher methacrylic acid copolymer causes more hydrogen bonding carboxylic groups to be formed and will increase the density of the microparticle wall [(14)]. The density and wall thickness of a high microparticle causes an increase in the protection power of the microparticle against stomach acid [(3)].

The mixture of *Lactobacillus casei* suspension with matrix solution and MRS was carried out by microencapsulation using spray drying method and the pre-adaptation process was firstly carried out.[(15)]. The three microparticle formulas produced had a moisture content (MC) higher than the required content of probiotic microparticles which was not more than 4% [(16)]. The moisture content of spray drying microparticles can be influenced by the inlet temperature. An increase in inlet temperature can cause a decrease in moisture content [(17)].

The difference in matrix levels will affect the characteristics of the probiotic microparticles that are formed. Probiotic microparticles that meet the characteristics of probiotic microparticles range from 1-1000 µm, ideally less than 100 µm. [(3,18)]. Entrapment

efficiency is carried out to determine the amount of probiotics coated in microparticles and show the content of probiotics as active ingredients [19]. Factors that influence entrapment efficiency are include solubility of the polymer in solvents, matrix content, and solvent removal rate. [1]. High matrix levels will increase the protection of probiotics against temperature.

Spray drying is a single closed system process that can be used for a variety of materials. The medicinal ingredients are dissolved or suspended into suitable solvents containing polymers. The solution or suspension is atomized into the drying chamber and the microparticles are formed as atomization droplets which are dried by hot air. The results are highly influenced by the nature of the material. Microparticle parameters, such as particle size and solvent residue levels, are influenced by instrument settings, such as inlet temperature, feed flow rate, air spray flow, and aspirator flow. Parameter optimization is done through trial and error [19]. The use of spray drying in the probiotic industry is limited because of the high temperatures during the process can reduce the viability of probiotics.

The size of probiotic microparticles of formula I, II and III increased with the increase in the matrix content of type L methacrylic acid copolymers used. This can occur because the increase in matrix levels causes an increase in wall thickness so that the size of the microparticles is larger [3]. Increased levels of L-type methacrylic acid copolymers on each formula showed significant differences in the particle size of the *Lactobacillus casei* microparticles formed. The protection power of probiotic microparticles against acids is the ability of probiotics in the form of microparticles to survive during the acidic atmosphere of the stomach.

Conclusion

Increased levels of type L methacrylic acid copolymers from 0.50%; 0.75%; and 1.00% as a matrix can cause an increase in the protection power of *Lactobacillus casei* microparticles against stomach acid. The formula with 1.00% type L metacrylate acid copolymer was a formula with the highest protection power for *Lactobacillus casei* microparticles against stomach acid.

Ethical Clearance: The research process involves participants in the survey using a questionnaire that was accordant with the ethical research principle based on the regulation of research ethic committee. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, nonmaleficence, and justice.

Conflict of Interest: The author reports no conflict of interest of this work.

Source of Funding: This study is done with individual funding.

REFERENCES

1. Cook MT, Tzortzis G, Charalampopoulos D, Khutoryanskiy V V. Microencapsulation of probiotics for gastrointestinal delivery. J Control Release. 2014;162(1):56–67.
2. Hardiningsih R, Nonta R, Napitupulu R, Yulinery T. Isolasi dan Uji Resistensi Beberapa Isolat Lactobacillus pada pH Rendah Isolation and resistance test of several isolates of Lactobacillus in low pH. 2006;7:15–7.
3. Barros JMS De, Charalampopoulos D, Khutoryanskiy V V, Edwards AD. Enteric coated spheres produced by extrusion/spheronization provide effective gastric protection and efficient release of live therapeutic bacteria. Elsevier BV. 2015
4. Arslan S, Erbas M, Tontul I, Topuz A. LWT - Food Science and Technology Microencapsulation of probiotic Saccharomyces cerevisiae var . boulardii with different wall materials by spray drying. LWT - Food Sci Technol. 2015;63(1):685–90.
5. Taylor P, Huq T, Khan A, Khan RA, Riedl B. Encapsulation of Probiotic Bacteria in Biopolymeric System Encapsulation of Probiotic Bacteria in Biopolymeric System. (June 2013):37–41.
6. Hassanzadazar H, Ehsani A, Mardani K, Hesari J. Investigation of antibacterial , acid and bile tolerance properties of lactobacilli isolated from Koozeh cheese. 2012
7. Xu M, Gagné-bourque F, Dumont M, Jabaji S. Encapsulation of Lactobacillus casei ATCC 393 cells and evaluation of their survival after freeze-drying , storage and under gastrointestinal conditions. J Food Eng. 2016;168:52–9.

8. Reddy PD, Swarnalatha D. Recent Advances in Novel Drug Delivery Systems. 2010;2(3):2025–7.
9. Roy SD, Nandy S, Banerjee S, Science P. International Journal Of Pharmacy & Life Sciences Microencapsulation : Convenient mode of drug delivery in novel drug delivery system. 2012;3(3):1555–62.
10. El-Sayed SJG, H. Me. Stimuli-Sensitive Particles For Drug Delivery. 171-190
11. Shi L, Li Z, Li D, Xu M, Chen H, Zhang Z, et al. Encapsulation of probiotic Lactobacillus bulgaricus in alginate – milk microspheres and evaluation of the survival in simulated gastrointestinal conditions. J Food Eng. 2013;117(1):99–104.
12. Vidhyalakshmi R, Bhakyaraj R, Subhasree RS. Encapsulation " The Future of Probiotics " -A Review. 2009;3:96–103.
13. M.Silverstein R, Webster FX, Kiemle DJ. Silverstein - Spectrometric Identification of Organic Compounds 7th ed.pdf. seventh ed. New York: John Wiley & Sons, INC; 2005.
14. Lemon MT, Jones MS, Stansbury JW. Hydrogen bonding interactions in methacrylate monomers and polymers. 2007;
15. Iravani S, Korbekandi H. Technology and potential applications of probiotic encapsulation in fermented milk products. 2015;52:4679–4696.
16. Teanpaisan R, Piwat S, Dahle G. Inhibitory effect of oral Lactobacillus against oral pathogens. 2011;452–9.
17. Madhusmita I, Brahmeshwar I. Formulation Optimization and Characterization of Spray Dried Microparticles for Inhalation Delivery of Doxycycline Hyclate. 2011;131(12):1813–25.
18. Rathore S, Desai PM, Liew CV, Chan LW, Wan P, Heng S. Microencapsulation of microbial cells. J Food Eng. 2013;116(2):369–81.
19. Kumar BP, Chandiran IS, Bhavya B, Sindhuri M, Pharmaceutics D, Krishna G. Indian Journal of Pharmaceutical Science & Research Microparticulate Drug Delivery System : A Review. 2011;1(1):19–37.

The Use of Diuretic Drugs in Heart Failure Patients

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ABSTRACT

Background: Heart failure can reduce the rates of expectations and quality of life. In the last few decades, the management of this disease has developed continously, including in pharmacological therapy. Diuretic is a class of drugs that is often used as a choice for heart failure patients. The pattern of diuretics usage needs to be observed further. Because if the use of diuretics is not appropriate, it potentially leads to drug related problems that affect patient management.

Objective: This study aims to examine the pattern of use of diuretics in heart failure patients who are undergoing treatment in hospital hospitalization units.

Method: This is a descriptive and retrospective study, using medical record data for heart failure patients who received diuretic therapy in the patient room at the hospital. Sampling method used the time limited sampling.

Result: Total patients who met the inclusion criteria were 50 patients, dominated by male (68%). The age of patients, most of them were in the age group 61-70 years (32%). The most widely used diuretics were the single dose furosemide (50%) and combination dose furosemide and spironolactone (36%). There was no drug related problem (DRP) in the drug interactions and undesirable side effects.

Conclusion: Most diuretic therapies for heart failure patients who were hospitalized at the hospital, were according to the available guidelines.

Keywords: *heart failure, drug related problem, diuretics*

Introduction

Heart failure is a disease that increase a morbidity and mortality rates. This disease weakens and reduces the expectations rates and quality of life. In this era, heart failure become an important health issue. Heart failure results in 12 to 15 million outpatient visits per year. It becomes the most common reasons for hospitalization in patients over the age of 65 years. Typical symptoms in heart failure are labored breathing when the patient is in a rest and activity, fatigue, leg edema. [1–3]

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In general, it can be said that over the past 50 years, there have been three different eras related to the management of heart failure. The earliest era, known as the non-pharmacological era, focused in its treatment on fluid restriction. Then followed by the pharmacological era, that found an increasing use of inotropes and diuretics and the discovery of vasodorators, and the discovery of posterior drugs related to the neurohormonal pathway. Along with all technological developments, new drugs are approved to improve significantly the prognosis of heart failure patients. In addition, a new era also immediately gave rise to regenerative therapy. [1,4-7]

In pharmacological therapy, one of the choices is using diuretic drugs. Diuretics are drugs that can increase urine flow rates, but clinically diuretics also increase the excretion rates of Na^+ (natriueresis) and Cl-, which is the accompanying anions. Diuretics have often been used as management of the heart failure symptoms for many years. Because diuretics interfere a sodium retention by increasing urine sodium and free

water clearance. The purpose of diuretics usage is to relieve the heart failure symptoms by reducing an excess volume without causing intravascular volume depletion. Diuretic classification is based on various ideas such as workplace (loop diuretics), efficacy (high-ceilling diuretics), chemical structure (thiazide diuretics), similarity of work with other diuretics (thiazide-like diuretics), effects on potassium excretion (potassium-sparing diuretics). [8–10]

The most commonly diuretic that used for congestive heart failure is loop diuretics such as furosemide which is given IV in doses of 40 mg, followed by oral use if it takes 20-80 mg/24 hours. In most patients with loop diuretics can achieve sufficient diuresis to relieve congestive symptoms, but when diuretic resistance arises, fluid management may be complicated and potentially damaging. The pattern of diuretic usage in heart failure patients still needs to be studied more because of the possibility of improper use of therapy and the potential of drug related problems occur that affect the management of heart failure patients. [11–14]

Method

The study that conducted was non-experimental or observational research, that was a descriptive retrospective. The study material used health medical record data in patients with a diagnosis of heart failure who received diuretic therapy in the hospital inpatient room.

Specified sample inclusion criteria were patients with heart failure and receiving diuretic therapy with or without complications. Furthermore, on the exclusion criteria, namely heart failure patients during the therapy period, the patient died, or is referred to another hospital and forced home.

Research samples were recorded on the data collection sheet, including: patient profile (name, gender, age, weight/height, address); date of hospital admission, date of hospital discharge, and medical record number; diagnostics, laboratory data, and kinetic data; Disease history, treatment history, and complaints experienced; The variables of diuretics that given to patients include type, dosage, and route of administration.

Data analysis was done by calculating the number of patients and grouping patients based on patient demographics, types of diuretics used and complications or comorbidities. In addition, it is necessary to know the use of other drugs to determine drug interactions in heart failure patients.

The sample collection was done with the time limited sampling method. Data was collected in the medical medical record room at Hospital of Bhayangkara H.S Samsoeri Mertojoso, Surabaya Indonesia. Data analysis was carried out based on data obtained from the patient's medical record. Then the data obtained from the data collection sheet was entered into the main table and then processed and analyzed descriptively in the form of tables or narratives.

This research had been reviewed by the Health Research Ethics Commission of Bhayangkara Hospital Surabaya and has been declared ethical.

Results

Based on the results of the study, it was found 50 patients who qualified the inclusion criteria and were dominated by male sex (68%). Furthermore, most of patients in the age group 61-70 years (32%). The most complaints that patients had experienced were breathing problems, chest pain and edema. In objective data, the diagnosis of heart failure was most evidenced through supporting data in the form of chest X-ray, ECHO and EKG. The history of the most comorbidities in heart failure patients was hypertension (32%) followed by coronary heart disease, diabetes mellitus with hypertension, and only diabetes mellitus.

Patterns for Usage of Heart Failure Drugs

Profile of the use of heart failure drugs: The most widely used drugs is the diuretic group, as many as 66 frequency of use.

Table 1: Profile of the use of the group of heart failure drugs

Groups of drugs	Frequency of usage
Cardiac Glycosides	5
ACE Inhibitor	18
ARB	16
B Blocker	26
Diuretics	66
Nitric	28

Note: *) One patient can receive more than one medication for heart failure during treatment

Type of Diuretics: The highest usage of diuretic drugs is furosemid with 50% a combination of furosemide and spironolactone (36%). And the the following type of diuretics mostly used are

The highest use of diuretic drugs is furosemide (50%), then followed by a combination of furosemide and spironolactone, spironolactone, combination hydrochlorothiazide and furosemid, and combination of hydrochlorothiazide and spironolactone, which their values are 36%, 10%, 2% dan 2%.

Dosage of Diuretics: The use of diuretic doses is divided into the use of single doses and combination doses which will be presented in detail in the table below.

Table 2: Single dose of diuretics

Type of diuretics	Dose regimentation	Frequency
Furosemide	2,5mg/hour pump	2
	10mg/hour pump	9
	1x20mg IV	1
	2x20mg IV	4
	3x20mg IV	1
	1/2x40mg p.o	1
1x40mg p.o		7
Spironolactone	1/2x25mg p.o	1
	1x25mg p.o	4

Table 3: Dosage of diuretic combination

Regimentasi dosis			Frequency
Furosemide	**Spironolactone**	**Hydrochlorothiazide**	
5mg/hour pump	1/2x100mg p.o	-	2
	1x100mg p.o	-	1
	2x25mg p.o	-	1
	-	2x25mg	1
10mg/hour Pump	1x25mg p.o	-	3
1x20mg IV	1x25mg p.o	-	2
2x20mg IV	1x25mg p.o	-	1
3x20mg IV	2x25mg p.o	-	1
	1x25mg p.o	-	1
1x40mg p.o	1x25mg p.o	-	3
2x40mg p.o	1x25mg p.o	-	3
-	1x25mg p.o	1x25mg p.o	1

Diuretics Route: The most therapeutic route of diuretics is oral.

Table 4: Diuretics route

Diuretics route		Frequency	Percentage (%)
Furosemide	Intravenous pump	19	27
	Intravenous	11	16
	Per oral	14	20
Spironolactone	Per oral	24	34
Hydrochlorothiazide	Per oral	2	3

Note: *) The number of routes given above is not the same as 50 patients, because in one patient can get a single diuretic therapy or combination diuretic therapy

Diuretic Therapy Monitoring

Monitoring of diuretic therapy is conducted with electronic serum monitoring.

Table 5: Diuretic Therapy Monitoring

Patients using diuretic therapy	Frequency	Percentage (%)
Serum electrolyte monitoring was carried out	29	58
Serum electrolyte monitoring was not carried out	21	42

Identification of *Drug Related Problem* (DRP)

Drugs Interaction: The percentage of possible drug interactions in heart failure patients is not equal to 100% because not all patients experience potential drug interactions.

Table 6: Drugs Interaction

Type of Drugs	Interacted with	Mechanisms of Drugs Interaction	Frequency	Percentage (%)
Furosemide	Amiodaron	Causes an increase in ventricular arrhythmias	3	6
	Digoxin	Increases digoxin toxicity	5	10
Spironolactone	Potassium chloride	Causes hyperchalemia	3	6
	ACE Inhibitor	Causes hyperchalemia	2	4

In the use of furosemide with digoxin monitoring**, t**herapy of furosemide with digoxin was monitored more than 4 patients (80%) rather than those who were not monitored as many as 1 patient (20%). And then heart failure patients who used spironolactone therapy with ACE-I contained 2 patients with 1 patient who did not carry out serum electrolyte monitoring (50%).

Side effects of drugs: In this study was found no drug side effects occurred in heart failure patients.

Discussion

From the data shows the heart failure patients who were undergoing hospitalization, complaints a shortness of breath and chest pain. Dyspnea or shortness of breath can result in pulmonary blockage or systemic hypoperfusion due to left ventricular failure. Patients usually experience various symptoms that associated with systemic fluid accumlation which are known to be venous blockages, associated with right ventricular failure ie peripheral edema. This usually occurs in areas that depend on the body, such as the ankle (Edema pedal) for outpatients or sacred areas to sleep in the patient's bed. Bowel or stomach blockages can also appear, but it does not lead to characteristic signs unless proven to be open ascites. In right ventricular failure it is also possible to find the pulmonary hypertension. [15]

The status of heart failure can be seen from medical support data such as echo, chest X-ray and ECG. The medical support data above is related to completing the diagnosis of heart failure, where ecocardigraphy is the most useful method in evaluating systolic and diastolic dysfunction. Chest X-ray is also an important component in diagnosing heart failure such as showing cardiomegaly. An electrocardiogram should be performed on all patients suspected of heart failure. [16]

From the results study above, patients who were diagnosed with heart failure were in the age range 61-70 years. The diagnosis of heart failure manifests most commonly in adults that over 60 years. The incidence of heart failure increases with age, and reaches 1% per year in people over 65 years old. [15,17]

The most common history of comorbidities in heart failure patients is hypertension. One factor that contributes to the development of primary hypertension is a physical disorder involving the renin-angiotype-aldosterone system (RAAS) and natriuretic hormone. Furthermore, the second most common comorbid disease is diabetes mellitus. Changes in structure that show a concentric left ventricular remodeling as a characteristic of diabetes.. [15]

The results showed the classification of drugs used in heart failure patients that mostly consumed, is a diuretic. Other classes of heart failure drugs used are glycosides, ACE inhibitors, ARB groups, β inhibitors and nitrate groups. The diuretic drugs used are hydrochlorothiazide (thiazide diuretic), furosemide (loop diuretic), and

spironolactone (potassium-sparing diuretic). These uses are either single or combination doses. In this study, the single dose of furosemide was given due to its higher diuresis and natriuresis efficiency. Whereas, the combination of furosemide and spironolactone is given because potassium-sparing diuretics are weak diuretics when used singly but it cause potassium retention, so they are usually given with loop diuretics to prevent hypokalaemia. [16,18,19]

The loop diuretic is a diuretic group which has the same ability to block the symporter Na^+ -K^+ - $2Cl^-$ in the raised portion of the Henle loop diuretic. This drug is given orally to reduce peripheral edema and pulmonary edema in moderate to severe stage of heart failure. Loop diuretics are effective in patients with reduced kidney. [18.20]

In the administration route of furosemide in heart failure patients is more given by pump than by intravenous or per oral method. Continuous intravenous administration of furosemide is indeed simpler, more effective, and a method to accelerate diuresis in certain patients. The administration of furosemide to patients depends on the clinical symptoms of the patient.[21]

Problems that related to the use of potential diuretic drugs in the heart failure, one of which is related to drug interactions. In the study showed that potential drug interactions occured between furosemide and amiodarone. Concomitant administration of drugs that can cause hypokalaemia and hypomagnesemia and increase the ventricular arrhythmias, including tachycardia. [22]

Other potential interactions was a combination of furosemide with digoxin. Cardiac glycosides inhibit sodium and potassium ATP-ase, which is associated with the transport of sodium ions and potassium ions acrossing the myocardial cell membrane. This is related to an increase in the availability of calcium ions that associated with contractions from cells. The loss of calcium is caused by diuretics, exacerbates potassium loss from myocardial cells, thereby increasing the activity and toxicity of digitalis. [20]

Other potential drug interactions occur between spironolactone and KSR. The effects of spironolactone and potassium compounds are additives, which can cause hypercalemia. In addition, spironolactone and ACE inhibitor groups also has the potential to cause reactions. ACE inhibitors can inhibit aldosterone which results in potassium retention, so it is expected to maintain adosterone potassium antagonists, such as spironolactone which causes hypercalemia.[20] In many patients that use combination therapy, the serum electrolyte was monitored. However, in this study was found no actual drug interactions. Furthermore, on the issue of other potential drug interactions is drugs side effects. In this study there were not found a patient that experienced the diuretic side effects.

Conclusion

Most of the usage of diuretic therapy in heart failure patients in inpatient installations, had been in accordance with existing guidelines. In this study, there was no Drug Related Problem (DRP) of diuretics usage.

Conflict of Interest: There is no conflict of interest in this study

Source of Funding: This research was carried out by a team and funded independently

REFERENCE

1. Abou-jokh C, Alvarez B. Innovative Strategies in Heart Failure : Present and Future. 2019;
2. Long B, Koyfman A, Rdms MG. Clinical Reviews in Emergency Medicine. J Emerg Med [Internet]. 2018;55(5):635–46. Available from: https://doi.org/10.1016/j.jemermed.2018.08.002
3. Fadol AP, Mendoza TR. Addressing the Symptom Management Gap in Patients With Cancer and Heart Failure Using the Interactive Voice Response System: A Pilot Study. 2018;9(2):201–14.
4. Allen K, Madan S, Massera D, Ms C, Litwin SE. Lifestyle Modi fi cations for Preventing and Treating Heart Failure. 2018;72(19).
5. Vazir A, Cowie MR. Decongestion : Diuretics and other therapies for hospitalized heart failure. Indian Heart J [Internet]. 2015;68:S61–8. Available from: http://dx.doi.org/10.1016/j.ihj.2015.10.386
6. Isabel S, Ramos L, Araújo I, Marques F, Branco P, Gaspar A, et al. A 2018 overview of diuretic resistance in heart failure. Rev Port Cardiol [Internet]. 2018;37(11):935–45. Available from: https://doi.org/10.1016/j.repc.2018.03.014

7. Voors AA, Kremer D, Geven C, ter Maaten JM, Struck J, Bergmann A, Pickkers P, Metra M, Mebazaa A, Düngen HD, Butler J. Adrenomedullin in heart failure: pathophysiology and therapeutic application. European journal of heart failure. 2019 Feb;21(2):163-71.

8. El-seedi HR, Khalifa SAM, Taher EA, Farag MA, Saeed A, Gamal M, et al. Cardenolides : Insights from chemical structure and pharmacological utility. Pharmacol Res [Internet]. 2019;141(December 2018):123–75. Available from: https://doi.org/10.1016/j.phrs.2018.12.015

9. Simonavičius J, Knackstedt C, Brunner-La Rocca HP. Loop diuretics in chronic heart failure: how to manage congestion?. Heart failure reviews. 2019 Jan 1;24(1):17-30.

10. Chitturi C, Novak JE. Diuretics in the Management of Cardiorenal Syndrome. Adv Chronic Kidney Dis [Internet]. 2018;25(5):425–33. Available from: https://doi.org/10.1053/j.ackd.2018.08.008

11. Kazory A, Costanzo MR. Extracorporeal Isolated Ultrafiltration for Management of Congestion in Heart Failure and Cardiorenal Syndrome. Adv Chronic Kidney Dis [Internet]. 2018;25(5):434–42. Available from: https://doi.org/10.1053/j.ackd.2018.08.007

12. Skogestad J, Aronsen JM. Hypokalemia-induced arrhythmias and heart failure: new insights and implications for therapy. Frontiers in physiology. 2018;9.

13. Kuriyama A. Continuous versus intermittent administration of furosemide in acute decompensated heart failure : a systematic review and meta-analysis. 2019;1:31–9.

14. Li S, Zhang X, Dong M, Gong S, Shang Z, Jia X, et al. Effects of spironolactone in heart failure with preserved ejection fraction. 2018;0(July).

15. DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey L. Pharmacotherapy A Pathophysiologic Approach, 10e. New York, NY: McGraw-Hill Education LLC; 2017.

16. Perhimpunan Dokter Spesialis Kardiovaskular. Pedoman tata laksana penyakit kardiovaskular di Indonesia. Jakarta Perhimpun Dr Spes Kardiovask Indones. 2009;

17. Kingery JR, Yango M, Wajanga B, Kalokola F, Brejt J, Kataraihya J, et al. Heart failure, post-hospital mortality and renal function in Tanzania: a prospective cohort study. Int J Cardiol. 2017;243:311–7.

18. Neal MJ. At a glance farmakologi medis. Ed V Jakarta Erlangga. 2006;70:94–5.

19. Sica DA, Gehr TWB, Frishman WH. Use of diuretics in the treatment of heart failure in older adults. Heart Fail Clin. 2017;13(3):503–12.

20. Goodman LS. Goodman and Gilman's the pharmacological basis of therapeutics. Vol. 1549. McGraw-Hill New York; 1996.

21. Magovern JA, Magovern GJ. Diuresis in hemodynamically compromised patients: continuous furosemide infusion. Ann Thorac Surg. 1990;50(3):482–4.

22. Antonelli D, Atar S, Freedberg NA, Rosenfeld T. Torsade de pointes in patients on chronic amiodarone treatment: contributing factors and drug interactions. Sat. 2005;12:19.

Hazard Identification, Risk Assessment, and Determining Controls in Laboratories

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ABSTRACT

A laboratory is a place to carry out experiments. Working in a laboratory means having zero chance to perform reckless behaviors in performing or using equipment and materials provided in a laboratory. A laboratory as a place with high chances of hazard occurrence is required to be examined by implementing Hazard Identification Risk Assessment Determining Control (HIRADC) analysis, which also an essential element in occupational safety and health management system due to the fact that it relates to the endeavor to prevent and control hazards used to determine the objectives and intentions of occupational safety and health. HIRADC analysis in this research is expected to reduce hazard risks that are likely to be discovered in laboratories. This research is performed in 2 nutrition laboratories in the Faculty of Public Health, Universitas Airlangga. The data used are the primary data obtained from observation. The results show that there are 15 hazard identifications from two identified laboratories. The highest hazard level is medium-risk, which consists of 3 hazard identifications. Risk controls need to be continuously implemented in order to control hazards that might be occurred.

Keywords: *laboratory, HIRADC, hazard*

Introduction

A laboratory is a place to carry out an experiment. Working in a laboratory requires cautious behavior in treating or using equipment and materials in the laboratory. This is intended to scale down the possibility of occupational accidents in a laboratory. Amongst of the potential hazards that are likely to happen in a laboratory are fire, poisoning, and equipment damage.[1]

Everything that contains danger is fundamentally sustained by the risk management to control hazards that can potentially cause several risks in occupational safety and health to prevent unwanted occupational accidents comprehensively, planned, and structured under a well-managed system. The number of hazard aptitude is determined by the possibility of the occurrence of the incidental accidents as well as by the severity it may cause.[2]

According to the International Labour Organization (ILO), 2.78 millions of workers are reportedly dead each year due to occupational accidents and occupational illnesses. Approximately 2.4 million (86.3%) of these deaths are caused by occupational illnesses, while more than 380,000 (13.7%) are caused by occupational accidents.[3] Referring to the data provided by National Social Security (re BPJS Ketenagakerjaan), the number of occupational accidents in Indonesia is still massive. In 2015 alone, 110,285 cases of occupational accidents were disclosed, while in 2016, 105,182 cases were detected. In addition, until August 2017, National Social Security attained the number of 80,392 cases of occupational accidents.[4]

The big number of accidents must not be underestimated. A laboratory as a workplace in which several of hazard risks can be discovered must have control to reduce the number of occupational accidents in Indonesia. OHSAS 18001 is one of occupational safety and health management systems with an international

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standard that aims to provide safety for workers from unwanted matters that might arise from workplaces or working activities itself. In accordance with the requirements given by OHSAS 18001 clause 4.3.1, an organization must set a procedure and conduct Hazards Identification, Risk Assessment, and Determining Control, which also known as HIRADC.[5]

A laboratory as a place with high risk of danger should also be carried out by HIRADC (Hazard Identification Risk Assessment Determining Control) analysis that roles as an indispensable element in occupational safety and health management system since it directly relates to the prevention and hazard control used to determine the objectives and intentions of occupational safety and health. The carried out HIRADC analysis is expected to reduce hazard risks that might arise in a laboratory.

Method

Study Population and Analysis: This research implemented observational approach and cross-sectional. The data were analyzed descriptively by elaborating the hazard potentials in the area in which the research was conducted to obtain risk assessments and determining controls. This research was carried out in Nutrition Laboratories of Faculty of Public Health, Universitas Airlangga Surabaya, namely the Laboratory of Nutrition Processing and the Laboratory of Biochemistry and Nutrient Processing Analysis. These locations were chosen as the locations of the research due to the fact that there had not been similar research carried out. The variables used in this research were the working activities in the laboratories, hazard sources, assessment, and risk control. The data gathered from this research are known as the primary data, which were obtained by observation. In addition, the results of the observation were presented in the form of narration and table before analyzed descriptively to draw a conclusion.

Risk Assessment: There are three main focuses in HIDARC, namely the attempt to perform hazard identifications and its characteristics, which is followed by filling up the assessment, risks of existing hazards, and last, recommending control endeavors that are likely to be executed.

Hazard identification is done to monitor high-risk workloads and underline the hazards related to certain equipment. Hazards in a working environment can be categorized into three major groups, for instance, health hazards, safety hazards, and environment hazards.[6] After that, evaluate risks whether the risks are acceptable or not is measured. To measure the score level of the risk, it is important to understand two main components, namely Likelihood, and Severity.The criteria to assess Likelihood can be seen in Figure 1, while the criteria to assess Severity are presented in Figure 2.

LIKELIHOOD(L)	EXAMPLE	RATING
Most Likely	The most likely result of the hazard/ event being realized	5
Possible	Has a good chance of occurring and it is not unusual	4
Conceivable	Might be occur at sometimes in future	3
Remote	Has not been known to occur after many after	2
Inconceivable	Is practically impossible and has never occurred	1

Source: **Department of Occupational Safety and Health Malaysia** *(2011)*

Figure 1: Likelihood Criteria

SEVERITY(S)	EXAMPLE	RATING
Catastrophic	Numerous fatalities, irrecoverable property damage and productivity	5
Fatal	Approximately one single fatality major property damage if hazard is realized	4
Serious	Non-fatal injury, permanent disability	3
Minor	Disabling but not permanent disability	2
Negligible	Minor abrasions, bruises, cuts, first aid type injury	1

Source: **Department of Occupational Safety and Health Malaysia** *(2011)*

Figure 2: Severity Criteria

After obtaining the severity level of risks, the control to suppress the risk level to become as low as possible is likely to be done.[7]

Result

According to the observation, in the Laboratory of Biochemistry and Nutrient Processing Analysis, five items of hazard identifications as displayed in Table 1 were discovered.

Table 1: Hazard Identifications in the Laboratory of Biochemistry and Nutrient Processing Analysis

No.	Activity	Hazard Source
1.	Food nutrient analysis (mixing food ingredients with reagents)	Acid reagent and concentrated base (heated up to 400° C in a fume hood)
		Heat from the fume hood
2.	Biochemistry analysis (mixing reagents and human body sample)	Reagents (Acid and strong base with high concentration)
		Droplets from human (blood, urine, saliva, hair)
3.	Biochemistry and nutrient analysis practices with a minor accident	No First Aid kit in the laboratory

Table 2: Hazard Identifications in the Laboratory of Nutrition Processing

No.	Activity	Hazard Source
1.	Peeling and cutting food ingredients to be processed	Sharp food ingredients
		Knife
		Bacteria
2.	Washing food ingredients and utensils	Bacteria
3.	Cooking foods on a stove and deep fryer	LPG
		Heat
		Hot oil
4.	Cooking foods using a microwave	Heat
		Electricity
5.	Cooking foods using an oven	Heat
6.	Food processing practices with a minor accident	No First Aid kit in the laboratory

The hazard sources discovered in both laboratories contribute to risk accidents and diseases caused by the work done in both locations. Referring to the terms proposed by AS/NZS 4360, in order to correctly measure the risk level of each hazard, the assessment of two components, Likelihood and Severity, from point 1 to 5 based on the possible risk occurrences needs to be done.[7] The information is presented in Table 3 and Table 4.

Table 3: Likelihood and Severity of the Laboratory of Biochemistry and Nutrient Processing Analysis

Hazard Source	Risk	Likelihood	Severity	Risk Level
Acid and concentrated base reagent (heated up to 400° C in a fume hood)	Fluid exposed to the skin	1	3	Low
	Fumes inhaled and enter the respiratory tract	2	3	Moderate
Heat from a fume hood	The heat from the heating devices exposed to the hands	1	2	Low
Reagents (Acid and strong base with high concentration)	Fluid exposed to the skin	1	3	Low
	Fumes inhaled and enter the respiratory tract	1	3	Low

Conted…

Droplets from human (blood, urine, saliva, hair)	Droplets exposed to the skin tissues	1	1	Low
	Droplets swallowed or inhaled and enter the human body	1	2	Low
No First Aid kit in the laboratory	Injuries cannot be treated with First Aid and caused more severe wounds	2	3	Moderate

Table 4: Likelihood and Severity of the Laboratory of Nutrition Processing

Hazard Source	Risk	Likelihood	Severity	Risk Level
Sharp food ingredients	Sliced by sharp food ingredients	1	2	Low
Knife	Hands sliced by a knife	2	2	Low
Bacteria	Food contaminated by bacteria	1	1	Low
Bacteria	Food ingredients and utensils contaminated by bacteria	1	1	Low
LPG	Exploding and fire	1	4	Low
Stove heat	The heat from the stove or heat-conductor utensils exposed to the hands	2	2	Low
Hot oil	Hot oil exposed to the hands	2	2	Low
Food heat	Hot food products (burn) exposed to the hands	2	2	Low
Electricity	The electric shock when connecting the cable to the socket	1	2	Low
Oven heat	Hot oven and food products (burn) exposed to the hands	2	2	Low
No First Aid kit in the laboratory	Injuries cannot be treated with First Aid and caused more severe wounds	2	3	Moderate

The following step to be performed is assessing risk levels by alluding the risk matrix as shown in Figure 3. The meeting point of Likelihood and Severity is the one that determines whether the risk level belongs to a low, moderate, or high level. Moreover, in elaboration, if the meeting point of Likelihood and Severity is in the green area, it can be presumed that the risk level is low. However, if the meeting point is in the yellow area, it is considered as moderate and high if it belongs to the red area.[7]



Source: **Department of Occupational Safety and Health Malaysia** *(2011)*

Figure 3: Risk Matrix

The high-risk level requires immediate actions to control hazards in accordance with five hierarchy controls. The moderate-risk level, on the other hand, compels designed approach in hazard controls as well as executes alternative plans if needed. Additionally, for the low-risk level, the hazards are still likely to be accepted and not in need of further control. [7]

Discussion

Hazard Identification

1. **The Laboratory of Biochemistry and Nutrient Processing Analysis:** In the hazard identification discovered in the Laboratory of Biochemistry and Nutrient Processing Analysis, it was settled that the reagent is the main hazard in the laboratory. Other than that, the reagent liquid is believed to be dangerous if exposed to the human body. Moreover, the reagent needs to be heated. Thus, it can be presumed that beside the reagent liquid that originally contains chemical matters, instruments and utensils with high temperatures as well as fumes from the reagent heating process are also undoubtedly alarming. Unfortunately, the subjects who perform such tests seem to underestimate the consequences and resulting to inhale the alarming fume.

   Other than food substances, the Laboratory of Biochemistry and Nutrient Processing Analysis also evaluates the biochemistry taken from the human body as the sample, for instance, blood, urine, saliva, and hair. Those samples are considered as hazards since they can transmit diseases. Therefore, it can be stated that doing activities in a laboratory means living close to danger, according to the survey conducted by Education Bureau in 2011/2012 regarding accidents in school laboratories in 401 middle schools which enlisted the reported 348 cases of laboratory accidents. From the survey, the results showed that 328 people were injured, with the percentages of 39.1% of grazes, 37.6% of minor burns, 8% of accidents on the eyes, and 7.2% of exposure to chemical substances.[8] First Aid kit needs to be stacked to anticipate minor accidents. However, regrettably, there is no First Aid kit spotted in the Laboratory of Biochemistry and Nutrient Processing Analysis.

2. **The Laboratory of Nutrition Processing:** In the Laboratory of Nutrition Processing, activities to process foods are the main activities performed. The processing equipment that is most likely to cause danger is a knife, providing it has a sharp side that can be a cause of grazes. Additionally, stoves and ovens in high temperatures that can cause burns and LPG that may explode. Other than that, food ingredients such as pineapples, shrimps, and fish can also be considered as the potential hazard sources. If food ingredients are contaminated with bacteria due to unclean washing process or un-fresh ingredients, the bacteria itself may transfer to the laboratory workers. Moreover, heated oil is presumably causing accidents, for example, hands splashed by hot-temperature oil. The Laboratory of Nutrition Processing, unfortunately, does not provide First Aid kit, resulting in minor accidents cannot be immediately treated.

Risk Assessment

1. **The Laboratory of Biochemistry and Nutrient Processing Analysis:** The average hazard level discovered in the Laboratory of Biochemistry and Nutrient Processing Analysis is the low-risk level, providing the occurrences hardly arise when doing such activities in the laboratory. Even so, the score of 2 in Likelihood aspect is given for fumes inhaled when processing food ingredients and untreated minor accidents due to the absence of First Aid kit in the laboratory.

   As for the Severity aspect, the average point given for the Laboratory of Biochemistry and Nutrient Processing Analysis is 3. Likewise, the risk of droplets exposed to skin tissues causing blisters, bruises, wounds, and worries resulting those hazards be given the Severity point of 1. As for the risk of hands exposed to the heat from a fume hood and droplets swallowed, the hazards be scored 2 points of Severity aspect since it may cause non-permanent disabilities.

   From the elucidation above, it can be concluded that there are only two hazards that are considered as moderate, namely fume reagents inhaled during food nutrient analysis and the absence of a First Aid kit.

2. **The Laboratory of Nutrition Processing:** The danger of processing equipment in the Laboratory

of Nutrition Processing such as knives, stoves, and ovens be given the score of 2 in Likelihood aspect. The same score is also given to hot oil, food heat, and the absence of First Aid kit. The explosion of LPG and electric shock accident records are nowhere to be found, causing both hazards to be given the score of 1 in Likelihood aspect.

For the Severity aspect, the highest score of Severity, 4, is attained from the explosion of LPG since it may be resulting in fatal injuries and the damage of properties. In contrast, the lowest Severity score is obtained by the bacteria in food ingredients and processing equipment, which each gets a score of 1. The Severity level with the score of 3 is only spotted in the risk caused by the absence of First Aid kit. As for the other hazards, the score given is 2 due to the fact that it does not cause any severe injury.

In broad, it can be stated that all hazard risks in the Laboratory of Nutrition Processing on average, attained the score of the low-risk level. Hence, one point that cannot be ignored is the absence of First Aid kit, which belongs to the moderate risk level.

Risk Control

Control actions are needed to prevent occupational accidents that can result to fatal injuries.[9] Amongs of the actions that can be executed are:

a. Administering briefing concerning on the proper and safe experiment instructions before each experiment (Standard Operating Procedure of the experiment and Experimental Instructions)

b. Administering briefing on how to properly and safely process food ingredients

c. Administering briefing on how to properly use knives or hazard-possible instruments that it can be safely used by the users

d. Administering briefing on proper personnel and equipment hygiene sanitation

e. Making regulations to wear Personal Protective Equipment (*APD)* such as rubber gloves, masks, goggles, and a laboratory coat

f. Placing LPG that are far from flammable substances and in a stable temperature

g. Procuring First Aid kits as needed to treat minor injuries caused by minor accidents when doing activities in the laboratory

h. Procuring Personal Protective Equipment, such as heat resistant gloves to minimize the possibility of hand exposed to hot equipment

Some of the elaborated suggestions above are reckoned to be considered in order to control hazards in laboratories to prevent occupational accidents and severe occupational illnesses.

Conclusion

The Laboratory of Biochemistry and Nutrient Processing Analysis and the Laboratory of Nutrition Processing in the Faculty of Public Health, Universitas Airlangga come with different types of hazards. The Laboratory of Nutrition Processing has more potential hazards (10 hazards) than the ones in the Laboratory of Biochemistry and Nutrient Analysis (5 hazards). Nonetheless, the risk levels discovered in the Laboratory of Biochemistry and Nutrient Analysis in moderate-level are reported more with the number of two, obtained from the risk of inhaling reagent fumes while analyzing food substances and the absence of First Aid kit in the laboratory. On the other hand, the Laboratory of Nutrition Processing only has one category of moderate-risk level: the absence of First Aid kits. Thus, it can be assumed that both Nutrition Laboratories in the Faculty of Public Health are considered quite safe inasmuch as no high-risk level of hazards discovered. As a matter of fact, only a few are scored a moderate-risk level. However, risk controls are still essential to be done in order for the hazards to be controlled.

Ethical Clearace: Taken

Source of Funding: Sponsored by University

Conflict of Interest: None

REFERENCES

1. Suyitno A., Sukirman. Biology for Junior High School. Bogor: Yudhistira. 2008.

2. Ramli, Soehatman. Occupational Health & Safety Management System OHSAS 18001. Jakarta: PT. Dian Rakyat. 2010.

3. Organisasi Perburuhan Internasional (ILO). Improving the Safety and Health of Young Workers. Jakarta: ILO. 2018

4. Anonim, BPJS Ketenagakerjaan. [Internet]. BPJS. 2018. [cited 22 January 2019]. Available from: https://www.bpjsketenagakerjaan.go.id/berita/18057/Menaker-Hanif-dorong-pemda-bikin-komitmen-Keselamatan-dan-Kesehatan-Kerja-(K3)-di-Wilayahnya.
5. OHSAS 18001. Occupational Health and Safety Management System Requirements 18001. 2007.
6. Mallapiang, F. dan Ismi A. S. Hazard Potential Analysis and Its Control With the HIRAC Method. Al-Sihah. 2014;6(2).
7. Department of Occupational Safety and Health Malaysia, 2011. Guidelines for hazard identification, risk assessment and risk control (HIRARC). Putrajaya: Ministry of Human Resources Malaysia, pp. 7-18.
8. Education Bureau. Results of The Survey on Laboratory Accidents in Secondary Schools in 2011/2012 School Year. [Internet]. The Government of the Hong Kong Special Administrative Region. 2013. [cited 29 January 2015] Available from: http://applications.edb.gov.hk/circular/upload/EDBCM/EDBCM13055E.pdf.
9. Prihatiningsih, S. dan Tjipto Suwandi. Application of the HIRADC Method as an Accident Prevention Effort on Rewinder Machine Workers. The Indonesian Journal of Occupational Safety, Health and Environment. 2014;1(1):73-84v

Risk Analysis of Accidents and Occupatioal Disease in Ohs (Occupational Health and Safety) Laboratory

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ABSTRACT

The application of Occupational Health and Safety is an important aspect that should be applied in a laboratory unit. Laboratory is a unit used to apply the theories taught in class and also as a means to study the academic activists. A laboratory is a facility that has potential hazards both directly and indirectly. Potential hazard is commonly referred to all sources, situations, or activities that could potentially cause injury (accident) or occupational diseases. Potential hazard causes not only an injury or occupational diseases caused in working, but can result in losses of material and environment for the surrounding communities such as fire, explosion or pollution due to the laboratory activities. Hazard in the laboratory is often not realized by those who are in the laboratory. This is due to the absence of assessment standards and poor socialization or learning about the potential hazard that make it is necessary to identify the level of hazard in a university laboratory. The object of this research study was laboratory of Department of Occupational Health and Safety at Faculty of Public Health, Universitas Airlangga, Surabaya. This research study was an observational research because the researcher only did observations without giving treatment. The research design used in this research study was a cross-sectional study because the research study was conducted at one particular time. The tool used to analyze risk was HIRADC (*Hazard Identification Risk Assessment Determining Control*). There were ten hazards that exist in the laboratory. The source of hazards were seen from the attitude at work, materials, and equipment, environment and the way of working. The results of the research study found that the risk level in the laboratory of OHS (Occupational Health and Safety) Department of Occupational Health and Safety Universitas Airlangga was 60% (low). The control could be done through the engineering control, administrative control, and the use of personal protective equipment (PPE).

Keywords: *Hazard Identification Risk Assessment Risk Control, Hazard, Risk analysis*

Introduction

Workplace certainly has the potential hazard that can cause accidents. One of the workplaces is the laboratory. Educational research unit, hereinafter referred to as laboratory, is academic support unit in educational institutions, in the form of closed or open spaces, permanent or movable, systematically managed for testing, calibration and/or production activities on a limited scale, by using equipment and material based on certain scientific methods, in the context of implementing education, research study, and/or community service (Permenpan RB Number 03 Year 2010). Laboratory is managed by technicians or laboratory staff known as Educational Laboratory Institutions.[3]

Educational Laboratory Institutions are positions that have scope, duties, responsibilities, and authorities to conduct management of educational laboratories occupied by Civil Servants with rights and obligations given in full by authorized officials. In the laboratory, there are rules and orders that must be obeyed by each laboratory user.

The existing regulations in Indonesia related to the implementation of Occupational Health and Safety are

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Law Number 1 Year 1970 on Occupational Health and Safety. Government Regulation Number 50 Year 2012 on Implementation of Occupational Health and Safety Management System. It states that the Occupational Health and Safety Management System applied must be in accordance with the national policy of Occupational Health and Safety Management System. OHS Management System includes the establishment of OHS policies, OHS planning, implementation of Occupational Health and Safety plan, monitoring of Occupational Health and Safety, evaluation of OHS performance, and reviewing and improving the performance of OHS.[5]

Entrepreneurial or Education Laboratory Institutions at least conducts an initial review of Occupational Health and Safety conditions such as hazard identification, risk assessment, and risk control. Risk assessment and risk control or commonly known as HIRADC is a method of the OHSAS 18001:2007 standard. Organizations in conducting hazard identification and risk assessment must pay attention to the scope, nature, and time to ensure the method is proactive and provide identification, priority and risk documentation, and application of controls as needed.[2]

The Global Estimates Fatalities reported that 6,000 workers worldwide had lost their lives every day due to accidents and work-related illnesses/occupational diseases. Based on the data from Social Insurance Administration Organization (BPJS), number of accidents remained in high each year. In 2015, there were 110,285 cases of occupational accidents. In 2016, as there were 105,182 cases of occupational accidents with cases decreased by 4.6%. Meanwhile, currently the number of occupational accidents in Indonesia is around 80,392 cases.[7]

Workplace accidents can be caused by mistakes and negligence in the use of machinery or the equipment in the workplace, disobeying the work procedures, lack of job training, unavailability of occupational health and safety equipment. As well as the workplace accidents that occur in the laboratory.

Department of Occupational Health and Safety, Faculty of Public Health is a leading educational facility and is very supportive of the academic community in developing research study, so that it always striving to increase and improve the best quality of all facilities in it.

Working in laboratory unit of Occupational Health and Safety or working in other laboratory has various hazards. Workplace accidents that occur can not be separated from the hazards that exist both physical, chemical, biological, ergonomic, and other hazards. The occupational accidents are high electrical tension, scratches, contracting diseases, punctured by lancet, and others. Occupational accidents in laboratory unit of Occupational Health and Safety must be identified, analyzed, and controlled to prevent the workplace accidents.

Therefore, this research study aims to analyze the risk of hazards using the Hazard Identification Risk Assessment Risk Control in laboratory unit of Occupational Health and Safety as an effort to prevent and control the risks of occupational accidents and occupational diseases to the laboratory users.

Material and Method

This research study was an observational research because the researcher only did observations without giving treatment during the research study. The research design used in this research study was a cross-sectional study; the data collection was carried out in a certain period of time.

The data analysis of this research study was descriptive because the researcher only described the process and data collected without analyzing the relationships between variables. The tools used in this research study were *hazard identification, risk assessment,* and *risk control.*

This research study only used primary data obtained through interviews and observations. Interviews were carried out to the laboratory staffs who were responsible for the laboratory unit of OHS or referred to as the Education Laboratory Institutions. Observations were made to obtain information related to work performed, sources of hazard, existing risks, and risk control efforts that had been made. The results of data collected and analyzed were presented with narrative text and HIRADC tables.

Finding

The laboratory unit of OHS, Department of Occupational Health and Safety, Universitas Airlangga had various activities; activities that had a source of hazard and would pose a risk to Occupational Health and Safety. The HIRADC method was used as a first

step that could be used to prevent the occurrence of risks that could cause workplace accidents. The first step was Hazard identification was performed on ten laboratory activities in the laboratory unit of OHS. The ten laboratory activities identified the hazard of each activity performed.

The next step was risk assessment of each hazard. Risk analysis was performed with qualitative methods by assessing aspects of opportunity or likelihood and severity which were then evaluated using a risk matrix as referred to the *Australian Standard/New Zealand Standard (AS/NZS 4360: 2004)*[1].

Risk assessment was conducted when laboratory activities began. The source of hazard had ten risks. There were six risks with a low category, three risks with a medium category, and one risk with a high category. The results of the risk assessment based on the calculation of likelihood and the severity which was converted using the risk matrix table, will be used as the next step, that was determining control.

Risk control had been performed by the laboratory staff on hazards or risks from each laboratory activity based on the findings or events occurred. By trying to compare the results of the risk assessment with the control efforts, then it will be known what attempts were still less effective. Therefore, hazard control can be performed using a hazard control hierarchy, namely elimination, substitution, engineering control, administrative, and the use of PPE (personal protective equipment.

1. **Hazard identification:** Activities conducted in laboratory unit of OHS had a variety of potential hazards such as the use of electrically powered equipment, the up and down of the bench, the use of sharp materials, the use of mouthpieces, non-functioning of water wash, and equipment cluttered or not placed properly. Potential hazard of using electrically powered equipment could cause electricity issues that were not in accordance with the MCB, so that the electricity could be interrupted, which might cause short circuit, or fire.

   Physical fitness practicum activities had potential hazards when the bench going up and down. If going up and down a bench happened in an incorrect position, it could cause muscle pain. Then, if the bench did not have strong feet, it could also cause accidents.

   At the time of the blood chemistry test using lancet, cotton, and capillary tube, these objects could transmit other people's blood from the remaining blood. In addition, the lancet could cause punctured or scratched skin due to the sharp lancet.

   At Laboratory unit of OHS, at the time of delivering the materials, the chair used was not ergonomic because it did not have a backrest and a right armrest. In addition, the chair used did not have a cushion on the buttocks.

   Water wash in laboratory unit of OHS could be used. This might cause the chemical that splashed into the eyes could not be washed easily. Therefore, these chemicals could cause irritation.

   Then the equipment in laboratory unit of OHS was in a mess condition and was not placed in the proper place. So, the equipment could be dropped, damaged, or lost.

2. **Risk Assessment:** After identification of hazard was performed, the source of hazard or potential hazard would have a risk impact. The risk impact was categorized into three categories, those were low, medium, and high category. The three categories were derived from calculations that refer to AS/NZS 4360:2004[1].

   Risk = Likelihood × Severity

   Based on the results of the risk assessment, there were ten risks. There were six risks with low category, three risks with medium category, and one risk with high category.

   Low-risk categories were the risk of injury and unable to perform the first aid, disease transmission through saliva or blood, eye irritation, time efficiency, and equipment damage. The risk with the medium category was the occurrence of severe injuries, the occurrence of symptoms of MSDs (*musculoskeletal disorders*), and falling equipment could injure another person. Then, for a high-risk category, that was electric shock or fire due to a short circuit.

Table 1: Risk Analysis and Risk Level

No.	Activity	Sources of Hazard	Risk	Risk Analysis		Risk Total	Risk Level
				L	S		
1.	Scratched sharp end of the room sides. Cut during practicum.	Equipment/sides of the room that could cause injury.	Unable to perform the first aid in case of accidents and injuries become more severe.	4	1	4	Low
2.	Falling down on the bench at the physical fitness laboratory.	When doing practicum, the practitioner can be negligent and lead to accidents.	Causing serious injury. Not yet happened but can happen at any time.	2	3	6	Medium
3.	The use of equipment with electric power When the learning process conducted, it is often interrupted.	Electric current is not in accordance with MCB (Miniature Circuit Breaker).	Electricity off when practicum is conducted. It can cause fire.	2	5	10	High
4.	Using someone else's mouthpiece that has been used in Pulmonary Physiology Laboratory.	When doing practicum, the practitioner can neglect to put the transducer used, not directly disposed in the place provided for disposal.	Transmission of disease through saliva.	2	2	4	Low
5.	The use of lancet, cotton, and capillary tube in blood chemistry laboratory after use.	Punctured by someone else's lancet. Exposed to other people's blood from cotton and capillary tube.	Transmission of blood-borne diseases.	1	4	4	Low
6.	*Air wash* does not work or often die	When getting foreign object in the eye	Eye irritation.	1	3	3	Low
7.	Wooden seating/ wooden benches are too old and many are not sturdy/strong.	Less ergonomic chair. Fell from the chair.	Symptoms of MSDs.	5	1	5	Medium
8.	Place the goods/tools above the cabinet (administration room).	Tool or item dropped when taken.	Injuring the person who took the tool item.	5	1	5	Medium
9.	Place a tool that can still be used and cannot be used as one.	Enable chemical reactions between tools.	Rust occurrence. Material loss. Time efficiency when searching.	4	1	4	Low
10.	The tool can not be used properly or damaged.	Do not know whether the tool is functioning properly or not.	Tool damage.	4	1	4	Low

3. **Determining the Controls:** Determining control in laboratory unit of OHS had been performed but the determining control was still not effective. This was because the laboratory staff did not conduct former HIRADC; they only looked at risks that could be observed by the eye but not thoroughly. The HIRADC method could help the existing determining controls and which risk could be prioritized to be controlled first.

   Determining control applied a control hierarchy. At low-risk category, determining control efforts could be done by elimination, that was eliminating or separating equipment which was not usable and could still be used. Besides that, it was also performed administratively, such as the procurement of equipment and the placement of first aid kit in accordance with PER.15/MEN/VIII/2008, Yellow Trash Bag (B3) was placed beside the spirometer.[4]

   Laboratory staff supervised the practicum by controlling the provision of Safety Box. Laboratory staff administered the place of the practicum, Laboratory staff proposed to procure a pump so that the water could be supplied to the laboratory room and the water wash functioned properly and the recapitulation sheets existed when the tools were used. Hence, if it did not function properly, calibration could be done immediately.

   Risks with the medium category was controlled by administrative way such as Making rules or SOPs for those who would enter the laboratory area; printed and put in front of the entrance (prohibition of eating, drinking, using cellphones when not needed, the use of PPE, and the use of tools). Add SOPs and rules in each lab chapter in the General Practicum Guide. For example, conditions that are permitted as a *role model* had to be in a healthy condition, not fasting, and menstruate. It needed provision of bearings on wooden chairs, repairment for the chairs that were felt to be less sturdy such as the addition of nails and so on. Replacement also needed to be performed for the seats/chairs that were truly not feasible, and also applying and maintaining 5R (Concise, Neat, Clean, Care, and Diligent).

   Whereas the high-risk category was performed using elimination, that was MCB replacement in the laboratory and performing routine checks every month.

Conclusion

Risk assessment using HIRADC in laboratory unit of OHS had various sources of hazard. There were ten potential hazards from laboratory activities.

The ten potential hazards may pose different risks. There were three categories of risk assessment, those were low-risk category, medium-risk category, and high-risk category. The results of the risk assessment had ten risks. There were six risks with low-category, three risks with medium-category, and one risk with high-category.

Determining control efforts performed followed a hierarchy of controls, those were elimination, substitution, engineering control, administrative control, and the use of PPE.

Ethical Clearance: Taken

Source of Fundings: Sponsored by University.

Conflicts of Interest: There are not any of conflicts amongst the authors.

REFERENCES

1. AS/NZS 4360. *3rd Edition the Australian and New Zealand Standard on Risk Management.* Australia. Broadleaf Capital International Pty. Ltd; 2004
2. OHSAS 18001. *Occupational Health and Safety Management System Requirements*; 2007
3. Administrative and Bureaucratic Reform Minister (Republic Indonesia). Regulation of the Minister of Administrative and Bureaucratic Reform Number 3 about Functional Position of Educational Laboratory Institution and the Credit Numbers; 2010
4. Manpower and Transmigration Minister (Republic of Indonesia). Regulation of the Minister of Manpower and Transmigration Number 15 about First Aid in the Workplace. Jakarta; 2008
5. President (Republic of Indonesia). Government Regulation Number 50 about the Implementation of Occupational Safety and Health System. Jakarta. 2012;2(7:3).
6. Constitution (Republic of Indonesia). Law Number 1 about Occupational Health and Safety;1970
7. Vendamawan R. Chemical Laboratory Management. Semarang. Metana; 2015

Gluten-Free Diet: Positive and Negative Effect on Human Health

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ABSTRACT

This article discusses the effects of a gluten-free diet on the human body suffering from various diseases (celiac disease, autism, allergies). The article highlights both the positive and negative effects of a gluten-free diet on the human body. In addition, the article provides a brief overview of gluten-free food technologies (confectionery, bakery products).

Keywords: *gluten, gluten-free diet, celiac disease, gluten-free foods, bakery products, technology*

Introduction

A gluten-free diet which is also known as the GFD is a kind of diet that firmly eliminates gluten. While gluten is the combination of different types of proteins that are specifically found in wheat and all the products related to wheat. It is also found in products like barley, oats, and rye. Gluten is contained not only in all baked products, wheat bread, pasta and macaroni products, but also in all kinds of foods made with the addition of wheat flour as a thickener - for example, semi-finished products, sauces and ketchups. The term "gluten" is applicable to a combination of simple prolamin (rich in proline), called "gliadins", and glutelin (rich in glutamine), called "glutenins" the cereal proteins[1].

Table 1: Content of gluten in different type of flour[2]

Type of flour	Protein content in 100g	Gluten content in 100g
Wheat flour	10 – 14 g	3.0 – 5.0 g
Barley flour	11 – 12 g	2.2 – 2.8 g
Rye flour	9 – 10 g	2 – 2.5 g
Oat flour	10 – 11 g	2 – 2.2 g
Millet	10 – 11 g	1.5 – 1.7 g
Dinkel wheat	10-15 g	0.3 – 1.0 g

The presence of specifical oats in a gluten-free diet is questionable because it can be dependent on the cultivar of oat and also the repeated cross-contamination through other gluten-containing cereals could be the reason of this[3]. A specificity of gluten protein is that it has a very low quantity nutritional as well as biological value. Research says that the presence of grains that specifically consist of gluten is not necessary for the human diet. On the other hand, an unstable amount of food, as well as an improper section of gluten-free replacement foodstuffs, could be the reason for nutritional deficiencies. Nutritional difficulties can be prohibited with the help of accurate dietary education[4].

Celiac disease (gluten-sensitive enteropathy) is a disease caused by the inability of the intestine to digest gluten from cereals. Celiac disease can occur in various clinical forms, not always explicitly. In fact, there are latent or hidden, clinically unexpressed and without obvious symptoms, monosymptomatic forms or forms with all intestinal and extraintestinal, clinical symptoms. It is not yet determined the method of preventing the development or treatment of celiac disease. Therefore, only a gluten-free diet is the only therapy that can ensure good health for people affected by celiac disease[5,6].

Benefits of a Gluten-free diet: One of the biggest benefits of a gluten-free diet is that it is helpful to improve the level of energy at a higher rate. There are various forms of gluten intolerance and also it has numerous severities but those don't have adverse effects

on the health of the human body. A gluten-free diet is also helpful to overcome the management of Autism. Autism is a mental disorder that usually takes place in the child of age two or less than that. For the treatment of this disorder, different therapies are recommended and a Gluten-free diet is also suggested by the doctor[7].

According to research it is also observed that a gluten-free diet is helpful to reduce weight however evidence for this claim is less but research says it is useful to diminish weight. A gluten-free diet is also helpful to absorb nutrients from the diet. By the absorption of nutrients, cellular activity of human body is improved so it can be beneficial for the human body. Gluten is the special kind of protein that is linked with the high intensities of swelling in the body that can be the ultimate source of a high level of oxidative stress in cells. The cells that are under oxidative stress can be the reason for cancerous changes[8].

Inflammation is the process that happens at the very first stage of many cancerous variations. In this case, the immune system might be inhibited instantaneously and incapable to take care of cancerous fluctuations in the very first stage. A gluten-free diet is also helpful to improve the overall immunity of the body. There are most of the diseases of heart and blood vessels that are caused just because of the inflammation and Gluten-free diet is helpful to reduce the inflammation so ultimately reduces the risks related to heart diseases[9].

A gluten-free diet also helps to reduce allergies. Gluten bigotry also establishes externally, as repeated occurrences that look like dermatitis that comes under the common occurrences. Though these can be managed with the help of application of contemporary anti-itch ointments, using an ointment is a much-recovered idea to avoid the rashes in the initial place. Urticaria is the type of allergy and also known as hives happens commonly in individuals with gluten allergies. So these types of allergies can be controlled with the help of a gluten-free diet. According to research, this diet is also helpful to improve fertility and risk of spontaneous miscarriages can also be controlled by a Gluten-free diet[10].

Some other positive impact of a gluten-free diet includes fewer headaches as well as less joint pain. Nutritional difficulties can be prohibited with the help of accurate dietary education that can suggest either to take a gluten-free diet or not. However, a strict gluten-free diet can also have some negative effects on the human body and these are as follows.

Negative effects of a Gluten-free diet: According to research, it is estimated a gluten-free diet has not enough quantity of fiber in the overall diet so it can be the reason for constipation. Whole wheat and food related to that has a huge quantity of gluten and these are also the major sources of fiber. On the other hand, gluten-free food consists of potato, tapioca as well as white rice that don't have the adequate quantity of fiber as per the requirement of the human body. Diet consist of fiber, though indigestible, plays an essential role to reduce the level of constipation. It is also helpful for keeping the bowel movements regular as well as soft. To prevent constipation while taking a gluten-free diet it is also very important to take the adequate quantity of food that is rich from the fiber.

Gluten-free including different types of grains, brown rice, quinoa as well as millet, fruits, vegetables, seeds, and nuts don't have an adequate quantity of fiber so causes constipation[11]. According to research, it is found that the people who are taking a gluten-free diet face the issue of nutrient deficiency[12]. There are lots of gluten-containing foods including the bread; cereal, as well as pasta and these, are richer form vitamins as well as a mineral. These are also helpful to fulfill the demand of human freedom that is lacked in a gluten-free diet. So the fact is gluten-free forms of these kinds of foods are less probable to be exhilarated. Just because of this human body face the deficiency of B vitamins and iron[13].

To evade such kind of deficiencies, there is a need to eat a balanced diet and also the person must take a multivitamin supplement[14]. There are some undesirable things that happen with the body while taking a gluten-free diet. These include less gas, bloating as well as diarrhea. So by taking a gluten-free diet digestive system of human body is disturbed and within 6-8 months effects can be adverse than before[15]. So these are some negative effects of a gluten-free diet on the human body.

Technology and formulation of gluten free food products: Currently, the production of gluten free food products, in particular confectionery products, is of particular concern in worldwide. One of the methods of production is to use in the formulation of flour of minor types as the main raw material.

The patent[16] describes the method of production of gluten free cake. The method involves following processes: churning margarine and granulated sugar to

form a homogeneous mass within 10-15 minutes. Then adding eggs and salt and mixing for 20 minutes. Sifted cornmeal and rice flour, starch and baking powder are gradually added to the finished mass. Next, candied fruits and grinded lemon are added. The molding is carried out in the treated non-stick coating form. Muffins are baked at 200 °C for 20-25 minutes and cooled to room temperature. The method of production allows to obtain gluten free cake with balanced amino acid composition and enriched with dietary fiber.

The authors[17] developed the technology and formulation of gluten free wafers. It comprises, wt.%: rice flour 12.0, buckwheat flour 48.0, sugar 18.4-19.0, fat component 8.0-10.0, chicken egg 3.3 -3.7, invert syrup 2.4-2.7, salt 0.3-0.5, drinking soda 0.3-0.5, ammonium salt 0.1-0.3, potato starch 2.0 -3.0, drinking water up to 100. The ratio of rice and buckwheat flour is 1:4. The proposed wafers is aimed expanding the range of gluten-free flour confectionery products and the possibility of using them in the nutrition of patients suffering from celiac disease, due to increased nutritional value and the lack of gluten.

Zharkova et al.[18] developed gluten free bread formulation and method of production. This method for the production of gluten-free bread includes the preparation of dough from gluten-free raw materials containing corn starch, granulated sugar, edible salt, baker's dry yeast, vegetable oil, thickener. Then the molding and baking process is performed. The gluten-free raw materials additionally contain amaranth flour, and xanthan gum is used in the following ratio, wt%: amaranth flour 18,5-29,3; corn starch 18.1-29,9; granulated sugar 2,1-2,2; dry yeast 0,31-0,326; xanthan gum 0.19-0.25; vegetable oil 2,47-2,48; table salt 0,745-0,761; water - the rest. The invention provides improved quality and nutritional value and expanded of the range of gluten-free products.

Another gluten-free bread production method includes kneading dough from a gluten-free mixture, water, sunflower oil and yeast. Gluten-free mixture contains the following ratio of components, wt.%: corn starch 51,5-56,5; rice flour 20.0-25.0; soy protein 9.7-10.0; salt 0.8-1.0; granulated sugar 2.0-2.5; food citrus fibers Herbacel AQ Plus 1.2-1.5; lecithin Lezi Pro90S 2.0-3.0; rowan powder (fruit/husk) 3.0-8.0. Gluten free bread baked by this method has brighter, harmonious taste and smell, improved structural and mechanical properties, high microbiological stability during storage[19].

Kozubayeva and Yegorova developed the gluten free cakes from amaranth flour. Amaranth flour was mixed with corn or rice flour and added to the dough in the form of a homogeneous mixture in the range from 5.0% to 25.0% of the total amount of flour according to the recipe. It was shown that the use of corn and amaranth flour in the ratio (10.0–12.5%): (90–87.5%) or rice and amaranth flour in the ratio (15.0–17.5%): (85.0–82.5%) allows to receive cakes products of the standard quality. Developed new cakes contain lower simple carbohydrates, but higher content of dietary fibers, easily digestible proteins and essential fatty acids compared with available on the market cakes[20].

Ethical Clearance: Not applicable

Conflict of Interest: Authors declare no conflict of interest

Source of Funding: There is no funding source

REFERENCES

1. Kulushtayeva B, Nurymkhan G, Smolnikova F, Okuskhanova E, Kozubayeva L, Abilova M, Khayrullin M, Kisimov B. Technology of production, nutritional value and food safety of gluten free bread, International Journal of Recent Technology and Engineering. 2019 Apr; 7(6):1338-44.
2. Jnawali P, Kumar V, Tanwar B. Celiac disease: Overview and considerations for development of gluten-free foods. Food Science and Human Wellness. 2016 Dec 1;5(4):169-76.
3. Duyff RL. Academy of Nutrition and Dietetics complete food and nutrition guide. Houghton Mifflin Harcourt; 2017 Apr 18.
4. De Palma G, Nadal I, Collado MC, Sanz Y. Effects of a gluten-free diet on gut microbiota and immune function in healthy adult human subjects. British journal of nutrition. 2009 Oct;102(8):1154-60.
5. Khegai RL. Gluten-free diet – for curing celiac disease. 2016 (cited 27 March 2019). Available from: http://www.rusnauka.com/36_NII_2016/Biologia/9_216497.doc.htm
6. Al-Shebani H, Mohammed A. Outcome of Celiac Disease after Two Years of Gluten-Free Diet. Indian Journal of Public Health Research & Development. 2018 Nov 1;9(11):1926-31.

7. Antiga E, Caproni M. The diagnosis and treatment of dermatitis herpetiformis. Clinical, cosmetic and investigational dermatology. 2015 Aug 1; 8:257-67.

8. Tiunov VM, Chugunova OV, Zavorokhina NV. Feasibility of the recipe composition and technological features of dry mixtures production for gluten-free flour culinary products. Bulletin of the South Ural State University. Ser. Food and Biotechnology. 2018 Jan 1; 6(1):23-31.

9. Francavilla R, Cristofori F, Stella M, Borrelli G, Naspi G, Castellaneta S. Treatment of celiac disease: from gluten-free diet to novel therapies. Minerva Pediatr. 2014 May 1; 66(5):501-16.

10. Bold J, Rostami K, Gluten tolerance; potential challenges in treatment strategies. Gastroenterology and hepatology from bed to bench. 2011 Feb 1; 4(2):53-7.

11. Comino I, de Lourdes Moreno M, Real A, Rodríguez-Herrera A, Barro F, Sousa C. The gluten-free diet: testing alternative cereals tolerated by celiac patients. Nutrients. 2013 Oct 1;5(10):4250-68.

12. Taetzsch A, Das S, Brown C, Krauss A, Silver R, Roberts S. Are Gluten-Free Diets More Nutritious? An Evaluation of Self-Selected and Recommended Gluten-Free and Gluten-Containing Dietary Patterns. Nutrients. 2018 Dec;10(12):1881.

13. Miranda J, Lasa A, Bustamante MA, Churruca I, Simon E. Nutritional differences between a gluten-free diet and a diet containing equivalent products with gluten. Plant foods for human nutrition. 2014 Jun 1;69(2):182-7.

14. Elli L, Branchi F, Tomba C, Villalta D, Norsa L, Ferretti F, Roncoroni L, Bardella MT. Diagnosis of gluten related disorders: Celiac disease, wheat allergy and non-celiac gluten sensitivity. World Journal of Gastroenterology: WJG. 2015 Jun 21;21(23):7110-19.

15. Saccone G, Berghella V, Sarno L, Maruotti GM, Cetin I, Greco L, Khashan AS, McCarthy F, Martinelli D, Fortunato F, Martinelli P. Celiac disease and obstetric complications: a systematic review and metaanalysis. American journal of obstetrics and gynecology. 2016 Feb 1;214(2):225-34.

16. Chugunova OV, Lejberova NV. Method of production of gluten free cake "Lemon with candied fruit". Russian Federation; Patent 2458508, 2012.

17. Grachev VI, Reznichenko IJ, Aleshina JA. Gluten-free waffles and their production method. Russian Federation; Patent 2520147, 2014.

18. Zharkova IM, Miroshnichenko LA, Rosljakov JF, Klikonos AA. Method of producing gluten-free bread. Russian Federation; Patent 2579257, 2016.

19. Dubrovskaja NO, Kuznetsova LI, Parakhina OA, Savkina OA. Method for gluten-free bread production with usage of gluten-free mixture. Russian Federation; Patent 2573327, 2016.

20. Kozubayeva, LA, Yegorova EY. Gluten free cakes from amaranth flour. Polzunovsky vestnik. 2018 Jan; 1:22-26.

Comparing Lower Grades and Higher Grades Astrocytoma in Three Age Groups: by CD133 Antibody

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ABSTRACT

Brain tumors are heterogeneous in nature and current studies reveal that aggressive behavior and recurrence of the tumor are led by brain tumor stem cells (BTSCs) This stem cells compartment demands distinct study to provide new therapeutics lines targeted against it. From the many markers that annotate BTSCs, is CD133, the first marker used to identify BTSCs and regarded as the protein which confers resistance and virulence of the tumor.

Aim of Study: Using CD133, to identify BTSCs by immunohistochemistry in paraffin sections of different grades of astrocytoma, distributed in to three different age groups then, compared with each other. We aimed to check the change in number of CD133-positive cells between grades and between ages, to confirm that CD133 is a real representative for the actual increase in virulence across grades and ages.

Materials and Methods: 121 paraffin blocks are collected from the archives of specialty surgery hospital in Baghdad and processed for immunostaining with CD133, then quantified to calculate number of positives and comparing the results between different grades and different ages.

Results: We obtained increased in number of positives of CD133 by ascending from lower grades towards higher grades in the three age groups; however, when we compared the same grade in between the 3 groups, we saw there was increase in expression from the children to the adult and then decrease in the older, the adulthood show the most increase. The ascending manner of the expression is no longer demonstrable across the age groups, that's the older group show lower expression than the adults despite being more virulent clinically. This mean that CD133 doesn't stand alone as a candidate for representation of the virulence in age group ≥50 years old.

Keywords: *astrocytoma, grades, ages, CD133, virulence*

Introduction

Most of the brain tumors develop the ability to resist the treatment and/or the recurrence after surgical removal [(1)], this demand more researches on the underlying causes. Emergence of the brain tumor stem cell (BTSCs) hypothesis [(2)], suggests that brain tumor mass consists of heterogeneous cell populations and only a relatively small fraction of cells in the tumor, termed brain tumor stem cells (BTSCs), have the ability to proliferate and self-renew expansively [(3, 4)]. BTSCs are thought to be the driving factor for intratumoral heterogeneity, cancer metastasis [(5)] and the cause for resistance to radiotherapy/chemotherapy, so targeting them will lead to tumor regression [(3,4)]. Thus, the presence of distinct compartments in a tumor demand distinct identification and analysis, thereby treatments [(6).] CD133 represents an important cell surface marker of the BTSCs as the capacity for tumor cell self-renewal and proliferation exclusively resides in the minority CD133+cell fraction [(2)]. Moreover, CD133-positive BTSCs represent the cellular population that confers glioma radio resistance and could be the source of tumor recurrence after radiation [(7, 8, 9)]. CD133 is the first recognized member of the prominin family, it's a pentaspan transmembrane glycoprotein,

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with 865 amino acids and five transmembrane domains [10]. From a clinical viewpoint, identification of BTSCs by CD133 has substantial implications clinically, as these cells "need to be eliminated in order to offer long-term disease free survival" [11]. The analysis of the BTSCs quantity by CD133 may provide novel perception into patient prognosis that may then guide the aggressiveness of therapy [2]

In our study, we investigated the expression of CD133 by BTSCs niches, in four grades astrocytoma in three age groups and compared the positives in between the grades and ages, to correlate the expression change with the grading of the tumor and with aging of the patients. This comparison checked if they went parallel with each other as the virulence increases, and checked if the CD133 expression can be used to measure the prognosis and the virulence of the disease as long as the grading and the aging do, and to see if the grading has a strong effect on its expression or/and if the aging has this effect. In this study, each group has four grades I, II, III, IV except the group of older patients begins with grade II, as we couldn't find grade I for this group.

Materials and Method

121 Specimen blocks of brain tumors was collected from blocks archives of pathology department/Specialty Surgery Hospital, after taking the consents from all attributed institutes. Paraffin blocks specimens were filtered according to inclusion criteria: primary astrocytoma, diagnosed according to WHO classification 2007, then categorized equally into the four grades of astrocytoma I, II, III, IV (except the older group we couldn't find grade I for this age) and distributed into 3 age groups, (childhood (0-18), early and middle adulthood (19-49 years) and older "late adulthood and elderly" (50-80). Each subgroup has 11 samples. Exclusion criteria: any brain tumors other than astrocytoma, any secondary brain tumors, recurrent brain tumors and any tumors that treated previously by radiotherapy or chemotherapy were all excluded. Samples were stained by H and E and immunostained by CD133. For immunohistochemistry, marker used was Polyclonal Anti- CD133 (MBS355164) (My Biosource) Detection kit [including the secondary antibody and chromogen] is (Ready-to-use IHC/ICC kit (Biotin free), One-Step HRP Polymer anti-Mouse, Rat & Rabbit IgG with DAB) # MBS841593 (My Biosource). For marker dilution, 1/300 was used diluted with Tris Base Saline (TBS). Washing done with (TBS/TritonX). Antigen retrival was done by Citrate buffer/Tween 20 at 100 C°, for 15 min. Protein block and hydrogen peroxide were applied then primary antibody; after that detection kit with dab.

Statistical Analysis: Eleven samples were counted for each grade. Five random images of each sample were counted by Aperio imagescope version 12.3.2.8013 (Leica). The mean percentage of the number of positives was calculated and reported as the mean then eleven samples were counted as such and statistically evaluated. The numbers were compared in between the different grades in the same group and in between the three groups for the same grade. Analysis of data was carried out using SPSS-25 (Statistical Packages for Social Sciences- version 25). The significance of difference of different means (quantitative data) were tested using Students-t-test for difference between two independent means or ANOVA test for difference among more than two independent means. Tukey's test used for calculating the significance between each two variables. Statistical significance was considered whenever the P value was equal or less than 0.05.

Results

Table 1: Reveals the number of positive cells immunostained by CD133 antibody, among four grades astrocytomas distributed in three groups children (<18y), adults (18-49y) and older (=>50y)

Astrocytoma Grade	Number of positive (NP) of CD133 immuno-labelling			P value
	Children (<18y)	Adults (18-49)	Older (=>50)	
Grade I	237195 ± 102974 (91357-381996)	604519 ± 132826 (387079-865519)	-	0.0001#
Grade II	484648 ± 140631 (307303-786582)	1000909 ± 340913 (576147-1763458)	825748 ± 288176 (352546-1235639)	0.0001*
Grade III	834223 ± 386767 (416248-1590931)	1596705 ± 276710 (1186986-2136518)	1314618 ± 357221 (801179-1912214)	0.0001*

Conted…

Grade IV	1207776 ± 357821 (838032-2006446)	2210875 ± 692743 (1152678-2912634)	1500973 ± 610768 (798325-3073683)	0.001*
P value	0.0001*	0.0001*	0.003*	
-Data were presented as Mean ± SD (Range)				
*Significant difference among difference independent means using ANOVA test at 0.05 level.				
#Significant difference between two independent means using Students-t-test at 0.05 level.				

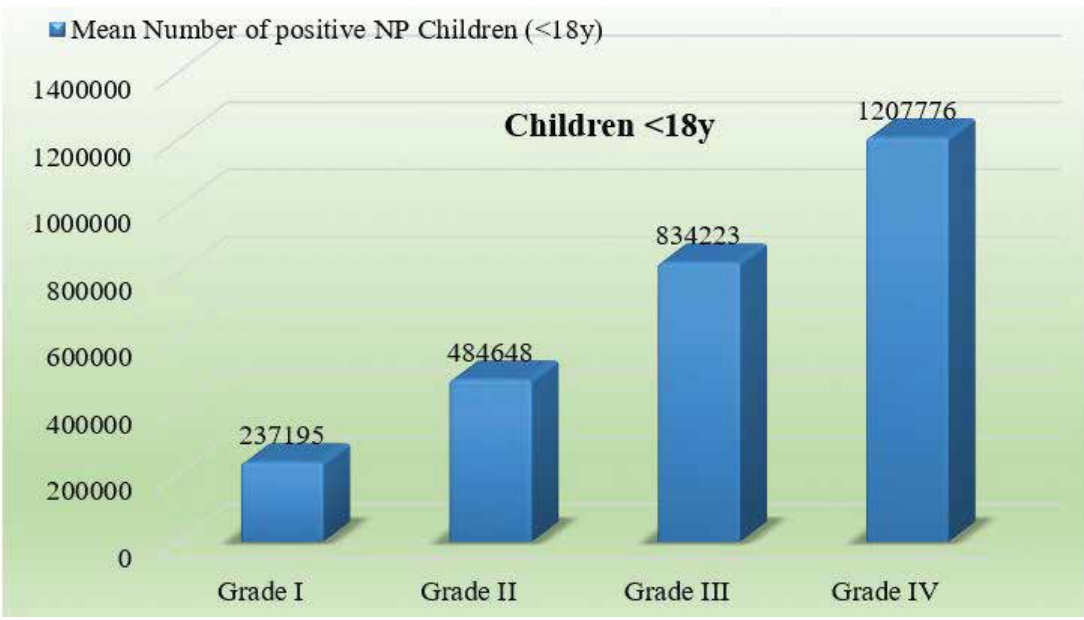


Figure 1: Comparing grades in children group reveals: increase in the no. of positivity whenever we go up from lower grades towards higher grades of astrocytoma. All the grades show high significance in changes when compared with each other

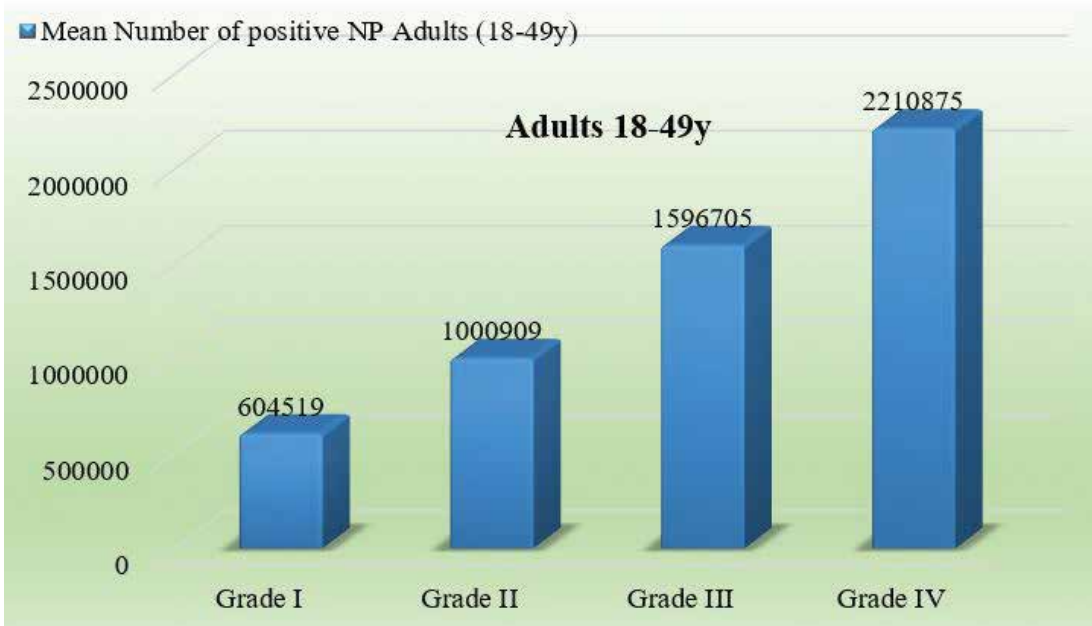


Figure 2: Comparing grades in adult group reveals: increase in the no. of positivity whenever we go up from lower grades towards higher grades of astrocytoma. All the grades show high significance in changes when compared with each other

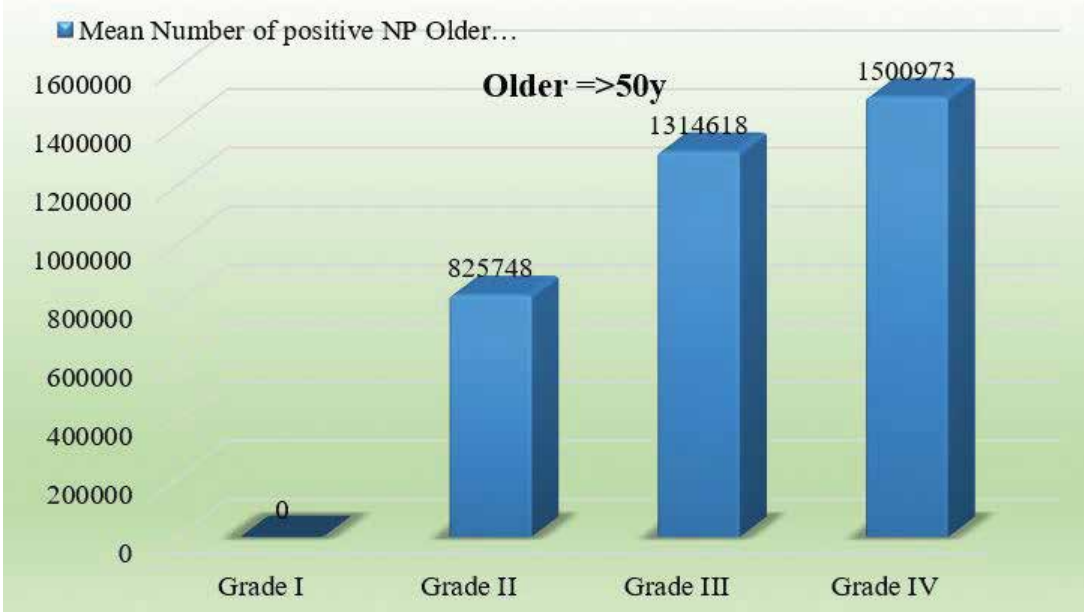


Figure 3: Comparing grades in the group of older reveals: increase in the no. of positivity whenever we go up from lower grades towards higher grades of astrocytoma (we couldn't find grade I for the older group). All the grades show high significance in changes when compared with each other except the grade III, IV show no significance

Discussion

We demonstrated: an increase in number of positivity whenever we go up from lower grades towards higher grades of astrocytoma in all groups (children, adult, and older groups), the number and intensity of cells expressing CD133 increases dramatically. All the grades show high significance in changes when compared with each other in the same group (p value was very significant except for grade three and grade four for the older group Fig 3). This goes with [12], who stated the expression of CD133 increases with grades; however, the latter conducted the study without segregating age groups for the grades and includes tumors other than astrocytoma like oligodendroglioma, which did not exclude the bias of different histology; in addition, it uses frozen section instead of paraffin sections. Our results also go with [13], however the latter conducted the study on different types of glioma not pure astrocytoma. Our results were inconsistent with [14] who describe no correlation between CD133 and grading of the glioma although the latter conducted the study by expression with immunofluorescence and without age groups and the study included secondary glioma in addition to different glioma types. The results were also inconsistent with [15], who proposed the percent of expression was in opposite to the grades; however, they found the Methylation of the CD133 promoter was associated with the grade of the tumor. Use of different procedure and different CD133 antibody clones might explain the difference between our findings and the results obtained in other studies. Another explanation was use of different tissue fixation methods. In other studies, cryosections were used to stain CD133, whereas we used formalin-fixed paraffin sections. As CD133 represent the virulence of the tumor [10, 16, 17], CD133 can be considered as virulence index of astrocytoma across the grades. Many studies stated that the increased in tumor aggressiveness and the bad prognosis go with increasing the grades [18, 19, 20]. From our results, this may be attributed to the increase in CD133 expression concomitantly. Other studies stated that the aggressiveness and the bad prognosis increase with aging [21, 19, 22, 23], however, the latter studies differentiate between elderly and younger through different virulent factors. In our study, when we compared expression of CD133 in between the three age groups for the same grade, there was increase in expression from children to adult then decrease again in older (table 1). One study [24] stated that CD133 expression has no relation with age, however the latter study analyzed CD133 gene by RT-PCR not by immunohistochemistry. All the grades demonstrate more increase in the adult group than the other two groups (table 1, Figure 1, 2, 3). The expression decrease again in the older group. In contrary to that, the

virulence increases with increase the age as described by [21, 19, 22, 23] and one of the favourable prognostic factor in astrocytoma is being less than 50 as illustrated by [25, 21, 26, 27], who all described the prognosis of age less than 50 is more favorable over the older age. Thus, we suggest CD133, as a virulence factor, cannot be solely representative to virulence in the age≥50, as it did not go parallel with age-dependent virulence. The age profile of the astrocytoma grades before 50 and after 50 years old, may carry in its molecular analysis another distinction other than CD133. This might further suggest that any type of therapy in this particular age group must take in consideration another virulent factors and renders the CD133 alone as defective candidate for the reflection of the virulence at ≥50 years old age

Conclusion

Based on the expression of CD133 protein by immunohistochemistry, we suggest an association between CD133 expression, and the increased in the grading of astrocytoma from low to high grade, this association is proportional, and this might explain the very different clinical course of the different grades of astrocytoma regarding the increased in virulence. This might help also when drawing a therapy destined against the BTSCs, taking in consideration the grading of the tumors. However, the situation was different when expression was compared with increase in the age. Different expression of the CD133 have been obtained in successive age groups and astrocytoma in older group ≥50 years, despite being more aggressive clinically than the astrocytoma in adults aging<50, the decrease in CD133 expression suggest that this aggressiveness might be attributed to other factors other than CD133 alone, as it does not reflect the real difference in aggressiveness. Beyond this, our results of CD133 expression across the ages might set for a difference base between age 50 and below and revealed interesting insights into astrocytoma differences across the grades and across the ages and therefore represents a valuable resource for future studies.

Conflict of Interest: There is no conflict of interest to be declared.

Ethical Clearance: All subjects included in this study are according to the Local Ethical Committee of the Ministry of Health/Iraq.

Source of Funding: This study was done by Self-funding.

REFERENCES

1. Westphal M, Lamszus K. The neurobiology of gliomas: from cell biology to the development of therapeutic approaches. Nat Rev Neurosci. 2011;12(9):495-508.
2. Singh SK, Clarke ID, Hide T, Dirks PB. Cancer stem cells in human brain tumors. Oncogene (2004); 23, 7267–7273.
3. Talukdar S, Emdad L, Das SK, Sarkar D, Fisher PB. Evolving strategies for therapeutically targeting cancer stem cells. Adv Cancer Res. 2016; 131:159–191
4. McGranahan N, Swanton C. Clonal heterogeneity and tumor evolution: past, present, and the future. Cell. 2017; 168(4):613–628.
5. Krause M, Dubrovska A, Linge A, Baumann M. Cancer stem cells: radioresistance, prediction of radiotherapy outcome and specific targets for combined treatments. Adv Drug Deliv Rev. 2017; 109:63–73
6. Dirks PB. Brain tumor stem cells: The cancer stem cell hypothesis writ large Mol Oncol. 2010; 4(5): 420–430.
7. Yin A, Miraglia S, Zanjani ED, Almeida-Porada G, Ogawa M, Leary AG, Olweus J, Kearney J, Buck DW. AC133, is a novel marker for human hematopoietic stem and progenitor cells. Blood. 1997; 90 (12): 5002–5012.
8. Maw, M. A., Corbeil, D., Koch, J., Hellwig, A., Wilson-Wheeler, J. C., Bridges, R. J., Kumaramanickavel, G., John, S., Nancarrow, D., Roper, K., Weigmann, A., Huttner, W. B., Denton, M. J. A frameshift mutation in prominin (mouse)-like 1 causes human retinal degeneration. Hum. Molec. Genet. 2000; 9: 27-34.
9. Bao S, Wu Q, Sathornsumetee S, Hao Y, Li Z, Hjelmeland AB, Shi Q, McLendon RE, Bigner DD, Rich JN. Stem cell-like glioma cells promote tumor angiogenesis through vascular endothelial growth factor. Cancer Res. 2006; 66:7843–7848.
10. Glumac P, and LeBeau A. The role of CD133 in cancer: a concise review. Clin Trans Med. 2018; 7:18.
11. Mimeault M., Hauke R., Mehta P. P., Batra S. K. Recent advances in cancer stem/progenitor cell

research: therapeutic implications for overcoming resistance to the most aggressive cancers. J. Cell. Mol. Med. 2007; 11(5):981-1011.

12. Liu G, Yuan X, Zeng Z, Tunici P, Ng H, Abdulkadir IR, et al. Analysis of gene expression and chemoresistance of CD133+ cancer stem cells in glioblastoma. Molecular Cancer. 2006; 5:67.
13. Zeppernick F, Ahmadi R, Campos B, Dictus C, Helmke BM, Becker N, et al. Stem Cell Marker CD133 Affects Clinical Outcome in Glioma Patients Clin Cancer Res. 2008; 14(1):123
14. Zhang M, Song T, Yang L, Chen R, Wu L, Yang Z and Fang J. Nestin and CD133: valuable stem cell-specific markers for determining clinical outcome of glioma patients. Journal of Experimental & Clinical Cancer Research, 2008; 27:85.
15. Dahlrot R H, Hansen S, Jensen S., Schrøder H., Hjelmborg J., Kristensen B. Clinical value of CD133 and nestin in patients with glioma: a population-based study. Int J Clin Exp Pathol. 2014;7(7):3739-3751
16. Wu X, Wu F, Xu D, Zhang T. Prognostic significance of stem cell marker CD133 determined by promoter methylation but not by immunohistochemical expression in malignant gliomas. J Neurooncol. 2016; 127:221–232.
17. Shareef M, Wasfy R, Abu Safia H, Marey K. Stem Cell Markers, Nestin, and CD133 are Markers of Aggressive Behavior in Astrocytic Tumors: An Immunohistochemical Study in Egyptian Population. Am J Clin Pathol. 2014;142: A002.
18. Kieran MW, Walker D, Frappaz D, Prados M: Brain tumors: from childhood through adolescence into adulthood. J Clin Oncol. 2010, 28:4783-4789.
19. Gerges N, Fontebasso A, Albrecht S, Faury D, and Jabado N. Pediatric high-grade astrocytomas: a distinct neuro-oncological paradigm. Genome Med. 2013; 5(7): 66.
20. Seifert M, Garbe M, Friedrich B, Mittelbronn M, Klink B. Comparative transcriptomics reveals similarities and differences between astrocytoma grades. BMC Cancer (2015) 15:952.
21. Smrdel U, Vidmar M, and Smrdel A. Glioblastoma in Patients over 70 Years of Age. Radiol Oncol. 2018; 52(2): 167–172
22. Parsons DW, Jones S, Zhang X, Lin JC, Leary RJ, Angenendt P, et al. An integrated genomic analysis of human glioblastoma multiforme. Science. 2008, 321:1807-1812. 48.
23. Yan H, Parsons DW, Jin G, Mclendon R, Rasheed A, Yuan W, et al. IDH1 and IDH2 mutations in gliomas. N Engl J Med. 2009; 360:765-773
24. Bien Möller Ellen Balz E, Herzog S, Plantera L, Vogelgesang S, Weitmann K et al. Association of Glioblastoma Multiforme Stem Cell Characteristics, Differentiation, and Microglia Marker Genes with Patient Survival. Stem Cells International. 2018; Volume 2018, Article ID 9628289, 19 pages
25. Arora, Alston, Eden, Estlin, Moran, and Birch. Age–incidence patterns of primary CNS tumors in children, adolescents, and adults in England. Neuro-Oncology. 2008; 11, 403–413
26. Szopa W, Burley TA, Kramer-Marek G, Kaspera W. Diagnostic and Therapeutic Biomarkers in Glioblastoma: Current Status and Future Perspectives Biomed Res Int.; 2017: 8013575
27. Rajabpour M, Yahyazadeh H, Beheshti M. Prognostic Factors and Survival of Glioblastoma Multiform (GBM) in Iranian Patients, Int J Cancer Manag. 2017; 10(4): e6260.

Differences in Growth of Children with Autism and Normal in Surabaya, Indonesia

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ABSTRACT

Background: Children with syndrome spectrum disorder wherein danger of a compromised dietary intake and biological process standing that might impact growth over each the short and long run. Children and youth with a disability were deemed to be at greater risk of obesity due to lower levels of physical activity, inappropriate behaviors associated with their disability, medication and related chronic health conditions.

Aim: To evaluate the growth status of children who were diagnosed with ASD in comparison with healthy controls.

Method: This research was a cross-sectional analytic study using questionnaire instruments to guardians and also direct measurements to respondents. The number of respondents for the group of children who have autism was 30 children and normal groups of children as many as 60 children. The independent variables in this study were children, autism and socio-economic, while the variables depend on body weight according to age, height according to age and head circumference according to age. This data was analyzed using the Mann Whitney U test.

Results: The results of the study of 30 children with autism and 60 normal children obtained a percentage of children suffering from autism and normal children in the same good nutritional status as many as 76.67%. Height according to age for children suffering from autism in normal conditions is 66.66% and normal children are larger 83.33%, while for head circumference according to age children with autism and normal children are 100% normal. After statistical tests using SPSS 23 with $\alpha = 0.05$, $p = 0.987$ was found for body weight according to age, $p = 0.650$ for height according to age and $p = 1$ for head circumference according to age.

Conclusion: There was no difference in body weight, height, and head circumference according to age between children with autism and normal so that it could be said that children who have limitations in this case autism have normal growth like other children.

Keywords: *Autism, Body weight, Height, Head circumference, Growth.*

Introduction

Autism spectrum disorder (ASD) was a neurodevelopmental disorder defined by deficits in social interaction and communication, yet as restricted, repetitive or stereotypic behavior, with Associate in Nursing onset before three years older[1–3]. Children with syndrome spectrum disorder wherein danger of a compromised dietary intake and biological process standing that might impact growth over each the short and long run. The restricted body of revealed analysis addressing this concern has been contradictory and inconclusive to this point[1,4]. Children and youth with a disability were deemed to be at greater risk of obesity due to lower levels of physical activity, inappropriate behaviors associated with their disability, medication and related chronic health conditions [2,5].

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Centers for Disease Control and Prevention (CDC) found that US boys were almost five times more likely to receive an ASD diagnosis than girls, indicating that approximately one in 42 boys is currently diagnosed with ASD [4]. Patients with ASD may also suffer from the leaky gut syndrome, which was caused by inflammation of the intestinal mucosa and abnormal bacterial overgrowth leading to a disorder of bowel motility [6–8]. Two factors that were known to be risks in ASD and potentially influence growth were food selectivity behavior and gastrointestinal health status. Selective dietary intake could play a significant role in the growth status of children with ASD. Children with ASD were more likely to have food selectivity and feeding issues resulting in challenging behaviors surrounding food intake than their typically developing peers[1,2,9,10]. Food selectivity continues to be highly reported in children with ASD and was simply defined as the consumption of an abnormally limited variety of food[1,11]. This behavior affects food choices, which, in turn, could affect nutritional status and growth. For children with food selectivity behavior, a refusal to consume one or more food groups is common, and anxiety and tantrums could be associated with the introduction of new foods [1,12].

Anthropometric measurements, including height, weight, and head circumference were an effective method of evaluating dietary intake, growth status and nutritional status in children with ASD[1]. As noted, the effects of gastrointestinal symptoms and food selectivity could lead to inadequate dietary intake, resulting in abnormal anthropometric measurements [1,6,13]. In some studies, no differences in BMI were reported between children with ASD and their typically developing peers, whereas other studies have reported higher rates of underweight children with ASD compared to their typically developing peers. For these reasons, we chose to evaluate the physical status of children with ASD by means of detailed dietary evaluation and anthropometric assessment. The present study aimed to evaluate the growth status of children who were diagnosed with ASD in comparison with healthy controls.

Method

The type of this research used analytic observational research that used a case-control research design. This study compared between the case group and the control group. This research was conducted in the special school of Chakra, Agca autism and normal children who were in Ceria, Diponegoro, and Darmahusada Children's Kindergarten. The inclusion criteria for the autism group in the study were autistic children who had not entered adolescence (women <12 years, men <14 years) and guardians of autistic children who were willing to become research samples, while the exclusion criteria were autistic children suffering from congenital abnormalities and other diseases which affects growth and autism children who were not in place when measuring growth. In the control group had the inclusion criteria for normal children who had the same age range as autistic children and guardians of normal children who were willing to be the study sample, while the exclusion criteria were normal children suffering from congenital abnormalities and other diseases that affected growth and normal children who were not in place when measuring growth. The sampling technique used in this study was using saturated sampling or census means that the entire population was examined, this applies to the group of children with autism. However, for the control group using the random sampling method. The independent variables in this study were children, autism and socio-economic, while the dependent variable was body weight according to age, height according to age and head circumference according to age. This data analyzed using the Mann Whitney U test.

Result

Table 1: Characteristics of participant

Characteristics	Autism		Normal	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Age (years old)				
>2-3	1	3.33	1	1.67
>3-4	1	3.33	2	3.33
>4-5	6	20	7	11.67

Conted…

>5-6	12	40	24	40
>6-7	8	26.67	17	28.33
>7	2	6.67	9	15
Gender				
Boy	21	70	42	70
Girl	9	30	18	30
Income				
<Regional minimum wage (standard)	4	13.33	10	16.67
> Regional minimum wage (standard)	26	86.67	50	83.33
Nutrition intake based on recall food method 24				
Deficient	24	80	8	13.33
Good	6	20	52	86.67

In this study, the study sample was boys less than fourteen years old and women less than twelve years old. In this study, it is also known about the income of parents who have an average parent's income above the Regional minimum wage(standard) and nutritional intake for children because they were considered to provide an important role in the growth of children. The method used in determining the amount of nutrient intake was using the 24-hour recall food method so that it known the amount of nutrition eaten.

Growth : The growth of children in this study was grouped into three according to the main purpose of looking for differences in growth which were classified into body weight, height and head circumference per age. The results of the growth of autism and normal children could be seen in table 2.

Table 2: Distribution samples based on the growth of autism and normal children

Characteristics	Autism		Normal		p value
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Body weight per age					
Severe thinness	1	3.33	0	0	0.986
Thinness	2	6.67	5	8.33	
Normal	23	76.67	46	76.67	
Overweight	4	13.33	9	15	
Height per age					
Severe short	5	16.67	0	0	0.650
short	8	26.67	2	3.34	
Normal	17	56.67	50	83.33	
Tall	0	0	8	13.33	
Head circumference per age					
Normal	30	100	60	100	1

Based on the table above, it was explained that there was no difference between the group of autistic children and the normal ones. Body weight in both groups was dominated by normal results, height and head circumference of both groups also within normal limits.

Discussion

Our first hypothesis was that children with ASD would have significantly lower anthropometric values, but this is no confirmed by our results. There was no consensus

among previous research comparing the anthropometric values of children with ASD and TD children found that prevalence of overweight and obesity was significantly higher among young children (2–5 years of age) and adolescents (12–17 years of age) with ASD compared with the matched controls. However, for ages 6–11 years, no prevalence differences were found [13]. Children aged 2–5 years with ASD had more overweight and obesity and children aged 6–11 years had more underweight than theNHANES-matched cohort [14].

The exact reason why the weight would be unhealthy among children with ASD was not clear. Among schoolchildren of the age studied herein, growth was highly sensitive to the balance between energy intake and total energy expenditure. However, the energy intake estimates in children with ASD and TD children were similar [13,15]. Likewise, ASD and TD groups could present different patterns of growth throughout the time life. In any case, although BMI was an important indicator of a healthy weight, it was not necessarily a good indicator of nutrient status[7,13]respectively. We chose to fully evaluate the nutritional and growth status of children with ASD and their typically developing peers given the limited amount of data available regarding this topic, incomplete work in prior datasets, and the conflicting results that have been reported to date

Parents of children with ASD reported a greater prevalence of food refusals based on the texture of food, mixtures, brand, shape, and taste/smell than did TD children. Contrary to expectations, a similar prevalence of food refusal based on temperature, foods touching other foods, and the color was found between children with ASD and TD children. Parents of children with ASD reported more reasons for food refusal, with over one-third of parents reporting refusal based on three or more characteristics of food [10]. Gluten-free/casein-free and lactose-free diets are followed by some children with ASD. Because children who adhere to these diets restrict all dairy products [9].

One such eating pattern, selective eating, was characterized by a diet that lacks variety and has been associated with inadequate consumption of foods low in energy density such as fruits and vegetables, lean protein-rich foods, and foods high in fiber. Although not uncommon in typically developing children, selective or "picky" eating appears to be more prevalent in children with autism spectrum disorders and may persist beyond the early childhood period. Children with ASD who exhibit food selectivity have been found to have sensory sensitivity with concomitant aversions to specific colors, smells, temperatures, and textures, and preferences for energy-dense foods. Thus, children with ASD who exhibit sensory sensitivity may be predisposed to diets with a limited variety that was high in energy-dense foods and low in fruits, vegetables, and fiber, putting them at increased risk for overweight and obesity[3,11–13,16].

There was no evidence of statistical interaction between any of the dietary patterns and BMI z-score with autism status [12]. According to the anthropometric data, there was no difference in body weight, height, and head circumference according to age between children with autism and normal. The results of the present study showed no significant differences between both groups regarding the contribution of energy intake from dietary carbohydrate, protein, and fat in daily diets. Also, no significant differences between both groups in relation to energy, carbohydrates, and fats intake were observed. Furthermore, children with autistic disorder showed significant low protein intake and high fiber intake compared to healthy controls. Overall, the results of the present study indicate that anthropometric measurements of children with ASD are similar to those of healthy peer controls. There were no significant differences in measurements of height, weight and head circumference across participants in this study.

Conclusion

There was no difference in body weight, height, and head circumference according to age between children with autism and normal, so that it could be said that children who have limitations in this case autism have normal growth like other children. Further research was needed to determine the acceleration of growth in both groups and the factors that influence it. Comprehensive physical and anthropometric assessment should be completed for all children with ASD in a primary care setting as a baseline measurement to evaluate the need for referral for more specialized evaluation and potential intervention on a case-by-case basis

Ethical Clearance: The study protocol approved by the Ethics Committee of Faculty of Medicine, Universitas Airlangga, Indonesia

Conflict of Interest: The author reports no conflict of interest in this work.

Source of Funding: This study is done with individual funding.

REFERENCES

1. Barnhill K, Marediya Z, Marti CN, Hewitson L, Gutierrez A, Ghossainy M. Growth status of children with autism spectrum disorder: a case-control study. J Hum Nutr Diet. 2016;30(1):59–65.
2. Emond A, Emmett P, Steer C, Golding J. Feeding Symptoms, Dietary Patterns, and Growth in Young Children With Autism Spectrum Disorders. Pediatrics. 2010;126(2):337–342.
3. Perry IS, Baronio D, Gottfried C, Faccioli LS, Riesgo R, Castro K. Feeding behavior and dietary intake of male children and adolescents with autism spectrum disorder: A case-control study. Int J Dev Neurosci. 2016;53:68–74.
4. Baio J, Wiggins L, Christensen DL, Maenner MJ, Daniels J, Warren Z, et al. Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014. MMWR Surveill Summ. 2018 Apr 27 [cited 2019 Mar 10];67(6):1–23.
5. Hinckson EA, Dickinson A, Water T, Sands M, Penman L. Physical activity, dietary habits and overall health in overweight and obese children and youth with intellectual disability or autism. Res Dev Disabil. 2013;34(4):1170–1178.
6. Meguid NA, Anwar M, Bjørklund G, Hashish A, Chirumbolo S, Hemimi M, et al. Dietary adequacy of Egyptian children with autism spectrum disorder compared to healthy developing children. Metab Brain Dis. 2017;32(2):607–615.
7. Hill AP, Zuckerman KE, Fombonne E. Obesity and Autism. Pediatrics. 2015;136(6):1051–1061.
8. Hou N, Liu X, Li T, Liang X, Xiong X, Liu J, et al. Correlation between Nutrition and Symptoms: Nutritional Survey of Children with Autism Spectrum Disorder in Chongqing, China. Nutrients. 2016;8(5):294.
9. Bandini LG, Anderson SE, Curtin C, Cermak S, Evans EW, Scampini R, et al. Food Selectivity in Children with Autism Spectrum Disorders and Typically Developing Children. J Pediatr. 2014;154(11):2262–2265.
10. Hubbard KL, Anderson SE, Curtin C, Must A, Bandini LG. A Comparison of Food Refusal Related characteristics of Food in Children with autism spectrum Disorder and Typically Developing Children. J Acad Nutr Diet. 2014;114(12):1981–1987.
11. Dovey TM, Staples PA, Gibson EL, Halford JCG. Food neophobia and "picky/fussy" eating in children: A review. Appetite. 2008; 50(2–3):181–193.
12. Evansa EW, Must A, Anderson SE, Curtin C, Scampini R, Maslin M, et al. Dietary Patterns and Body Mass Index in Children with Autism and Typically Developing Children. Res Autism Spectr Disord. 2014;71(11):3831–3840.
13. Marí-Bauset S, Llopis-González A, Zazpe I, Marí-Sanchis A, Morales Suárez-Varela M. Comparison of nutritional status between children with autism spectrum disorder and typically developing children in the Mediterranean Region (Valencia, Spain). Autism. 2017;21(3):310–322.
14. Hyman SL, Schmidt B, Johnson C, Molloy C, Peck R, Reynolds A, et al. Nutrient Intake From Food in Children With Autism. Pediatrics. 2012;130:145–153.
15. Esteban-Figuerola P, Canals J, Fernández-Cao JC, Arija Val V. Differences in food consumption and nutritional intake between children with autism spectrum disorders and typically developing children: A meta-analysis. Autism. 2018.
16. Siddiqi S, Urooj A, D'Souza MJ. Dietary Patterns and Anthropometric Measures of Indian Children with Autism Spectrum Disorder. J Autism Dev Disord. 2018.

Functional Outcome after Conventional Open Discectomy for Patients with Herniated Lumber Disc: One Year Follow Up

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ABSTRACT

Introduction: Lumber disc herniation is a common and frequently occurring disease. Conventional discectomy is in use for decades, and it has got a curative effect for treatment of disc herniation which will not respond to conservative treatment.

Aim of the Study: The current study aimed to evaluate the functional outcome after (12 month) of conventional discectomy for the management of patients with lumber disc herniation.

Patient and Method: A prospective study done in the period between October 2015 and February 2018 on 78 patients (40 males and 38 females) their mean age 37.6 years (range21-65) was diagnosed with sciatica caused by single level lumber disc herniation (LDH) and underwent open discectomy. Each patient was followed up for one year regarding their functional outcome, using the Oswestry disability index.

Results: The means of the total oswestry low back pain scoring scale after 6 months, and 12 months of management were significantly decreased compared to mean before management (60.7% versus 38.1%, P=0.004; and 60.7% versus 24.7% respectively).

Conclusion: Conventional open discectomy is still a good method for treatment of lumber disc herniation.

Keywords: *Lumber disc herniation, conventional discectomy. Oswestry Disability Index*

Introduction

Lumber disc herniation (LDH) is the most common diagnosis among the degenerative abnormalities of the lumbar spine (affecting 2 to 3% of the population, and it is the principle cause of spinal surgery among adult population. [(1).]. The natural history is generally favourable, with improvement of symptoms in 75% of patients after 4 weeks [(2).] Although most patients relieved from symptoms without surgical treatment, there is a consensus for operating on selected patient with persistent radicular pain after 2-6 months. [(3)]

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Surgical discectomy gives earlier relief of symptoms, enabling patient to return to their work and other daily activities more rapidly.[(3)]

Conventional classical operation (laminectomy/ laminectomy with discectomy) is in use for decades; however in 1977 microdiscectomy technique was performed for lumber disc herniation.. [(3)]

The advantage of open discectomy is that there is more accumulated experience with it, no additional endoscope or microscope is needed, and the duration of learning curve and of the operation is shorter.. [(4)]

The last decade has seen an evolution of minimally invasive spine surgery with

new technological developments. Minimally invasive spine surgery is thought to decrease postoperative pain and allow quicker recovery by limiting soft tissue retraction and dissection. Advances in microscopy, tissue

retractors, and specialized instruments have enabled surgeons to perform procedures through small incisions. As with the open approach, the goals of the minimally invasive approach are to adequately decompress the involved neural elements, stabilize the motion segment, and/or realign the spinal column according to the needs of the individual patient [5]

In 1997 tubular retractors and the endoscope was first introduced and later adapted to incorporate the operative microscope [6,7]. These techniques allow for enhanced visualization through a small skin incision, and they cause minimal disruption to the posterior muscles. As a result, patients spend less time in the hospital and are able to mobilize quicker, ultimately leading to high patient satisfaction and significant cost savings. [8,9]

Several recent studies have compared conventional open discectomy with microdiscectomy to find if there are any significant differences by using either method. In this study we want to find the functional outcome after one year for patient who underwent conventional open discectomy. In future we hope when the operative microscope become available that we will do comparative study for the functional outcome after doing open discectomy versus microdiscectomy.

In this study we used the Oswestry Disability Index (ODI) [10] (also known as the Oswestry Low Back Pain Disability Questionnaire) to evaluate the functional outcome postoperatively. It is extremely important tool that researchers and disability evaluators use to measure a patient's permanent functional disability. The test is considered the 'gold standard' of low back functional outcome tools

Patient and Method

Patient and Study Design: Seventy eight patient (40 males and 38 females) diagnosed with sciatica caused by lumber disc herniation (LDH).conventional open discectomy done for them during the period from October 2015 to February 2018. Each patient was followed up for one year after the surgery regarding t functional outcome.

The patients included in the study had single level disc herniation with radiculopathy proved by MRI, with no history of previous back surgery.

Scoring System: The scoring system that had been used to evaluate the functional outcome of the patients in this study is the Oswestry Disability Index (ODI) which is also known as (Oswestry Low Back Pain Disability Questionnaire). [10]

The score was calculated for each patient in the study (in regard to all of its variables: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life if applicable, social life and travelling) at the preoperative period (the day before the surgery), and recalculated during the periods of the follow up which had been selected in the current study (6 months and 12 months) postoperatively.

Surgical Procedure: Preoperatively lumber spin MRI and AP and LAT plain X ray of lumbar spine were taken. Informed consent was taken from all the patients included in this study. Surgery was done under general anaesthesia, patient placed in a prone position with the abdomen free to reduce the intraoperative venous bleeding. The proper level was determined by fluoroscopy. A 5-8 cm.mid line incision and facia incision done, and the paravertebral tissue retraced using deep retractors. In most cases flavectomy and arcotomy of the lamina above the disc level was done. Carful mobilization of the dural sac and the nerve root medialy before evacuating the herniated disc. This might involve entering the disc space, or just removing a free sequestrated disc fragment (sequestrectomy).After checking the epidural space, the layers were appropriately closed.

Follow up: All patients discharged from the hospital after 2-3 days with instruction of free movement in bed with assisted walking for few steps until day ten where the stitches were removed. After 2-3 weeks they can return to their light daily activities. The follow up continue and after six months all the patient were re-evaluated using the Oswestry disability score. The same thing done for all the patients after 12 months. All the data about the patients and the results of the ODI were analysed accordingly.

Statistical Analysis: The data analyzed using Statistical Package for Social Sciences (SPSS) version 25. The data presented as mean, standard deviation and ranges. Categorical data presented by frequencies and percentages. Paired t-test (two tailed) was used to compare different ODI scores pre and postoperatively among study groups. A level of P – value less than 0.05 was considered significant.

Results

The total number of patients in this study was 78. All of them were diagnosed as having lumber disc herniation and treated by conventional open discectomy.

The general characteristics and variables regarding the patients are shown in table (1). The age was ranging from 21 to 65 years with a mean of (37.6) years and standard deviation (SD) of ± 7.3 years. The patients aged ≤ 50 years were (67) (85.89%), and those above (50) were (11) (14.10%). Females were 38 (48.7%) and males were 40 (51.2%). For occupation; 44.9% were housewives, 19.2% free jobs, 14.15%employee, 8.89% farmers, 7.7 %retired, and 5.1%drivers. The table show that the right sided disc herniation is little bit more than the left. It also shows that 50% of the patient has herniation at L4/L5 level, and about 45% have herniation at L5/S1 level.

Table 1: General characteristics and variables of the patients

Variable	No. = (78)	Percentage %
Age(21-65)		
Mean(37.6)		
≤ 50	67	85.89%
> 50	11	14.10%
Gender		
Male	40	51.28%
Female	38	48.71%
Occupation		
Housewife	35	44.9%
Free job	15	19.2%
Employee	11	14.1%
Farmer	7	8.89%
Retired	6	7.7%
Driver	4	5.1%
Side		
Right	42	53.84%
Left	36	46.15%
Level		
L5/SI	35	44.87%
L4/L5	39	50%
L3/L4	2	2.56%
L2/L3	2	2.56%

Total Oswestry Low Back Pain Scoring Scale: Comparison of total ODI Score before operation and after; 6 months, and 12 months of management (table 2). It shows significant improvement after 6 and 12 months from the operation, 60.7% versus 25.2 %, (P=0.001); and 60.7% versus 21.4% (P=0.001) respectively).

Table 2: The results of ODI preoperatively, 6months, and 12 months postoperatively

variable	ODI% Mean ± Std. Dev	P Value
preoperatively	60.7 ± 5.62	0.001
6months postoperatively	25.2 ± 10.42	0.001
Reduction of ODI/6months	35.5	
Preoperatively	60.7 ± 5.62	0.001
12months postoperatively	21.4 ± 3.69	0.001
Reduction of ODI/12months	39.3	

Discussion

The prevalence of symptomatic herniated lumber disc is about 1-3%in Finland and Italy. About 19/27% of people without symptoms have disc herniation on imaging.[11]

Lumber disc herniations are the most common causes for working –age individuals to undergo lumbar spine surgery. [12].

The surgeon according to his training and his experience can chose (for surgical treatment of lumber disc herniation) any method like microdiscectomy, endoscopic microdiscectomy or the classical operation (laminectomy/laminectomy with discectomy).

Several questionnaires are available to help measure the functional status of a patient, the ODI is the most commonly used outcome-measure questionnaire for low back pain in a hospital setting [13].

As seen from our results using the ODI there was a great improvement in the functional out come after conventional open discectomy. Statistically there was significant decrease in the score ($P < 0.05$).

Most of the studies shows a significant improvement of the ODI postoperatively, but there was no significant differences whether we use conventional open discectomy or microdiscectomy [1,3,4,14,15].

Cagatay et. al. [4] in their paper on 519 patients compare the outcome of functional results between patients treated by open discectomy and others treated by microdiscectomy, concluded that "the long term results in both groups were similar and the choice of either method depend on the experience".

Xiaosheng et. al.[14] also compare the two methods; they found that both methods obtain the same satisfactory results. The advantages of microdiscectomy are that it is minimally invasive method, with less blood loss, short time, short hospitalization, with fewer medical expenses.

Andreas et. al... [3], also found no significant difference in the functional outcome between two methods.

Kovačević et. al. [15] compared standard lumber discectomy with microdiscectomy and concluded that there in no particular advantage of either technique in terms of functional outcome. But they also found that there was significant lower recurrent disc herniation and higher reduction of leg pain in case of microdiscectomy.

Luis et. al. [1] concluded that the clinical results were similar after 2 years by using either surgery. They were in favor of early surgery because recovery is faster and surgery is economically favorable since it enables early return to work.

George et. al. [16] did analysis of results of surgery of over 39.000 patients and found that all the patients had 79% good/excellent results, and none of the operative procedures gave a different outcome.

Table (3) is to compare between different studies regarding age and gender of patient who underwent open discectomy.

Table 3: Age and gender of different studies

Study	Total No.	Age (range)	Mean age	Male	Female
Present study	78	21-65	37.6	40 (51.28%)	38 (48.77%)
Cagatay et. al. [4]	276	27-67	44.8	176 (63.8%)	100 (36.2%)
Xiaosheng et.al. [13]	225	15-79	46	127 (56.44%)	98 (43.55%)
Kovačević et. al. [14]	111	17-75	44.9	57 (51.35%)	54 (48.64%)

The table shows that the mean age group in this study was 37 years while in the other studies was about 45-46 years. Our study also shows that the number of patients above 50 years were(11) and represent (14.10%) of the whole group. These results give us an idea about epidemiology of lumber disc herniation in the population, were this disease is less common in older people. Jo Jordan et.al. [11], found that the highest prevalence of lumber disc herniation is among people aged 30-50 years.

Daoyou et. al. [17] concluded that a decrease of LDH with aging occur in the elderly. This is because the volume and inflammation of the nucleus gets lesser since degeneration lead to atrophy of the nucleus with the aging. Thus, the pressure from the nucleus will become gradually less, with the result being lower incidence of annulus injury and occurrence of lumber disk herniation, especially after 80 years old [17].

In almost all the studies the males are predominantly affected by LDH than females and this is probably because males involved in more "hard working" types of jobs. [4,11,14,15]. Yet our study shows the highest percentage of female patients among other studies. The explanation for that is that about 50%of housewives in the group are "farmers" coming from rural areas around city of Najaf.

Regarding the levels predominantly affected, our study shows that 94.87%of the cases have disc herniation at L4/L5 and L5/S level. The same findings seen by Jo.Jordan et al[11], Cagatay et al. [4], and dauyo et.al. [17]where the results where 95%, 93.47%, and 95% respectively, with L4/L5 more predominant.

Conclusion

Conventional lumber open discectomy is still a good method for treatment of lumber disc herniation.

Conflict of Interest: No conflict of interest

Source of Funding: None

Compliance with Ethical Standerds: Informed consent was obtained from all individuals participant included in the study.

REFERENCES

1. Luis R. Vialle, Emiliano N. Vialle, Juan E. S. Henao et al Lumber disc herniation. Rev. Bras. Ortop.2010;45(1):17-22
2. Gijsbert M Overdevest,1,2 Wilco C Peul,1,2 Ronald Brand,etal. Tubular discectomy versus conventional. J Neurol Neurosurg Psychiatry. 2017;(0): p. 1-9.
3. Sorlie N,Gulati S.,Giannadakis C.Open discectomy vs microdiscectomy for lumber disc herniation-aprotocol for a pragmatic coparative effectivness study: F1000research, version 1.2016; 5:2170
4. Cagatay C. & Murteza C. Open discectomy vs. microdiscectomy: result from 519 patients operated for lumber disc herniation.Eurasian J.Med.2018;50(3):178-181
5. Choll W. Kim, MD, PhD, Krzysztof Siemionow et al. The Current State of Minimally Invasive Spine Surgery. The journal of bone and joint surgery. 2011 MARCH 16,; 93(6).
6. Foley KT, Smith MM, Rampersaud YR. Microendoscopic approach. Neurosurg Focus. 1999; 5(7).
7. Palmer S. Use of a tubular retractor system in microscopic. Neurosurg Focus. 2002; 2(13).
8. Arts MP, Peul WC, Koes BW, Thomeer RT. Management of. J Neurosurg Spine. 2008;: p. 32–39.
9. Kogias E, Vougioukas VI, Hubbe U, Halatsch ME. Minimally. Minim Invasive Neurosurg. 2007;: p. 160–162.
10. Fairbank JCT & Pynsent. The Oswestry Disability Index. spine j. 2000: p. 2940-2953..
11. Joanne L. Jordan, Kika Konstantinou, John O'Dowd. Herniated lumber disc.BMJ Clin. Evid.2009; 2009:1118
12. Gregory D. Schroder, Christine A. Guyre, Alexander R.Vaccavo.The epidemiology and pathophysiology of lumber disc herniation. Seminar in spine surgery.2016;28(1):2-7
13. Mehra A, Baker D, Disney S, Pynsent PB. Oswestry diability index scoring made easy. The annals of the royal collage of surgeans of England. 2008 sep.: p. 497-9.
14. Xiaosheng lu.,Wei LI.,Jichen He.et al A retrospective study of microscope assisted discectomy versus open fenestration discectomy for lumber disc herniation.Ann.Clin.Lab. Res.:2016;4:3.
15. Kovačević Vogin, Jovanovic N, Miletić-Kovačević M, Nikolic R, Peulić M, Rotim K, et al. Standared lumber discectomy versus microdiscectomy:differance in treatment outcome and reoperation rate. Acta clinical croatia. 2017 sep 56: p. 391-8.
16. George I.Dohrmann, Nassir Mansour. Long term results of various operations for lumber disc herniati on:Analysis of over 39.000 patients.Med. Princ.Pract. 2015 may;24(3)258-290
17. Daoyou Ma, Yunbiao Liang, Daoming Wang et al Trend of the incidence of lumber disc herniation;decreasing with aging in the elderly. Clin. Intery Aging 2013:8:1047-1050.

Early Complications Following Bipolar Hemiarthroplasty as Primary Treatment for Displaced Femoral Neck Fracture in Elderly Patients

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ABSTRACT

Femoral neck fracture is one the most important traumatic event in elderly patients. The objective of this study is to assess the incidence of early complications following bipolar hemiarthroplasty for management of displaced femoral neck fractures in elderly patients.

Patients and Method: This is a prospective study of 60 patients 60-90 years old (37 female and 23 male) with displaced femoral neck fracture who underwent bipolar hemiathroplasty with a follow up period ranged from 12-22 months. Several variables including age, gender, medical comorbidities, type of fracture,complication mortality and Harris Hip score were assessed.

Results: There were four cases of infection, two cases of dislocation, eighteen cases anterior thigh pain, two cases of DVT and two mortality. The average HHS decrease with increasing age of the patients. There was no significant intraoperative complications but there was postoperative complicaions.

Conclusions: Bipolar hemiarthroplasty through posterior approach seems to be a good option for primary treatment of displaced femoral neck fractures in elderly patients with few complications.

Keywords: *Hemiarthroplasty, femoral neck fracture, complications.*

Introduction

Femoral neck fracture is one of the most important traumatic event in the elderly, because of its high rate of complications [(1)]. Femoral neck fractures occur most frequently in elderly female patients following fall from standing height and may be associated with osteoporosis. Undisplaced femoral neck fractures account for 15% of these fractures in elderly and are usually treated with internal fixation. There are several surgical options for displaced femoral neck fractures with regard to patient's age, functional status and cognitive function. In this group of patients, reduction and internal fixation is associated with significant complications. Therefore, hip arthroplasty is the treatment of choice. The appropriate intervention was selected based on individualized patient assessment and planning[(2)].

In United Kingdom, over 300 000 patients are admitted to hospital with fragility hip fractures every year [(3)]. The incidence of these fractures is 2-3 times more in females as compared to male population [(4)]. Hip fractures account for around 20% of the surgical fractures. Femoral neck fracture account for approximately 50% of all fractures of the hip region [(5)].

The incidence of proximal femoral fractures tends to increase among the elderly as mean lifespan continues to increase. Hip fracture rates are highest in Northern and Central Europe, moderate in North America, and at the lowest in south Asia and Africa. For each decade after 50 the risk of hip fracture double and the worldwide incidence is predicated to rise from 1.7 million in 1990 to 6.3 million in 2050 [(6)]. Hip fractures are associated with 30 % mortality at one year and a profound temporary, sometimes permanent impairment of independence and quality of life [(3, 7, 8)].v

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Patient and Method

This prospective study conducted on 60 patients (37 female and 23 male) with displaced intracapsular femoral neck fracture (Garden type 3 and 4), all treated by bipolar himiarthroplasty from January2016 to November 2017. The follow up period ranged from 12-22 months.

They were 60 - 90 years of age with mean of (74.2). Thirty-nine patients have right hip fracture (65%), in twenty-one patients the left hip was involved (35%).

The time interval between the injury and bipolar hemiarthroplasty varies from two to seven days.fracture occure in48 patient after fall while 7 sustained RTA and 5 had twisting injury.

Method

The patients were investigated for fitnes for anesthesia.

Assessment for the general health of the patients with medical consultation if needed.

Analgesia and enoxaparin (LMWH) in prophylactic dose was given to the patients. LMWH stopped 12 hours before surgery and return back after 12 hour.

Informed written Consent was taken.

Surgical Technique: All patients were operated under spinal anesthesia and given 1-gram ceftriaxone intravenously one hour before skin incision. All patients were operated through posterior Moor approach by the same surgical team.

The patient was securely fixed in the lateral decubitus position with the operated side uppermost.

The skin incision starts 10 cm from the PSIS and directed laterally and distally posterior to the posterior edge of greater trochanter and extends for 10 or more cm, parallel to the shaft of femur.

The fascia lata was exposed and incised in line with skin incision. Gluteus maximus muscle splitting in proximal incision then occurred.

Retraction of the gluteus maximus muscle reveals the back of greater trochanter overlying by trochanteric bursae. Special care is taken in order to not injure the sciatic nerve. In most cases, the sciatic nerve have to be identified and protected.

Blunt dissection will usually remove the trochanteric bursa. Internal rotation of the hip makes external rotator more stretch and obvious and displaces their insertion away from the sciatic nerve. The external rotator and piriformis tendon now tagged with a stay sutures so that they well be re-attached at the end of the procedure. After that, they are transected near their insertion and reflected backwards to protect sciatic nerve.

The capsule now seen and incised longitudinally or mainly by T-shaped incision exposing the fractured femoral head and neck.

The fractured head then removed by corkscrew with transecting ligmentum teres and measured to determine the appropriate size.

After that, the femoral canal preparation performed. Then filling the femoral canal by cement using cement gun and then insert the cemented prosthesis and waiting for setting and finally reduction done.

Assessment of the size of prosthesis and the stability of hip then done. Suturing in layers (joint capsule, external rotator, piriformis, fascia lata, skin) with suction drain and finally dressing.



Fig. 1: Preoperative x-ray of the hip



Fig. 2: Postoperative x-ray of the hip

After Care: The patients instruct to lie supine with abducted and externally rotated lower limbs.

An antibiotic regimen with ceftriaxone 1gm IV once daily for 3 days then change to oral antibiotic in form of Augmentin 1000 mg twice daily for 7 – 10 days, low molecular weight heparin (enoxaparin 4000 IU once daily) for thirty days in addition to analgesia in form of paracetamol vial 1g three times daily and tramadol ampoule on need administered postoperatively.

We advise patient to start movement of normal limb and ankle movement of operated limb as early as possible and as tolerated in addition of calf massage by relatives, elastic stocking. Patients were mobilized on the second postoperative day using a walker frame. AP radiograph of the operated hip performed after mobilization (second postoperative days), 14 days postoperatively (at time of stiches removal), and then as indicated. The suction drain removed after 24-48.

The patient continued on partial weight bearing for 4-6 weeks then turned to full weight bearing accordingly

Fellow up: The patients were followed for any complication at second week, fourth week, second month, six month and 1 year.

All data were collected and analyzed according to Harris Hip Score(9)

Results

There were 60 patients in our study. their age varied from 60 to 90 years old (mean 74.2).Sex distribution showed female predominance (37 female and 23 males) forming 61.67% and 38.33% respectively.

There was at least one comorbid condition in 36 patients. Cardiovascular disease was the most common comorbid condition in our patients.

In our study there was not any significant intraoperative complications.17 patients needed blood transfusion intraoperative while 11 pt. receive blood in the ward (1 unit of blood). No intraoperative mortality was observed. The duration of surgery ranged from 45-60 minutes (the mean is 52.5), post-operative length of stay 2-4 days, In 1 year follow up we have :

Four cases had wound infection (6.67%) discovered at time of stiches removal

Three cases was superficial infection responding well to parenteral then oral antibiotic therapy and one was deep infection need surgical debridement and extraction of bipolar and finally received THR.

Two cases had posterior dislocation (3.33%).

Eighteen cases had anterior thigh pain (30.00 %) which was mild to moderate.

Two cases had DVT (3.33%) which treated conservatively.

Two cases of death (3.33%).

Table 1: Harris Hip Scores of Patients in the studied group

Harris Hip Scores	Pt.	%
Excellent (90-100)	11	18.33%
Good (80-89)	37	61.67%
Fair (70-79)	7	11.67%
Poor (< 70)	5	8.33%

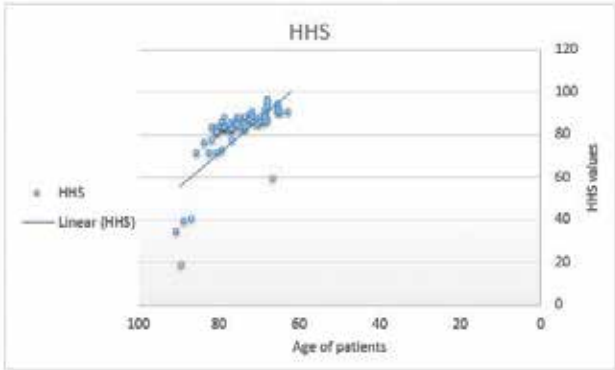


Fig. 3: Relationship of HHS and age of the patient

This figure show the decrement of HHS with increasing age of the patients.

Table 2: Show the relationship (P-value) between complications and age, gender, Type of fracture, medical comorbidities, and blood transfusion

Variables	Complications				
	Infection	Dislocation	Anterior thigh pain	DVT	Death
Age	0.0007227	0.8624	0.293	0.0009	0.4793
Gender	0.5778485	0.0701	0.0171	0.7353	0.2643
Type of fracture (Garden classification)	0.8697328	0.3308	0.4604	0.3308	0.0056
Presence or non of comorbidities	0.0939334	0.7737	0.3087	0.2475	0.2475
Blood transfusion	0.0269024	0.1283	0.8249	0.1283	0.1283

Discussion

Elderly ambulatory patient with Garden's type III and type IV, better treated by prosthetic head replacement or total hip replacement. This is because old people must be active and got up without delay to prevent complications. [10,11,12].

Using a prosthesis in a fresh femoral neck fracture allows immediate weight bearing and returns of elderly patients to activity and help to avoid complications of recumbency. It also eliminates avascular necrosis and nonunion as a complications of femoral neck fractures. It also reduces the reoperation rates compared to internal fixation. [13,14].

The complications of persistent pain and protrusio acetabuli with unipolar hemiarthroplasties have led many surgeons to choose a bipolar system. The lack of biological fixation of the non-textured stem inserted without cement may cause long-term thigh pain. The biarticular design of the bipolar system is thought to be associated with less acetabular wear than unipolar prostheses. A suggested but unproved advantage of the bipolar design is improved stability of the prosthesis and resistance to dislocation. [15,16].

In this study, we had 4 cases of surgical site infection(SSI) (6.67%), three superficial infection treated conservatively. The fourth was deep refractory infection not responding to conservative management, it ended with THR.,

Shah et al. [17]., Lu-Yao G et al.[18], and Saberi.[19] reported incidence of SSI as 0.1%, 1.7% and45%. In this study, we found that there was significant relationship between SSI and age of patients *P*-value (0.0007), presence of DM *P*-value (0.0004) and receiving blood transfusion *P*-value (0.0269).) . Kaye et al[20]. in their article (the effect of increasing age on the risk for surgical site infection) proved that increasing age in adult has often been identified as a risk factor for SSI.

In their study Lu-Yao G et al.[18] found that patients with DM had a higher SSI than those without DM (5.6% vs. 3.7%) Kim et al [21] found significant relationship between allogeneic blood transfusion and SSI following hip and knee arthroplasty. The incidence was 2.88% vs 1.74% for the transfusion and non-transfusion group respectively) On the other hand, we found no relationship between infection and each of gender of pt., type of fracture and presence of comorbidities other than DM.

We had 2 case of posterior dislocation in our studied group (3.33%) which happened 6 – 8 week postoperatively when patients start full weight bearing and both cases treated by open reduction under spinal anesthesia.

For the same complication, Rajak et al. [22],Mandanat et al. [23]. and Kim et al[24]. reported 3%,5.6% and 3.8 % respectively.

This dislocation rate may be attributed to compromising the strong posterior capsule during posterior Moore approach making the hip more vulnerable to dislocation. There was insignificant relationship between dislocation and our comparable variables.

There were 18 cases of anterior thigh pain (30.%) which was mild to moderate (according to simple pain score)[9], they respond well to rest or simple analgesics in form of paracetamol or NSAIDs.

Also Rajak et al. [22]. reported 30% cases of pain of which 20% mild pain and 10% moderate pain, while Vincent et al [25]. reported the 24.6% rated as moderate to severe in their series. We found significant relationship between anterior thigh pain and gender *P*-value (0.0171), while there was insignificant relationship between anterior thigh pain and other variables.

We reported two cases of DVT (3.33%).while Lee et al[26]. reported incidence of (2.7%). Mazen et al[27]. reported higher incidence which was(11.8%). We found significant relationship between DVT and age of the patients *P*-value (0.0009), while there was insignificant relationship between it and other variables.

There were two cases of death, which represent about (3.33%). One of them died after three weeks of operation and the other one died six weeks postoperatively.

Rajak MK et al. [22]. had no mortality in their series of 30 patient while Rödén M et al [28] reported (9.3%) mortality in their 100 patient.

We found significant relationship between mortality and type of fracture *P*-value (0.0056), while there was insignificant relationship between it and other variables.

The mean Harris Hip Score result in our study was 80.6 which was comparable to other studies such as that of Rajak et al. [22] (83.1) and Mouzopoulos et al) [29].

(83.7. HHS decrease with increase ages of the patients as seen in this paper.

Conclusion

Bipolar r hemiarthroplasty through posterior approach seems to be a good option for primary treatment of displaced femoral neck fractures in elderly with few complications.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: Informed consent was obtained from all individuals participant included in the study.

REFERENCES

1. D'Angelo F, Giudici M, Molina M, et al. Mortality rate after hip hemiarthroplasty: analysis of risk factors in 299 consecutives cases. J. Orthopedic and Traumatololgy. 2005; 6(3):111-6.
2. Florschutz AV, Langford JR, Koval KJ. Femoral neck fractures in the geriatric population. In Ricci W M, Ostrum R F. Orthopedic Knowledge Update (OKU), Trauma 5. Printed in the USA. 2016 by the American Academy of Orthopaedic Surgeons. P. 613.
3. Jettoo P, James P. Dynamic hip screw fixation versus multiple screw fixation for intracapsular hip fracture. J. orthopedic surgery 2016;24(2):146-9.
4. Mittal R, Banerjee S. Proximal femoral fractures: principles of management and review of literature. J. clinical orthopaedics and trauma 2 0 1 2 ; (3) 1 5 -23.
5. Freitas A, Torresb GM, andré cezar de andrade de mello e souzab A C DM, et al. Analysis on the mechanical resistance of fixation of femoral neck fractures in synthetic bone, using the dynamic hip system and an anti-rotation screw. Revista Brasileira Ortopedia. 2014; 49(6):586–592.
6. David J, Mauffrey H and C. Trauma. In Miller M D, Thompson S R. Miller's review of orthopedic. Seventh edition. Philadelphia: 2016 by Elsevier.809.
7. Stephanie m, Zielinski & max A, et al. Adherence to a femoral neck fracture treatment guideline. International orthopedics (2013) 37:1327–1334.
8. Leu1 TH, Chang WC, jeff chien-fu lin J C F et al. Incidence and excess mortality of hip fracture in young adults: a nationwide population-based cohort study leu et al. bmc musculoskeletal disorders (2016) 17:326.
9. Harris W H.Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. an end-result study using a new method of result evaluation. JBJS. 1969 jun;51(4):737-55.
10. Moroni A, Hoque M, WaddellJP, et al. Surgical treatment and management of hip fracture patients. Arch Ortho Trauma Surg. 2014; 134(2):277-81.
11. Tanous T, Stephenson KW, Grecula MJ. Hip hemiarthroplasty after displaced femoral neck fracture: a survivorship analysis. Orthopedics. 2010;33(6):385.
12. Wang F, Zhang H, Zhang Z, et al. Comparison of bipolar hemiarthroplasty total hip arthroplasty for displaced femoral neck fractures in the healthy elderly: a meta-analysis. BMC Musculoskeletal Disorder. 2015 Aug 28(16) 229.
13. Ravikumar K J, Marsh G. Internal fixation versus hemiarthroplasty versus total hip arthoplasty for displaced subcapital fractures of femur –13 year results of a prospective randomized study. Injury 2000 ; 31(10):793 – 7.
14. Nicolaides V. Galanakos S. Mavrogenis A F. et al. Arthroplasty versus internal fixation for femoral neck fractures in elderly.Strategie2. Trauma and Limb Reconstraction, 2011 Apr, 6(1):7-12.
15. Rogmark C, Carlsson A, Johnell O, et al. Primary hemiarthroplasty in old patients with displaced femoral neck fracture. A 1 year follow up of 103 patients aged 80 years or more. Acta Orthop Scand 2002 b ; 73 : 605-10
16. Calder S, Anderson G, Jagger C, et al: Unipolar or bipolar prosthesis for displaced intracapsular hip fracture in octogenarians, JBJS 78B:391, 1996. 22-
17. Shah SN, Wainess RM, Karunakar MA. Hemiarthroplasty for Femoral Neck Fracture in the Elderly: Surgeon and Hospital Volume– Related Outcomes. The J. of arthroplasty. 2005;20(4):503-8.

18. Lu-Yao GL, Keller RB, Littenberg B, et al. Outcomes after displaced fractures of the femoral neck. A meta-analysis of one hundred and six published reports. The JBJS 1994;76(1):15-25.

19. Saberi S, Arabzadeh A, Khomeisi B et al. Early Complications Following Bipolar Hemiarthroplasty for Femoral Neck Fracture in Elderly Patients. Acad J Surg, 2014; 1(3-4): 45-48.

20. Kaye KS, Schmit K, Piper C, et al. the effect of increasing age on the risk for surgical site infection.J. of infectious diseases 2005;191: 1056-62.

21. Kim JL, Park JH, Han SB, et al. Allogeneic blood transfusion is a significant risk factors for surgical site infection following total hip and knee arthroplasty: a meta-analysis. The J. of arthroplasty. 2017 Jau; 32(1): 320-325.

22. Rajak MK, Jha R, Kumar P, et al. Bipolar hemiarthroplasty for intracapsular femoral neck fractures in elderly patients. J. of orthop. Surg. (Hong Kong). 2013;21(3):313-6.

23. Madanat R, Mäkinen TJ, Ovaska MT. Dislocation of hip hemiarthroplasty following posterolateral surgical approach: a nested case–control study. International Orthopaedics (2012) 36:935–940.

24. Kim Y, Kim JK, Joo IH et al. Risk Factors Associated with Dislocation after Bipolar Hemiarthroplasty in Elderly Patients with Femoral Neck Fracture. Korean Hip & Pelvis 2016 28(2): 104-111.

25. Vincent D, Pellegrini JR, Bradley A. Minimum ten years results of primary bipolar hip arthroplasty for degenerative arthritis of the hip. JBJS, incorporated.2006,volume 88-A,number 8.

26. Lee S, Hwang J, Kim Y. Venous thromboembolism following hip and knee replacement arthroplasty in koria :A nationwide study based on Claim registry. Jornal of korian medical sciences. 2016 Jan;31(1): 80-88.

27. Mazen S, Julien G, Riad F. Retrospective evaluation of bipolar arthroplasty in fractures of the proximal femur. North American journal of medical sciences. 2010 Sep; 2(9): 409-415.

28. Rödén M, Schön M, Fredin H. Treatment of displaced femoral neck fractures: A randomized minimum 5-year follow-up study of screws and bipolar hemiprostheses in 100 patients. Acta Orthopaedica Scandinavica, 2003, 74:1, 42-44

29. Mouzopoulos G, Stamatakos M,Arabatzi H et al.The 4 year result after a displaced subcapital hip fracture treated with 3 surgical options.Int. Orth.2008 june;32(3):367-373.

Assessment of the Anterior Talofibular Ligament(ATFL) Thickness in Chronic Stroke Patients by Ultrasound

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ABSTRACT

Stroke is one of the commonest diseases affecting people world - wide. Spastic equino varus foot is one of most common disabling deformities observed among hemiparesis patients. The aim of the study is to compare ATFL thickness on the affected and unaffected sides of chronic stroke patients with that of healthy individuals using ultrasonography.

Method: Comparative case-control study carried out between October 2017 to September 2018. There were 77 chronic stroke patients (46 males and 31 females) , matched 154 healthy individual (90 males and 64 females).

The thickness of the anterior talofibular ligament(ATFL)was measured using ultrasound.

Results: The mean thickness of ATFL in stroke cases was significantly higher (2.74 ± 0.25 mm) than the mean thickness of ATFL in control group (2.34 ± 0.22 mm) , while the mean ATFL thickness was significantly higher in both affected and unaffected sides in stroke cases than mean thickness in the control group. Within the stroke cases the mean ATFL thickness was significantly higher in the affected than unaffected side, while in control group, there was no significant difference between both sides.

Conclusion: Chronic stroke patients had thicker ATFL on the affected side than unaffected side & both sides were thicker than the group healthy control.

Keywords: *Ultrsonagraphy.Anterior talofibular ligament. Equniovarus. Strocke*

Introduction

Anterior talofibular ligament (ATFL)is one of the most biomechanically important ligament of ankle, it is also the most frequently and often first to be injured as a result of abnormal inversion stress[(1)]. The average width of ATFL is 7.2 mm and average length is 24.8 mm long [(2)]. The anterior talofibular ligament limits the anterior displacement of the talus and plantarflexion of the ankle. Only in plantarflexion the ligament comes under strain[(3)].

Following stroke patient may develop hemiparesis, which can have a profound effect upon walking ability[(2,4)]. Spastic equinovarus foot (SEVF) is one of the most common disabling deformities observed among hemiplegic patients. SEVF deformity has four main causes[(5,6)]. The first is spasticity of the calf muscles (soleus, gastrocnemius, tibialis posterior, flexor digitorum and flexor hallucis longus muscles) , responsible for SEVF in the stance phase of gait. The peroneus longus and brevis muscles may also be spastic (often with clonus), but such spasticity is useful to limit the varus and stabilize the ankle. Secondly, the spastic muscles have a tendency to remain in a shortened position for prolonged periods, which, in turn, results in soft-tissue changes and contractures, leading to a fixed deformity. Thirdly, weakness of the ankle dorsiflexor muscles (tibialis anterior, extensor digitorum and hallucis muscles) as well as the peroneus longus and brevis muscles is often emphasized by triceps spastic co-contraction and/or contracture. The weakness also affects the triceps surae muscles, leading to a lack of propulsion at the end of the stance phase of gait.

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Lastly, an imbalance between the tibialis anterior and the peroneus muscles leads to varus of the hind-foot in the swing phase, as peroneus activation must compensate for physiological varus positioning related to contraction of the tibialis anterior. In such a case, the foot will be placed in an unstable varus position during the swing phase and at the beginning of the stance phase[7]. The incidence of equinovarus deformity of the foot in adult stroke patients has been reported to vary between 10% and 20% [2].

Equinovarus deformity can increase the chance of fall,as the feet tend to drag over the floor during swing phase[8]. Recovery of walking ability by addressing the ankle-joint deformity helps patients with stroke to regain independence in daily life, and is one of the main rehabilitation training goals[9]. Fortunatly, ankle-foot orthoses have been used successfully to correct equinovarus deformity after stroke[10]. However little was written about the effect of equinovarus deformity on ATFL in patient with post stroke hemiplegia. The aim of this study is to compare between the anterior talofibular ligament (ATFL) thickness on the affected and unaffected sides of chronic stroke patients with that of healthy individuals using ultrasonographic study.

Patients and Method

Patients and Study Design: This comparative case control study was carried out on 77 patients from October 2017 to September 2018. There were 77 chronic stroke patients, matched with 154 healthy individual. The selection of patients (chronic stroke patients) and control group was done according to inclusion and exclusion criteria, where chronic stroke is a period starting six months after initial stroke. All patients and controls were referred from orthopedics and rehabilitation unite after fully diagnosis of chronic stroke patients by clinical examination and imaging modality.

The study group included 77 chronic stroke patients (46 males and 31 females) , mean age (60.2 ± 9.8) , mean BMI (26.20 ± 4.3) matched with 154 healthy control group (individuals without disorders of the ankle or had no surgical intervention of the lower limbs) (90 males and 64 females) , mean age (59.9 ± 9.6) mean BMI (26.7 ± 3.78).

Inclusion Criteria: The events of stroke (hemorrhagic or ischemic stroke) at least 6 months, who have developed weakness on one side with abnormal gait.

Exclusion Criteria

1. Previous botulinum toxin injection to gastro-soleus muscles
2. Event of post stroke period ankle injury.
3. Fixed ankle contracture.
4. Previous surgical intervention of the lower limbs.

Method

All the patients and control group underwent gray scale sonography to measure thickness of anterior talofibular ligament (ATFL) using a linear probe (7 - 12 MHz GE VOLUSON E8 ultrasound machine) and was done by same radiologist.

Measurements was taken as the patient in a supine position with the ankles in neutral or slight plantar flexion. A longitudinal image of the ATFL was scanned with the transducer placed in a slightly oblique direction from the anterolateral aspect of the lateral malleolus to the peak of the talus.

The hyper echogenicity of the two bony landmarks made them easy to be identified the ligament. The normal ATFL was depicted as hyperechoic bundles on sonography. ATFL thickness was measured halfway between the two bony landmarks of the ankle. All sonographic measurements were taken in the plane perpendicular to the long axis of the ligaments for standardization and reproducibility of the measurements. The thickness of the ligaments was measured two times, and the mean values were recorded as shown in figure (1).

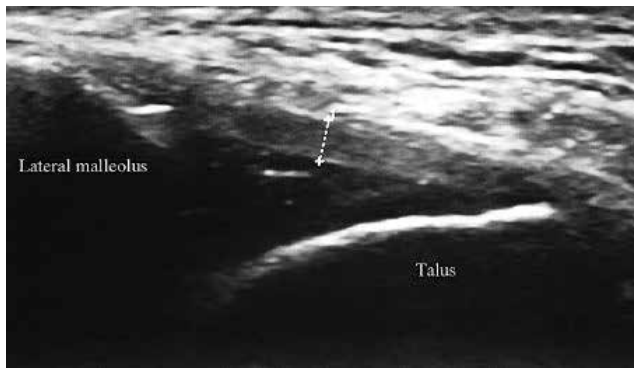


Figure 1: A musculoskeletal ultrasound image of the anterior talofibular ligament and thickness measurement (49)

Results

A total of 77 chronic stroke cases and 154 controls were enrolled in this study, both groups were almost matched for age and gender, where the mean age was 60.2 ± 9.8 in patients and 59.9 ± 9.6 in controls, (P > 0.05). Males were almost dominant in both groups represented 59.7% and (58.4%) among stroke cases and controls, respectively, (P > 0.05) . The mean body mass index (BMI) was 26.20 ± 4.3 in stroke cases and 26.7 ± 3.78 in controls with no significant difference, (P > 0.05).

History of diabetes mellitus was relatively more frequent in stroke cases, contributed for 32.5% while it was reported in 23.4% of controls, however, the difference was statistically insignificant, (P> 0.05) . Hypertension was also more frequent in stroke cases than controls, 54.5% and 43.5%, respectively with no statistically significant difference (P > 0.05) (table 1).

Table 1: Demographic characteristics of the studied group

Variable	Statistic	Group		P Value
		Stroke cases (N = 77)	Controls (N = 154)	
[redacted]				

Among the stroke cases, right side was affected in 43 (55.8%) cases and the left side in the remaining 34 cases (44.2%). Tthe disease duration of stroke cases ranged (6 – 36) months with a mean of 18.8 ± 10 months.

The comparison of mean ATFL thickness of stroke cases and controls revealed that ATFL was significantly thicker in stroke cases than controls; the mean ATFL thickness was significantly higher in both affected and unaffected sides in stroke cases than controls, 2.74 ± 0.25, 2.52 ± 0.27 and 2.34 ± 0.22 mm respectively, Furthermore, within the stroke cases the mean ATFL thickness was significantly higher in the affected than unaffected side, (P. value < 0.001). (tables 2) and (figure 3.2).

Table 2: Results of ANOVA multiple LSD (least significant difference) comparison of ATFL thickness of stroke cases and controls

[redacted]

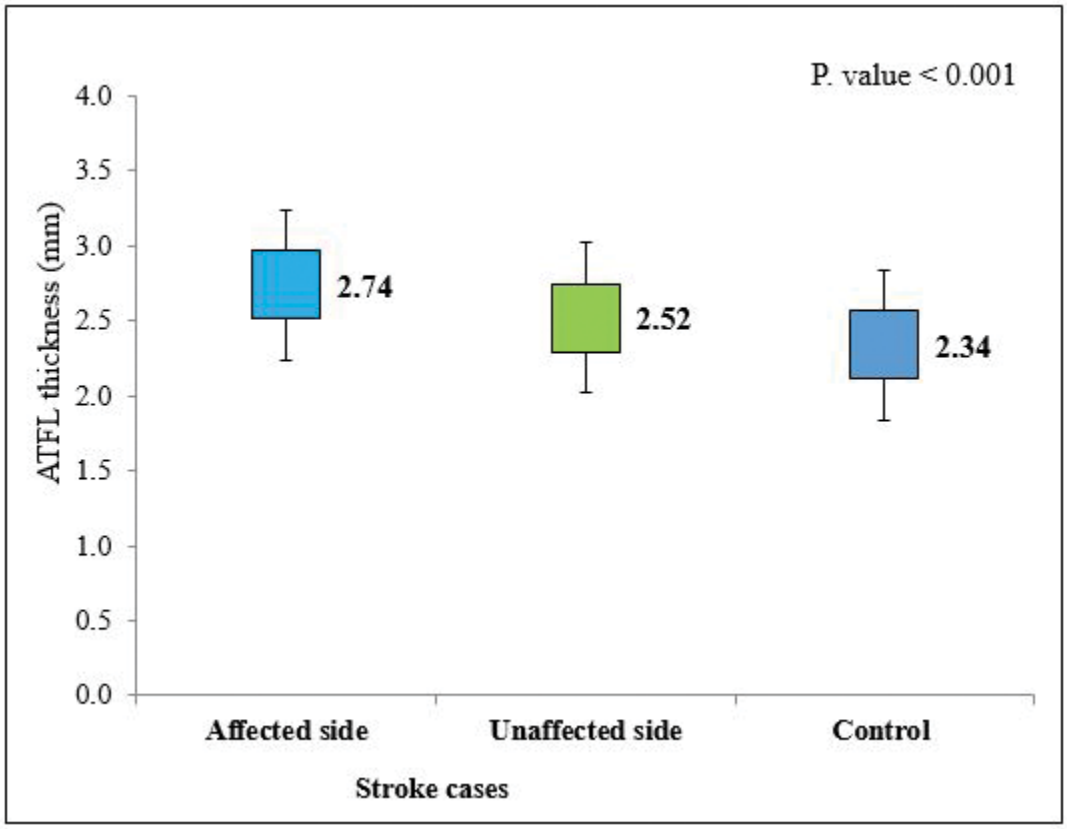


Figure 2: Graphical comparison of mean ATFL thickness of stroke cases and controls

To assess the possible effect of demographic variables in both stroke cases and controls on the ATFL thickness, inter-correlation was performed for these variables against the ATFL thickness in affected and unaffected side (table 3), the results of these correlations revealed that the ATFL thickness not affected by the demographic characteristics of the stroke cases, in all comparison, (P>0.05).

Table 3: Correlation matrix of the ATFL thickness with demographic characteristics of stroke cases (N = 77)



Similarly, the inter - correlation was performed in control group, (table 4), and the results of these correlations were also statistically insignificant, (P > 0.05).

Table 4: Correlation matrix of the ATFL thickness with demographic characteristics of controls (N = 154)

Hypertension	*R*	0.049	0.047
	P. value	0.55	0.57

Discussion

Stroke is one of the commonest diseases affecting people world - wide, chronic stroke patients with weakness on one side have higher risk of fall and ankle ligament injury, equino varus deformity is the result of abnormal activity in multiple muscles, it occur in 20 % of patients with stroke. Although most studies have focus on gait patterns of stroke patients, the presence of an equino varus foot was not specified, subcategorization of gait patterns would be helpful in developing and delivering more targeted treatment.

Ultrasound is now widely used for the assessment of the tendon and ligaments abnormalities, healthy ligaments contain high level of collagen with a structural orientation. Changes to ligaments as a result of disease and injury can give rise to a spectrum of damage, the mildest form is interstitial tearing of collagen fibers in which the ligament may be elongated and lax. Ultrasound is one of the most sensitive tools to diagnoses the injury of ligaments and other soft tissues and quantify the ligament integrity[11].

Ultrasound could be used to evaluate thickness and type of the injury of the ATFL[12]. It has been shown that ultrasound has high sensitivity and specificity for chronic ATFL tear, Advantages of using musculoskeletal ultrasound include cost - efficiency, shorter examination time, and the ability for real - time and dynamic imaging. It also utilizes no ionizing radiation and is portable, as well as widely available[13].

Furthermore, dynamic sonography (during externally applied stress) has the potential to identify ligament [11].

In the present study, it has been shown that the mean thickness of ATFL in stroke cases was significantly higher than the mean thickness of ATFL in control group and the mean ATFL thickness was significantly higher in both affected and unaffected sides in stroke cases than the mean thickness in control group. In addition, in the stroke cases the mean ATFL thickness was significantly higher in the affected than the unaffected side, while in control group there was no significant difference of the mean ATFL thickness between both sides.

Yildizgoren, M. et al [14]. studied (38) patients with chronic stroke and (38) normal control group and to the best of our knowledge this is the only available research that investaged ATFL thickness in patients with post stroke hemiparesis. He found that chronic stroke patients have a thicker ATFL on both the affected and unaffected sides, compared with healthy individuals (2.75 ± 0.41, 2.42 ± 0.30, 2.35 ± 0.19 mm) respectively. This is consistent with our study which showed that the mean ATFL thickness was significantly thicker in both affected and unaffected side in stroke cases than mean thickness in control groups (2.74 ± 0.25, 2.52 ± 0.27 and 2.34 ± 0.22 mm) respectively.

It can be postulated that these findings may be due to several factors. Hemiplegic patients often have inadequate ankle dorsiflexion due to loss of motor control, spasticity of the gastrocnemius soleus or the invertor group, and/or ankle contracture[14]. Because a ligament is a highly organized fibrous tissue, its mechanical properties are directionally dependent on stress, an increased thickness of the ATFL reflects morphologic changes that occurred secondary to the ankle injury[14].

The viscoelastic characteristic of ligaments is the gradual increase in ligament deformation over time under a constant load. Recruitment of collagen fibers may be important for resisting gradual deformation of the ATFL under a constant load, and the ATFL is thickened on the affected side [14].. The stabilization of the ankle in a neutral position reduces the load on the ATFL and prevents ankle torsion.

The use of ultrasonography can aid in early detection of the affected ligaments, thus helping to prevent ankle deformity.

In this study hypertension, diabetic mellitus and disease duration had no significant effect on ATFL thickness.

Conclusion

ATFL is thicker on the affected side than the unaffected and both of them are more thick than in the feet of control group.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: Informed consent was obtained from all individuals participant included in the study.

REFERENCES

1. Meyer NB, Jacobson JA, Kalia V, Kim SM. Musculoskeletal ultrasound: athletic injuries of the lower extremity. Ultrasonography. 2018;37(3):175.
2. Verdie C, Daviet JC, Borie MJ, Popielarz S, Munoz M, Salle JY, et al. Epidemiology of pes varus and/or equinus one year after a first cerebral hemisphere stroke: apropos of a cohort of 86 patients. Journal Article (lang: fre) p. 81– 86, volume 47, issue 2, 2004.
3. Da Silveira ACP. Extended biomechanical model of the ankle-foot complex - incorporation of muscle and ligaments - University of Coimbra, Ana Carolina Pinto da Silveria. thesis. 2015;99.
4. Voigt M, Sinkjær T. Kinematic and kinetic analysis of the walking pattern in hemiplegic patients with foot-drop using a peroneal nerve stimulator. Clin Biomech. 2000;15(5):340–51.
5. Ward AB. Managing spastic foot drop after stroke. Eur J Neurol. 2014;21(8):1053–4.
6. Fuller DA, Keenan MAE, Esquenazi A, Whyte J, Mayer NH, Fidler-Sheppard R. The impact of instrumented gait analysis on surgical planning: treatment of spastic equinovarus deformity of the foot and ankle. Foot ankle Int. 2002;23(8):738–43.
7. Ward AB. A literature review of the pathophysiology and onset of post-stroke spasticity. Eur J Neurol. 2012;19(1):21–7.
8. Bakheit AMO. The pharmacological management of post-stroke muscle spasticity. Drugs Aging. 2012;29(12):941–7.
8. Bakheit AMO. The pharmacological management of post-stroke muscle spasticity. Drugs Aging. 2012;29(12):941–7.
9. Peurala SH, Karttunen AH, Sjögren T, Paltamaa J, Heinonen A. Evidence for the effectiveness of walking training on walking and self-care after stroke: a systematic review and meta-analysis of randomized controlled trials. J Rehabil Med. 2014;46(5):387–99.
10. Mulroy SJ, Eberly VJ, Gronely JK, Weiss W, Newsam CJ. Effect of AFO design on walking after stroke: impact of ankle plantar flexion contracture. Prosthet Orthot Int. 2010;34(3):277–92.
11. Ahmed R, Nazarian LN. Overview of musculoskeletal sonography. Ultrasound Q. 2010;26(1):27–35.
12. Cai Y, Li S, Chen S, Hua Y, Shan J. Suppl-4, M2: An Ultrasound Classification of Anterior Talofibular Ligament (ATFL) Injury. Open Orthop J. 2017;11:610.
13. Hua Y, Yang Y, Chen S, Cai Y. Ultrasound examination for the diagnosis of chronic anterior talofibular ligament injury. Acta radiol. 2012;53(10):1142–5.
14. Yıldızgören M, Velioglu O, Demetgul O, Turhanoglu A. Assessment of the Anterior Talofibular Ligament Thickness in Patients with Chronic Stroke: An Ultrasonographic study. J Med Ultrasound. 2017;25(3):145–9.

Classroom Control Patterns and its Relation to the five major Factors of the Personality of Sports Education Teachers in Babil Governorate

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ABSTRACT

This study investigates the physical level of classroom control differed by the five major factors of personality? Are there gender differences between the patterns of classroom control according to the five major factors of the personality? Is there a relationship between the patterns of classroom control and the five major factors of the personality of the physical education teachers? The objectives of the research are to construct and codify the scale of the patterns of classroom control and to prepare and apply the scale of the five major factors of the personality as well as the extraction of the standards and levels for the scale of class control patterns.

Keywords: *prepare, regulate, classroom control patterns, five major factors, personality.*

Introduction

The Introduction and Importance of Research: The school is one of the most important institutions of the Ministry of Education in which the student's personality is formed, his ethics are refined, and knowledge which will be his weapon in the future is learned. It is the cornerstone through which the student reaches his goals and it provides him with all means of success according to the rules and regulations.[1,2] One of the most important components of the school environment is the classroom. Its management is both an important and difficult task. It is an important part of the work of the teachers of physical education [3, 4]. The physical education teacher is the main supervisor of the classroom and is directly responsible for the implementation of the educational process.[5]

The classroom control is one of the bases upon which to achieve the educational objectives of the educational process and its success, and its role is not only to raise the level of academic achievement for students, but also to contribute to their moral and social development, so the control is an educational process that requires control of behavior, passions and emotion under the leadership in order to achieve a specific goal, it is considered a psychological and social needs which the educational process seeks to develop it for students [6].

One of the models that described the personality is the model of the five major factors of the personality, which contains five dimensions through which the difference in personality is explained based on each prevalent dimension among the teachers of physical education, and it gives us a description of individual differences among teachers.

The importance of this research is to identify the patterns of classroom control practiced by teachers of physical education, the five major factors of the prevalent personality, and the relationship between the patterns of classroom control and the five major factors of the personality of the physical education teachers. [7]

The Research objectives

1. To construct and codify the scale of the patterns of classroom control for physical education teachers in Babil Governorate.
2. To prepare and apply the scale of the five major factors of the personality for the physical education teachers in Babil Governorate.
3. The extraction of the standards and levels for the scale of class control patterns of physical education teachers in Babil Governorate.

4. To identify the level of the classroom control patterns for physical education teachers in Babil Governorate.
5. To identify the relationship between the classroom control patterns and the five major factors of the personality for physical education teachers in Babil Governorate.
6. To identify the gender differences between the classroom control patterns for physical education teachers in Babil Governorate.

The Research Methodology and Field Procedure

The Research Methodology: The researcher used the descriptive approach in the method of survey studies. The standard studies are suited to the process of building and codifying standards which corresponds to the nature of the current study.

The research Community and Sample: The research community and its sample of physical education teachers in Babil Governorate have been identified. Their number was (759) of which (582) were male teachers and (177) were female teachers. The size of the research samples was (455) representing a percentage of (59.94). The sample of reconnaissance was (30) teachers, construction sample was (190) teachers, codifying sample was (190) teachers while the number of the application sample was (200) teachers.

The research tools and used equipment: The current research tools include: 1- Sources and references 2- Questionnaire form 3- Laptop.[16]

Table 1: Shows the five major factor scale articles for personality according to dimensions

The dimension	The Positive articles		The negative articles	
	The Articles	Total	The Articles	Total
Neurosis	6,11,21,26,36,41,51,59	8	1,16,31,26	4
Extraversion	2,7,17,22,32,37,47,52	8	12,27,42,57	4
Openness to experience	13,28,43,53,58	4	23,33,38,48,3,8,18	7
Acceptability	4,19,34,49	4	9,14,24,29,39,44,54,59	8
Conscientiousness	60,50,40,35,25,20,10,5	8	15,30,45,55	4
		33		27

The correction key was according to the 5-Likert scale, where the tester obtains the following answers when responding the articles of the scale as shown below:

Table 2: Shows the degree of response on the scale of the five major factors for personality

The Articles	Strongly Agree	Agree	I have no opinion	Disagree	Strongly Disagree
The Positive	5	4	3	2	1
The negative	1	2	3	4	5

Determining the validity of the five major factor scale articles for personality: The researcher presented the (60) articles of the scale to (7) experts and specialists. The researcher used the test (Ka-2) to identify the valid and invalid articles. The results showed the validity of all articles where the calculated (Ka-2) value of (7) was greater than the tabular value (3.84) with (0.05) significance level and (1) degree of freedom. The experts agreed to keep the answer alternatives as mentioned above **(8).**

Procedures for controlling the scale of the patterns of classroom control: For the purpose of achieving the objectives, there must be a tool to measure the patterns of classroom control based on scientific bases and appropriate to the Iraqi environment. After studying the relevant researches and scales like studying [7, 8], the researcher has taken the following steps:

Define the Objective and purpose of the scale: The aim is to construction and codify the scale of classroom control patterns and its purpose is to identify the prevalent classroom control pattern of the research community represented by physical education teachers in Babil Governorate.

Steps of constructing the Scale: A good test should be prepared to include the whole curriculum in a balanced manner. The Steps of constructing the Scale are:

Determine the fields of scale: Seven dimensions were presented to experts and specialists showing the validity of the dimensions (patterns) of the democratic, chaotic, punitive and authoritarian. The dimensions (patterns) of (preventive, therapeutic, reprehensive) were excluded because the calculated (Ka-2) values are less than the tabular value (3.84) which was below the significance level (0.05) and degree of freedom (1).

Presentation, analysis and discussion of results: The five major factor scales and the classroom control patterns have been applied to the application sample of (200) teachers representing a percentage of (26.35%). When the data were processed statistically, the number of male and female teachers who were categorized by the five major factors of the personality was determined. The number of democratic pattern male teachers was (55) and female teachers was (27. The number of punitive pattern male teachers was (20) and female teachers was (3), whereas the number of the authoritarian pattern male teachers was (22) and female teachers was (7). The number of the chaotic pattern male teachers was (53) and the number of female teachers was (13). On the scale of the five major factors of the personality. There were (51) male teachers on the neurosis factor and (5) female teachers. There were (20) male teachers and (10) female teachers on the extraversion factor and the openness to experience there were (21) male teachers and (7) female teachers. There were (15) male teachers and (17) female teachers on the conscientiousness factor, and there were (43) male teachers and (11) female teachers on the vigilant conscience factor. By this we have achieved the **second research objective** which is (the preparation and application of the scale of the five major factors of the personality of the teachers of sports Education in Babil Governorate).

Table 3: The Statistical description of the scale of the classroom control patterns according to the five major factors of the personality

The patterns	Total number	Number of articles	The hypothetical median	Minimum value	Maximum value	Arithmetic median	Standard deviation	Standard error	Skaewness
Female Teachers									
Democratic	27	13	48.00	37.00	59.00	47.41	6.53	0.26	0.45
Punitive	3	11	35.00	33.00	37.00	34.67	2.08	0.20	0.23
Authoritarian	7	10	34.00	31.00	37.00	35.43	2.44	0.92	0.79
chaotic	13	11	43.50	40.00	47.00	43.77	2.13	0.59	0.62
Total	50	45	192.50	166.00	219.00	185.12	9.19	0.73	0.87
Male Teachers									
Democratic	55	13	35.50	23.00	48.00	40.29	4.95	0.67	0.32
Punitive	20	11	44.50	34.00	55.00	42.35	5.72	0.28	0.51
Authoritarian	22	10	45.00	40.00	50.00	44.36	2.90	0.62	0.49
chaotic	53	11	38.50	30.00	47.00	38.08	4.50	0.62	0.33
Total	150	45	152.00	138.00	166.00	152.17	8.14	0.66	0.08
The Total Scale									
Democratic	82	13	41.00	23.00	59.00	42.63	6.43	0.71	0.27
Punitive	23	11	44.00	33.00	55.00	41.34	5.97	0.25	0.48
Authoritarian	29	10	40.50	31.00	50.00	42.20	4.77	0.89	0.43
chaotic	66	11	43.50	30.00	47.00	39.20	4.72	0.58	0.30
Total	200	45	178.50	138.00	219.00	160.41	11.43	1.23	0.79

It appears that the arithmetic median hypothesis of the scale of the classroom control patterns which were extracted from the achieved degree and its value (178.50) is the largest achieved arithmetic median which was (160.41). The arithmetic median achieved for the teachers (152.17) is greater than the hypothetical median of (152.00) and is not Influential. We also see that the arithmetic median of female teachers is equal to (185.12) and is smaller than the hypothetical median which was (192.50).

Normative Levels of the Classroom control Patterns Scale: Three normative levels were determined. both levels are good and weak (15.73%) The average level reached a rate of (68.27%) Of the area under the normal distribution curve, where it appeared to us that the level of teachers is average but the misses and the sample as a whole were weak, representing (38.67%) For teachers and (54%) For misses and (73%) For the sample as a whole of the research community as shown in the below:

Table 4: Shows the standard levels and percentage of the test of the classroom control patterns

The scale of the classroom control patterns	Sample number	Weak 15.73%		Average 68.27%		Good 15.73%	
		Number	%	Number	%	Number	%
Females	Categories	166 -183		184 – 201		202 – 219	
	50	27	54	15	30	8	16
Males	Categories	138-147		148-157		158-176	
	150	45	30	58	38.67	47	31.33
The sample as a whole	Categories	138-165		166-193		194-221	
	200	146	73	42	21	12	6

The relationship between the classroom control patterns and the five major factors of personality: The researcher used the simple correlation coefficient (Pearson) and the results were as follows:

Table 5: Shows the correlational relationships between the classroom control patterns and the five major factors of personality

The classroom control patterns Personal factors	The Democratic	The punitive	The authoritarian	The chaotic
Neurosis	0.06	0.63	0.51	0.11
Extraversion	0.45	0.09	0.12	0.13
Openness to experience	0.10	0.13	0.08	0.05
Acceptability	0.57	0.10	0.11	0.14
Conscientiousness	0.12	0.54	0.49	0.07

As shown above, it is found that the relationship between the Neurosis, the punitive and authoritarian pattern is statistically significant as well as the extraversion with the democratic pattern is statistically significant, the acceptability was a statistical significant with the democratic pattern while the conscientiousness was a statistical significant with the punitive and authoritarian pattern because the value of Sig was less than significant level (0.05).

Discussion of Results

After the standard levels of the scale have been extracted, the level of classroom control for the research sample as a whole was (weak) at (73%). As for the female teachers, the level is also weak at (54%) The male teachers were at an average level of (38.67) and this is a good indicator of their classroom control, especially as we know that this result may be due to the environment that provides male teachers with a degree of control over the students and that their abilities are suitable for the work of controlling the classroom. As for the differences between male and female teachers, the significant for female teachers in the democratic and chaotic pattern was higher and the reason for this result that female teachers are mothers before everything, they are dealing with their emotions and they are not cruel with the students regardless of their gender, As for male teachers, they have

the advantage in the punitive and authoritarian pattern, as mister is hard on students when they violate the rules and regulations. As for the differences in the fields of classroom control patterns, it was found that differences are random except the preference of the democratic pattern on chaotic, and authoritarian on chaotic also, The democratic pattern was the best pattern, as it was represented by (82) teachers, followed by chaotic pattern which was represented by (66) teachers.

Conclusion

By presenting, analyzing and discussing the results, the researcher reached the following conclusions:

1. The scale of the classroom control patterns has been codified for physical education teachers.
2. The common personality factors were revealed, the neurosis and the Conscientiousness factors were common for male teachers, and the acceptability and Conscientiousness factors were common for female teachers.
3. The patterns of classroom control were revealed and the dominant patterns for male teachers were democratic and chaotic, and for female teachers were punitive and authoritarian.
4. Three levels were extracted on the scale of the classroom control (good, average and weak)
5. The female teachers' level was weak, and the female teachers were average, and the sample as a whole was weak.

The Recommendations: In light of the researcher's conclusions, he recommends the following:

1. Teachers need to learn about ways to distance them away from authoritarian and punitive patterns.
2. The need to prepare courses to help teachers of physical education on how to practice classroom control patterns.
3. The need for teachers of physical education to know the modern patterns of classroom control and its impact on the process of learning in the classroom.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

REFERENCES

1. Ahmed Ben Faya. The role of teacher's supervisors and principals in providing an effective classroom climate in the classrooms of the elementary school in Medina. Master's degree thesis. Saudi Arabia. Umm Al Qura University. Faculty of Education. 2006
2. Halima Bu hamla, control patterns practice for intermediate school students and their relationship to the appearance of violent behavior. Master's degree thesis. Algeria. Al Haj Lakhdar University. Faculty of Humanities, Social sciences and Islamic sciences. 2015
3. Halima Attia Hassan. The level of the practice of teachers of private public schools in the capital Amman Governorate for the patterns of classroom control and its relation to psychogenic pain disorder from their point of view. Master's degree thesis. Middle East University. Faculty of Educational Sciences. 2016
4. Khadija khalal and Hassiba Meziane. Methods of Behavioral classroom control for New teachers. Algeria. University of Gilani bonoamana. Faculty of Humanities and Social Sciences. 2017
5. Reem Salmon. Classroom control and its relationship to the location of control for misters and misses of the elementary education stage in the city of Tartous. Tartus University Journal for Research and Scientific Studies. Volume 1. Issue 1. 2017
6. Reem Salmon et al. Self-efficacy and its relation to classroom control patterns for teacher students. Tishreen University Journal for Research and Scientific Studies. Vol. Issue 6. 2016
7. Rima Mohamed El Moudy. The role of classroom in achieving self- control for learners. Master's degree thesis. Syria. Tishreen University. Faculty of Education. 2015
8. **Saed ragoh,** Patterns of school control and its relation to the effectiveness of classroom control from the point of view of teachers. Master's degree thesis. Algeria. University of 8-Mohammed Khader. Faculty of Humanities and Social Sciences. 2014

Effect of Speed Training Technique in Determining the Effectiveness of Creatine and Phosphorus for Advanced Volleyball Players

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ABSTRACT

The importance of research is to maintain the production of energy and non-disbursement in a large way and it is only through the right and appropriate training, including the method of increasing speed and thus put the scientific information for trainers on the importance of maintaining the production of energy for players through the implementation of this training and testing.

This study aimed to prepare the training of increasing speed in determining the effectiveness of creatine and phosphorus for advanced volleyball players. Also, to Identify the impact of high intensity training in determining the effectiveness of creatine and phosphorus for advanced volleyball players.

This study concluded that, the technique of speed training is especially important in the production of energy after decomposition of creatine and phosphorus during the appropriate training. Also, Experimenting with appropriate training and investigating the facts of speed and its importance in the volleyball game in the production of energy through the control of creatine and phosphorus also, this study recommendations that, adopting the method of training of increasing speed is especially important in the production of energy after decomposition of creatine and phosphorus during appropriate training. Also, the need to emphasize the experimentation of appropriate training and investigating the facts of speed and its importance in the game of volleyball in the process of energy production through control creatine and phosphorus.

Keywords: *Speed training technique, creatine phosphorus volleyball players*

Introduction

Human Health The most important thing that is sought in scientific research and how to raise the functional variables to the best using either necessary nutritional supplements or exercise activities that work on functional changes that raise the health offenders of the human. **(1)**

When functional changes and energy production are related to the exercise of any physical activity here, we need to be precise in dealing with the methods of training in a true scientific way as they control the energy production necessary to complete the game and achieve good results in the game in practice.(2)

The game of volleyball is characterized by speed in the implementation of basic skills both in defense or attack and during periods of the game, which lasts more than two hours in some cases, which requires the player to maintain its speed and strength without falling during that period, it must be training in a manner that can control the discharge necessary energy for performance. (3)

Therefore, the method of increasing speed, which ranges from speed to slow to the maximum speed, is sometimes more controlled by functional changes physiological, including creatine and phosphorous necessary in dealing with energy. (4)

The power out of the (ATP) needs constant compensation of energy during sports activity through creatine phosphate, which is one of the sources of energy and stock in the cells of the body because of its impact on the phenomenon of extending the body and fills the shortage of energy sources during physical performance.**(5)**

Hence, the importance of research is to preserve the production of energy and non-drainage in a large way and it is only through the right and appropriate training,

including the method of increasing speed and thus we put a scientific information for trainers on the importance of maintaining the production of energy for players through the implementation of this training and testing.[6]

Increasing Speed Training Method: It is a modern sports training method that helps the athlete to increase the speed of performance gradually from easy to difficult and thus avoid sports injuries in addition to the development of special speed of the game, this is what (Amarullah Ahmed Al-Bassati, 1998)"1" confirm it. ((This method is the gradual increase of running speed from (jogging to running) to the enemy at full speed and then rest in walking and improves this type of training both speed and strength). [7]

Blood creatin is an important indicator to measure the amount of physical effort, as it changes after physical exertion. Creatine changes to creatinine after loss of water molecule. The normal values of creatine in the blood for healthy people are about 0.5 - 0.9 mg/100 ml serum)[8].

There is about 98% of muscle creatine in the form of phosphocrytin (CP), which is a high energy source in muscles) (9).

Phosphate has the ability to bind in reverse with many enzymatic systems and other essential compounds of metabolic processes and is related to the functions of ATP, ADP and phosphocrytin, which produce energy. [10].

2-Research Problem: The energy spent by the player suits the specificity of the game and the training which the player exercises to win and the good results. In the absence of proper training with the system of energy exchange will not raise the level of the player with the effort and sure to drop the level and not to win.

And through the humble experience of the researcher as a player and specialist in the science of physiology found that experimentation is an important factor in investigating the scientific facts of the quality of the training and its physiological impact, so it is necessary to know each method of training and its specialties in upgrading the functional side and energy production in the body of the player, including creatine and phosphorus, Perhaps not studied in terms of physiological and specificity of the game, including the game of volleyball. [11]

Therefore, the researcher decided to study this problem by identifying the effect of the technique of increasing speed in determining the effectiveness of creatine and phosphorus for advanced volleyball players.[12]

Research Goals:

1. Prepare the training of increasing speed in determining the effectiveness of creatine and phosphorus for advanced volleyball players.
2. To identify the effect of high-intensity training in determining the effectiveness of creatine and phosphorus for advanced volleyball players.
3. To identify the differences between the results of (pre/post) (Before/After) tests in determining the effectiveness of creatine and phosphorus for advanced volleyball players.
4. To identify the differences between the control and experimental groups in determining the effectiveness of creatine and phosphorus for advanced volleyball players.

3-Research Hypotheses:

1. There are significant differences between the results of (pre/post) (Before/After) tests and for the benefit of post (After) test in determining the effectiveness of creatine and phosphorus for advanced volleyball players.
2. There are significant differences between the control and experimental groups and for the benefit of the experimental group in determining the effectiveness of creatine and phosphorus for advanced volleyball players.

Material and Method

Research Areas:

Human Field: Volleyball team players in the Faculty of Basic Education/Diyala University.

Spatial Field: the Faculty of Basic Education/Diyala University and Shams laboratory for pathological analysis in Baquba Al-Jadida/Tabu Street.

Time Zone: Duration from 3/12/2018 to 13/2/2019.

Field Procedures:

Research Methodology: The researcher used the experimental method with the sample of the controlled and experimental groups to suit the solution of the research problem and achieve its objectives.

Research Community and Its Sample: The research community is identified in a deliberate manner for the volleyball players of the applicants who represent the volleyball team in the College of Basic Education/ University of Diyala and their number are (20) players.

After that, 12 players were selected from the main team, who continued the training and the participants in the tournaments. The sample was randomly divided into two groups (controlled and experimental groups), so that the number of each group was 6 players and the sample formed 60% of the original society.

The sample was homogenized within the group by using the difference coefficient and the equivalence of the two groups using the (t) test as in Table (1).

Table 1: Demonstrates the homogeneity and equivalence of the control and experimental groups

Level of significance	Calculated t-value	The experimental group			Controlled group			Measurement	t
		Coefficient of variation	SD	M	Coefficient of variation	SD	M		
Not significant	0.013	2.013	3.61	179.25	2.042	3.66	179.22	Length/cm	1
Not significant	0.378	2.915	2.5	85.74	2.1	1.79	85.22	Weight/kg	2
Not significant	0.021	17.381	0.077	0.443	16.063	0.071	0.442	L/U Creatine	3
Not significant	0.14	3.598	0.113	3.14	3.555	0.112	3.15	L/U phosphorus	4

The Schedule (t) value at the freedom level (10) and the level (0.05) = 1.812

Information Collection Methods

Means of Data Collection:

1. Arabic references.
2. Exploration experience.
3. Measurements used.

Instruments and Tools Used:

1. Needle to draw blood samples.
2. Bottles to save blood samples.
3. Centrifuge
4. Cool Box to save blood samples with all requirements for obtaining ratios.
5. Optical analysis device
6. Electronic blood pressure device.
7. six (6) Volleyballs.
8. Medical balance.
9. regulated volleyball playground.
10. Metric tape measure.

Field Research Procedures:

Determining Research Variables: Based on the researcher's humble experience and review of sources and references, the variables that the researcher considers necessary were identified as follows:

1. Creatine.
2. The phosphorus.

Exploration Experience: The researcher conducted an exploratory experiment on 3/12/2018 on the same research sample. The required exercises were applied for the purpose of rationing the training load used according to the method of increasing the speed and creating the measurements required for measures, and the purpose of the experiment was to:

1. Knowing the required equipment and tools.
2. Knowing the right time.
3. Knowing the obstacles facing the researcher in the future.
4. The regulation of exercises and the calculation of the appropriate size by the quality of training high intensity and low intensity.

Measurements and method of procedure used: The researcher carried out the pre (before) measurement on the members of the research sample after the performance of a high intensity training unit and then the blood was withdrawn by 5 cm cubic by a specialist pre and post (before and after) the training curriculum of the research sample and laboratory treatment for measuring creatine and phosphorus through laboratory treatment.

Field Experience:

Pre (Before) measurement: The pre (before) measurement was conducted on 17/12/2018.

Main Experience and used Training: After learning the conditions and components of load for the method of training, increasing speed, a set of exercises for the technical performance of volleyball was developed and applied in this method, which is determined by the intensity of the training and ranges (90-100%).

The exercises were implemented in the main section of training units of the trainer during the special number period at a rate of (3) units per week and for two months (24) training units.

The size of the load was determined according to the intensity set. The rest was based on pulse return (120-130 bpm) and time was calculated to rest during the pulse. The application of the exercises was from 18/12/2018 to 12/2/2019.

Post (after) Measurement: The post-measurement is carried out on 13/2/2019.

Statistical Method

Using (spss) system with statistical treatments and to find the following:

1. Arithmetic mean (M).
2. Standard deviation (SD).
3. The difference coefficient.
4. Test (t) for interrelated samples.
5. Test (t) for independent samples.
6. Percentage.

Results and Discussion

By noticing and observing Table (2) and (3) we can see significant differences in controlled and experimental groups in pre/post measurements. This is an evidence of improvement in the physiological variables under study, including creatine and phosphorus, which are important in conserving energy sources. This is due to the training that is used and positively influenced by the physical loads that saved the energy production through correct analysis For the important compounds creatine and phosphorus "to decompose the chemical bonds in phosphocrytine resulting in the emission of energy that reproduces ATP. **(15)**

As the regularity of the sample in the training and the use of additional loads of the set, this is consistent with the statement by Karima Ahmed Fattouh, "The regularity in the training program lead to the creation of some physiological variables of the body as a manifestation of adaptation to the nature of that activity. (13)

Table (4) shows differences between the controlled and experimental groups and for the benefit of the experimental group, in which the researcher considers to be due to the increased training technique used as a method of handling high stress intensity and affecting the process of energy production. As the responses and changes that occurred during the application of this training course, which led to the events of a state of real-time and cumulative adjustment of the increase in the amount of muscle compounds in the recovery, and this cycle increases the energy stocks within the muscles working after the combination of compounds to form a phosphocrytine compound (CP).Which is reflected in the increase in the proportion of stocks of energy sources to be an important factor in the events of speed as it is the first key to the operation of energy systems after (ATP) because of the very low amount of energy funding to the working muscles(14), which led to the body to consume compound (CP) due to physical performance. The increased level of serum creatine phosphate (CP) in the muscle changes particularly in sports activities that require high performance and short-term durability in order to ensure the reconstruction of ATP **(14)**."

Table 2: Shows the pre/post (t) value of the controlled group

Level of significance	Calculated (t) value	The standard error	Post (after)		Pre (before)		Measurements
			SD	M	SD	M	
significant	5.333	0.015	0.021	0.522	0.071	0.442	L/U Creatine
significant	2.272	0.044	0.023	3.25	0.112	3.15	L/U phosphorus

The Schedule (t) value at the freedom level (5) and the level (0.05) = 2.015

Table 3: Shows the pre/post (t) value of the experimental group

Level of significance	Calculated (t) value	The standard error	Post (after)		Pre (before)		Measurements
			SD	M	SD	M	
significant	4.269	0.078	0.241	0.776	0.077	0.443	L/U Creatine
significant	3.66	0.112	0.146	3.55	0.113	3.14	L/U phosphorus

The Schedule (t) value at the freedom level (5) and the level (0.05) = 2.015

Table 4: Shows the post (t) value of the controlled and experimental groups

Level of significance	Calculated (t) value	Experimental group		Controlled group		Measurements	t
		SD	M	SD	M		
Significant	2.351	0.241	0.776	0.021	0.522	L/U Creatine	1
Significant	4.545	0.146	3.55	0.023	3.25	L/U phosphorus	2

The Schedule (t) value at the freedom level (10) and the level (0.05) = 1.812

Conclusions and Recommendations

Conclusions: Throughout the results, the researcher concluded the following:

1. The technique of growing (increasing) speed training is especially important in the production of energy after decomposition of creatine and phosphorus during the appropriate training. [12]
2. Experimentation an appropriate training and investigating the facts of speed and its importance in volleyball in the process of energy production through the control of creatine and phosphorus.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

REFERENCES

1. Amarullah Ahmed Al-Bassati, Principles and rules of sports training and its applications: Alexandria, the establishment of knowledge, 1998.
2. Majid Ali Mussa, The effect of the formation of the speed-lengthening training loads in some functional and 3.Rissan Khrebit Majid, Biochemical and physiological analysis in sports training: Dar Al-Hikma, University of Basra, 1991, p 146.
4. Gaiton and Hull, (Translated by Sadiq Al- Hilali). Reference in medical physiology: World Health Organization, Regional Office for the Eastern Mediterranean, 1997.
5. Muhammed Nasraddin Radhwan, Methods of measuring physical effort in sport, Book center, Egypt: 1988.
6. Karima Ahmed Fattouh, Physical fitness relationship with some physiological characteristics of swimming practices in Kuwait; Journal of Studies and Research, Faculty of Education for Sports, Helwan University;1992.
7. Muhammed Hassan Alawi and Abw Alaa Ahmed Abdul Fatah, Physiology of Sports Training: Arab Thought House, Cairo, 2000.

8. Amarullah Ahmed Al-Bassati, Principles and rules of sports training and its applications: Alexandria, the establishment of knowledge,1998, p 98.
9. Majid Ali Mussa, The effect of the formation of the speed-lengthening training loads in some functional and biochemical variables in short run distances: PhD thesis, Faculty of Physical Education, University of Basra,2003, p38.
10. Rissan Khrebit Majid, Biochemical and physiological analysis in sports training: Dar Al-Hikma, University of Basra, 1991, p 146.
11. Gaiton and Hull, (Translated by Sadiq Al- Hilali). Reference in medical physiology: World Health Organization, Regional Office for the Eastern Mediterranean, 1997, p 1076.
12. Muhammed Nasraddin Radhwan, Methods of measuring physical effort in sport, Book center, Egypt: 1988, p48.
13. Karima Ahmed Fattouh, Physical fitness relationship with some physiological characteristics of swimming practices in Kuwait; Journal of Studies and Research, Faculty of Education for Sports, Helwan University;1992.
14. Muhammed Hassan Alawi and Abw Alaa Ahmed Abdul Fatah, Physiology of Sports Training: Arab Thought House, Cairo, 2000, p352.

Study of the Effect of Different Intensity and Duration of LED Light on Shear Bond Strength and Adhesive Remnant Index of Metal Orthodontic Brackets

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ABSTRACT

Background: Bonding of orthodontic brackets of fixed orthodontic appliance by using acid etch technique was first introduced in 1955. LED-based light sources posses many benefits as minimal heat generation. There is a new generation of LED light cure corporate with three different intensities (standard, high power and extra power). **Objective:** this study was aimed to evaluate the effect of increasing intensity and decreasing duration of LED light on shear bond strength and adhesive remnant index of metal orthodontic brackets.

Materials and Method: Sixty healthy extracted maxillary premolars were divided into three groups of twenty teeth for each, group (I) cure with a standard LED light curing (1000mW/cm2) for 10 seconds, group (II) cured through a high-intensity LED curing light (1400mW/cm2) for 8 seconds, group (III) cured with a extra high-intensity LED curing light (3200mW/cm2) for 6 seconds. The teeth mounted in acrylic resin, Shear bond strength test was done. Then, adhesive remnant index (ARI) was evaluated. Data were analyzed by one-way analysis of variance ANOVA test and LSD, and Fisher exact test.

Results: The results showed that there were statistically significant differences among the study groups. The maximum value of shear bond strength was for group III (17.834 ± 0.367) and the minimum shear bond strength value was for group I (8.888 ± 0.307). ARI scores showed a statistically significant differences among groups, with a high tendency toward score 1 and score 0 in all three groups.

Conclusion: High intensity LED light with low curing duration has advantage of increasing bond strength in addition to reducing chair time taken for curing procedure and enamel cleaning following de-bonding procedure without any effect on the enamel integrity.

Keywords: *LED lights, shear bond strength, ARI, orthodontic brackets, maxillary premolars, chair time.*

Introduction

Bonding of orthodontic brackets of fixed orthodontic appliance by using acid etch technique was first introduced in 1955 [1], as just auto-polymerizing materials were obtainable at that time [2]. With introduction of light-cured adhesives, these materials became widely accepted among orthodontists since they provide ample working time to accurately locate the orthodontic bracket on the enamel surface, to clean any overflow material, ease of use and allow immediate insertion of archwire [3]. In the last several years, various light-cured devices have been introduced including Tungsten-quartz halogen curing units (TQH) [2,4], Halogen light-curing units [5], argon laser, xenon plasma arc and solid-state light-emitting diodes (LED) technology [6]. These devices vary in their energy source, light intensity and wavelength [7,8]. With TQH technology just 1% of the over-all energy input is used for light emission and generated as heat with residual energy [9]. The Halogen bulbs units supply 400-900 mW/cm2, and need 40-second light curing per situate to become sufficient polymerization of adhesives [10]. Argon laser or plasma arc light curing devices are costly, complicated and of relatively large size [11].

The use of light curing LED units of gallium nitride blue light-emitting diodes in orthodontics was firstly suggested by Mills [12].Following that time, more efficient LED devices had developed in order to increase performance of photo-activation and

reduce polymerization time, so this will decrease chair time, offering more comfort to patient and fulfilling professional requirements [2, 7,13]. LED-based light sources posses many benefits as minimal heat generation, this reduced temperature because LEDs have a lifecycle over 10,000 hours ineffective of significant degradation in light output [14], small size, ergonomic, less weight, low power consumption, reduced noise generation, longer life source of radiation, light emission spectrum with most dental photo-initiator techniques using camphoroquinone as the di-ketone absorber, with the greatest absorption in the blue section of the visible light spectrum at a wavelength of 470nm [2,5,7,13,15]. Also, the LED lights are resistant to shock and vibration and do not need filters to produce blue light [2,16]. LED lights can succeed optimum result of clinical bonding with inferior curing time when compared with the conventional curing system [17-19]. For all these positive characteristics, the technology of light-emitting diode is presently the most popular method of light curing for orthodontic bracket bonding [2,15,20,21].

It is imperative to remember that high strength of bond values are inherently critical, as they can cause enamel breakages during removing of the brackets [22, 23,24]. The ARI index gives an idea about the effect of shear bond strength on the tooth.

There is a new generation of LED light cure corporate with three different intensities (standard, high power and extra power). The purpose of this study was to evaluate the effect of three different light intensities with different time exposure in vitro on shear bond strength and ARI of metal orthodontic brackets as to whether they allow more curing time reduction without reducing shear bond strength or they do not. In addition, study their effects on the ARI.

Materials and Method

Teeth Samples: Sixty extracted human maxillary first premolars were gathered from two orthodontic clinics. The teeth were cleaned off debris and saved in normal saline solution in a closed container at room temperature (22°C ± 3) and normal saline replaced continuously to avoid bacterial growth until the time of bonding procedure.

The inclusion criteria of samples included: no caries, no cracks, no visible decalcification and or hypoplastic areas (teeth were examined by using light curing unit).

Before bonding procedure, all buccal surfaces of the teeth were cleaned and then polishing with non-fluoridated pumice for 20 seconds. Teeth were irrigated with water spray for 10 seconds and then dried with triple air syringe for 10 seconds before mounting procedure. Thereafter, the teeth distributed randomly into three groups of 20 teeth in every group.

Mounting Procedure: The investigator used large fissure bur to do a retentive groove in the teeth to enhance the teeth keeping within the acrylic blocks serrated all teeth. Then, the teeth were vertically mounted in a block made from self-cure acrylic; hence, the crown was uncovered and the buccal view was directed to be parallel to the surveyor analyzing rod. Thus, the applied force would be at 90^0 angle to the bracket-tooth interface [22].

Etching and Bonding: The whole buccal surfaces of all teeth were etched with the 37% phosphoric acid gel (Etching agent, Resilience; Ortho-Technology; Fl/USA) for 20 seconds. Later, teeth were washed with copious water and dried for approximately 20 seconds until the enamel appeared chalky white. Subsequently, a primer was applied with a cotton applicator on etched buccal surface (Sealant resin, Resilience light cure adhesive; Ortho-Technology; Fl/USA). Maxillary first premolar stainless steel brackets were bonded to the teeth usage adhesive paste (Resilience light cure adhesive; Ortho-Technology; Fl/USA), positioned the bracket on the buccal surfaces of the tooth in the desired position with minimum force and following placement pushed firmly in order to be positioned accurately. After that, clean excess of adhesive paste flow out from under the bracket with a sharp scalar. Resin was cured by using Valo Ortho LED curing light (Ultradent, South Jordan, UT) (Figure 1) at the same light-tip distance (10mm) with the following procedures:

Group I: 20 teeth were cured with a standard LED curing light (1000mW/cm2) for 10 seconds, 5 seconds from medial surface then 5 seconds from distal surfaces.

Group II: 20 teeth were cured by a high-intensity LED curing light (1400mW/cm2) for 8 seconds, 4 seconds from medial surface then 4 seconds from distal surface.

Group III: 20 teeth were cured with a extra high-intensity LED curing light (3200mW/cm2) for 6 seconds, 3 seconds from medial surface then 3 seconds from distal surface.

Light intensities of VALO device was examined by using a radiometer (Demetron, Kerr Corporation, Orange, Calif) to confirm the manufacturer light intensities values before starting the study.



Figure 1: Valo Ortho LED curing light

Shear Bond Strength Test: Using a testing universal machine (model 4411; Instron, Norwood, MA, USA), at cross-head velocity about (0.5mm/min) via testing machine (Figure 2).

Specimens positioned in acrylic resin were prepared in a way that the brackets were perpendicular to the shear blade. All study groups were submitted to the shear bond strength test with placing the tip of active shear blade on the superior portion of the bracket base (Figure 3), and the force was directed to the bracket–tooth interface by a blade at a cross-head velocity of 0.5mm/minute till the bracket detached.

The maximum force applied for de-bonding the bracket from tooth surface was recorded in Newton (N). The readings were gained in kgf (Kilogram-force), changed into N (Newton), then the shear bond strength was determined by dividing the force by bracket surface area, with average surface area of the bracket base was (12.4mm^2), so the shear bond strength measured values in MPa.

Adhesive Remnant Index Assessment: Following the debonding procedure, the debonded enamel area of teeth and the brackets were checked by using a stereomicroscope with magnification of X20 (Olympus, Tokyo, Japan) in order to evaluate the ARI and at the same time carefully examine the integrity of enamel surface. Depending on ARI scores as determined by Artun and Bergland [25].

Score 0 = the enamel free from any adhesive remaining.

Score 1 = the enamel contain less than half of adhesive.

Score 2 = the enamel contain more than half of adhesive.

Score 3 = whole the enamel covered with the adhesive remaining.



Figure 2: Instron machine



Figure 3: Shear bond test

Statistical Analyses: Statistical analyses were performed using ANOVA test and LSD test to figure out any statistical difference in shear bond strength values of the three light intensities. The difference in ARI scores between the three groups was examined by Fisher exact test. The significance levels depended on statistical analysis as follows: (0.05≥P>0.01) considerably significant, (0.05 ≥ P>0.001) highly significant and (P>0.05) non-significant.

Results

Descriptive statistics for measured shear bond values of three groups were demonstrated in Table (1). The mean shear bond strength (measured in MPa), standard deviation (SD) and statistical comparisons for three groups were showed in Table (2).

The statistical analysis of the results using One-way analysis of variation (ANOVA) was related to determine any significant differences for values among groups. The ANOVA test showed that there were statistically significant differences among the three groups. The highest mean ± SD shear bond strength value was for group III (17.834 ± 0.367) MPa; whereas the lowest value was for group I (8.888 ± 0.307) MPa. Also the LSD test showed that there were statistically significant differences among the groups (Table 2).

The comparison of ARI scores of the three light intensities showed statistically significant differences, with a high tendency toward score 1 and score 0 in all three groups (Table 3). Examination of enamel surface of each tooth showed normal enamel surface without detachments or cracks.

Table 1: Descriptive statistics of shear bond strength values (MPa) for the three studied groups

Groups	Mean	SD	Minimum	Maximum
Group I	8.888	0.307	**8.412**	**9.427**
Group II	14.277	0.441	**13.810**	**14.872**
Group III	17.834	0.367	**17.087**	**18.310**

Table 2: Comparison of the shear bond strength values (MPa) among the three studied groups

Groups	Mean (MPa) ± SD	95% CL	P value	LSD*
Group I	8.888 ± 0.307	8.668-9.108	P≤0.001	2.763
Group II	14.277 ± 0.441	13.961-14.593		
Group III	17.834 ± 0.367	17.572-18.097		

*LSD= 2.763 (Any difference in means of any two groups greater than 2.763 is considered significant)

Table 3: Comparison of ARI scores among the three studied groups

Groups	Score 0	Score 1	Score2	Score3
Group1	7(35%)	8(40%)	4(20%)	1(5%)
Group2	7(35%)	9(45%)	3(15%)	1(5%)
Group3	8(40%)	9(45%)	3(15%)	0(0%)

Group 1 viz Group 2: Fisher Exact Test = 2.715, df=1 P-value =0.007**

Group 1 viz Group 3: Fisher Exact Test = 7.077, df=1 P-value =0.000**

Group 2 viz Group 3: Fisher Exact Test = 2.264, df=1 P-value =0.024*

** Highly significant. * Significant.

Discussion

Orthodontic patients request for premium orthodontic with brackets, but orthodontists are still concerned about their bond strength. So the study tried to get better and easier ways to bond the brackets used in fixed orthodontic appliances. Different recent advancements have been made to develop shear bond strength, these advancements have focused on getting better bond strength, shortening bonding time, minimizing bonding steps number, and reducing the remnants of adhesive after debonding without effect on enamel surface of the teeth.

With provision of LED lights in the markets, the manufacturers are continuously developing new LED devices with increased light intensity to reduce curing time, which subsequently reduces clinical chair time[26, 27].

These improvements have moved to create the superior bonding strength, at the same time must maintain enamel surface during treatment and after de-bonding.

There is a new generation of VALO-LED light (Ultradent Products Inc.) with three different light intensities mode and suggesting curing times for both metal and ceramic brackets (Table 3).

Table 3: VALO-LED light modes and suggesting curing times

Variables	Standard	High power	Extra power
Power (Mw/cm^2)	1000	1400	3200
Time (sec.)	1×10	2×4	2×3

Bracket debonding during treatment course can occur due to low shear bond strength [28], which will delay treatment and cause discomfort to the patient. Reynolds suggested that the lowest shear bond strength level would be about (5.6-7.8) MPa nearly for all different orthodontic tooth movements [29]. According to Reynolds lowest level, the three studied groups above the minimum shear bond level.

The present study can be considered the first study that investigated this new generation of VALO-LED light available in the Iraqi market**.**

The obtained results demonstrated that the mean shearing bond strengths of Group I, Group II, and Group III were 8.888, 14.277, and 17.834 MPa, respectively. The outcome of present study showed that there were significant differences among the three studied groups. Group I showed the lowest shear bond strength, while group III had the highest value.

ARI scores were compared among the three groups using Fisher exact test which showed significant differences and, at the same time, all three groups showed high tendency toward score 1 (40-45%) and score 0 (35-40%), which indicated that in all three groups, the adhesives mainly adhered to bracket bases not to enamel surfaces but without effecting the enamel integrity.

These results indicated that using this new generation of VALO-LED light allows increasing the shear bond strength which is the most important objective of orthodontists and at the same time reducing the time waste during curing procedure. Additionally, preserving enamel integrity throughout the orthodontic treatment and following de-bonding and reducing enamel cleaning time following de-bonding procedure, which will result in benefits to both orthodontists and patients at the same time.

Conclusion

High intensity LED light with low curing duration has the advantage of increasing bond strength in addition to reducing chair time taken for curing procedure and enamel cleaning following de-bonding procedure without any effect on the enamel integrity.

Ethical Clearance: Obtained from the Research Ethics Committee at College of Dentistry/ University of Kufa, lraq.

Source of Funding: Self-funded.

Conflict of Interest: Nil.

REFERENCES

1. Buonocore MG. A simple method of increasing the adhesion of acrylic filling material to enamel surfaces. J Dent Res 1955; 34: 849-53.
2. Mills RW, Jandt KD, Ashworth SH. Dental composite depth of cure with halogen and blue light emitting diode technology. Br Dent J 1999; 186: 388-391.
3. Nomoto R. Effect of light wavelength on polymerization of light cured resins. Dent Mater J 1997; 16: 60-73.
4. Newman GV. Bonding plastic orthodontic attachments to tooth enamel. J New Jersey Dent Soc 1964; 35: 346-358.
5. Stansbury JW. Curing dental resins and composite by polymerization. J Esthet Dent 2000; 12: 300-308.
6. Martinelli J, Pires-de-Souza FCP, Casemiro LA, Tirapelli C, Panzeri H. Abrasion resistance of composites polymerized by light-emitting diodes (LED) and halogen light-curing units. Braz Dent J 2006; 17: 29-33.
7. Price RB, Felix CA, Andreou P. Evaluation of a second-generation LED curing light. J Can Dent Assoc 2003; 69: 666.
8. Correr AB, Sinhoreti MAC, Sobrinho LC, Tango RN, Schneider LFJ, Consani S. Effect of the increase of energy density on Knoop hardness of dental composites light-cured by conventional QTH, LED and xenon plasma arc. Braz Dent J 2005; 16: 218-224.
9. Althoff O, Hartung M. Advances in light curing. Am J Dent 2000; 13: 77D-81D.

10. Rueggeberg FA, Caughman WF, Curtis JW Jr. Effect of light intensity and exposure duration on cure of resin composite. Oper Dent 1994; 19: 26-32.

11. Mavropoulos A, Staudt CB, Kiliaridis S, Krejci I. Light curing time reduction: in vitro evaluation of new intensive light-emitting diode curing units.??????????????????

12. Mills RW. Blue light emitting diodes-another method of light curing? Br Dent J 1995; 178: 169.

13. Layman W, Koyama T. A Clinical comparison of LED and halogen curing units. J Clin Orthod 2004; 38: 385-387.

14. Haitz RH, Craford MG, Wiessman RH. Handbook of Optics. Vol 2. New York, NY: McGraw-Hill; 1995: 121-129.

15. Dunn WJ, Taloumis LJ. Polymerization of orthodontic resin cement with light-emitting diode curing units. Am J Orthod Dentofacial Orthop 2002; 122: 236-241.

16. Stahl F, Ashworth S H, Jandt K D, Mills R W. Light-emitting diode (LED) polymerisation of dental composites: flexural properties and polymerisation potential. Biomaterials 2000; 21: 1379-1385.

17. Mirabella D, Spena R, Scognamiglio G, Luca L, Gracco A, Siciliani G. LED vs halogen light-curing of adhesive-precoated brackets. Angle Orthod 2008; 78: 935-940.

18. Krishnaswamy NR, Sunitha C. Light-emitting diode vs halogen light curing of orthodontic brackets: a 15-month clinical study of bond failures. Am J Orthod Dentofacial Orthop 2007; 132: 518-523.

19. Koupis NS, Eliades T, Athanasiou AE. Clinical evaluation of bracket bonding using two different polymerization sources. Angle Orthod. 2008; 78: 922–925.

20. Keim RG, Gottlieb EL, Nelson AH, Vogels DS. JCO study of orthodontic diagnosis and treatment procedures. Part 1. Results and trends. J Clin Orthod. 2002; 36: 553-568.

21. Bishara SE, Ajlouni R, Oonsombat C. Evaluation of a new curing light on the shear bond strength of orthodontic brackets. Angle Orthod 2003; 73: 431-435.

22. Pickett KL, Sadowsky PL, Jacobson A, Lacefield W. Orthodontic in vivo bond strength: comparison with in vitro results. Angle Orthod 2001; 71(2): 141-8.

23. Lin CL, Huang SF, Tsai HC, Chang WJ. Finite element sub-modeling analyses of damage to enamel at the incisor enamel/adhesive interface upon de-bonding for different orthodontic bracket bases. J Biomech 2011; 44(1): 134-42.

24. Holberg C, Winterhalder P, Holberg N, Wichelhaus A, Rudzki-Janson I. Orthodontic bracket debonding: risk of enamel fracture. Clin Oral Investig 2014; 18(1): 327-34.

25. Klocke A, Kahl-Nieke B, Effect of debonding force direction on orthodontic shear bond strength. Am J Orthod Dentofacial Orthop 2006; 129: 261-5.

26. Artun J, Bergland S. Clinical trials with crystal growth conditioning as an alternative to acid-etch enamel pretreatment. Am J Orthod 1984; 85(4): 333-40.

27. Flury S, Lussi A, Hickel R, Ilie N. Light curing through glass ceramics with a second- and a third generation LED curing unit: effect of curing mode on the degree of conversion of dual-curing resin cements. Clin Oral Investig 2013; 17: 2127-37.

28. Noor MH, Ammar SK, Yassir AY. An in virto evaluation of shear bond strength of chemical and light-cured bonding materials with stainless steel, ceramic, and sapphire brackets. J Bagh Coll Dentistry 2011; 23(2): 133-8.

29. Reynolds I R. A review of direct orthodontic bonding. British Journal of Orthodontics 1975; 2: 171-178.

Comparative Study between Muscle-Split Versus the Classical Muscle-Cut Subcostal Incision for Open Cholecystectomy

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ABSTRACT

Introduction: Many incisions have been advocated and used for open cholecystectomy. The right subcostal incision is commonly chosen, in which abdominal wall muscles divided in the line of incision. The aim of this study is to unreveal whether muscle splitting incision for open cholecystectomy affects operative duration and blood loss, postoperative pain, duration of hospitalisation, then subsequent local complications namely, wound infection and incisional hernia compared with the traditional rectus muscle dividing open cholecystectomy.

Methodology: Analytic study included adult cases (n=120) that were undergone a right-sided subcostal incisions for open cholecystectomy, who were not candidates for laparoscopic approach or those were converted to open version. They were randomly divided into two groups (n=60 each) depend on the operation type *viz*. classical muscle-cut subcostal incision (MCSI) group and same length, muscle-split subcostal incision (MSSI) group. Patients were examined for operative time (calculated from starting incision till closure of skin), intraoperative blood loss, postoperative pain (using the visual analogue score), and length of hospitalization. Six weeks postoperatively, all incisions were followed, and any case of surgical site infection or incisional hernia was reported.

Results: Regarding operative variables, the operative time is more in group MSSI (92.7min) with less blood loss (12.3ml) than that in group MCSI (86.4 min) with more blood loss (28.6ml). The postoperative pain is significantly less in group MSSI as compared to MCSI depending on visual analogue score, as the following: day 1 (3.44 Vs. 1.56), day 2 (1.78 Vs. 0.90), and day 3(1.18 Vs. 0.76). Six weeks postoperative follow up showed that 11 patients as 7(11.6%) in group MCSI, and 4(6.6%) of group MSSI) developed surgical site infection; all were treated as outpatient cases. Besides, 4 patients as 3 patients (5%) in group MCSI, and only 1case (1.6%) of group MSSI developed incisional hernia requiring surgical repair.

Conclusion: Muscle split subcostal incision is quite suitable for uncomplicated open cholecystectomy with less operative blood loss, less postoperative pain, earlier discharge, and less postoperative complications, namely wound infection and incisional hernia.

Keywords: *laparoscopic cholecystectomy, Muscle split subcostal incision, Muscle-cut subcostal incision, Postoperative complications*

Introduction

The laparoscopic cholecystectomy is now considered as the "gold standard" technique for the management of gallstone disease[1]. However, open cholecystectomy still widely performed especially for cases not appropriate for laparoscopy[2], those converted to open approach, or wherever facilities for laparoscopy are unavailable especially in developing countries[3,4]. Many incisions have been advocated and used for open cholecystectomy, and the right subcostal incision is

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commonly chosen[5,6]. It is the muscle division, which is supposed to be responsible for postoperative pain and the resultant local and systemic effects[7].

Theodore Kocher[8] originally described the subcostal incision; it affords excellent exposure to the gall bladder and biliary tract and can be made on the left side to afford access to the spleen[8.] It is of particular value in obese and muscular patients and has considerable merit if diagnosis is known and surgery planned in advance[9]. The subcostal incision is started at the midline, about 2-5 cm below the xiphoid and extends downwards, outwards and parallel to and about 2.5cm below the costal margin[7]. Extension across the midline and down the other costal margin may be used to provide generous exposure of the upper abdominal viscera. The rectus sheath is incised in the same direction as the skin incision, and the rectus muscle is divided with cautery; the internal oblique and transversus abdominis muscles are divided with cautery[7,10]. Special attention is needed for control of the branches of the superior epigastric vessels, which lie posterior to and under the lateral portion of the rectus muscle. The small eighth thoracic nerve will almost invariably be divided; the large ninth nerve must be seen and preserved to prevent weakening of the abdominal musculature. The incision is deepened to open the peritoneum[7,11].

In the recent years, many surgeons have advocated the use of a small 5-10cm incision in the subcostal area for cholecystectomy which is known as mini cholecystectomy. This incision is similar to the Kocher's incision except for the length of the incision[12]. The major advantages of this incision are lesser postoperative pain, early recovery from the surgery and return to work and good cosmetic results[13]. But a disadvantage is less exposure, which can be dangerous in cases of difficult anatomy or lot of adhesions and chances of injury to bile ducts or other structures[14,15]. It is the muscle division, which is supposed to be responsible for postoperative pain and the resultant local and systemic effects[16].

This study was undertaken to know whether the muscle splitting technique for open cholecystectomy affects operative duration, blood loss, postoperative pain, and encourages early mobilization with a reduction in hospital stay, and whether it relates to surgical site wound infection or hernia compared with the traditional rectus muscle dividing open cholecystectomy.

The aim of this study is to reveal whether muscle splitting incision (MSSI) for open cholecystectomy affects operative duration and blood loss, postoperative pain, duration of hospitalisation, then subsequent local complications viz. wound infection and incisional hernia compared with the traditional rectus muscle dividing open cholecystectomy.

Materials and Method

Patient's Enrollment: This study has been conducted at the Kirkuk General Hospital, for the period from December 2016 to August 2018. The patients (n=120) with ages ranging between 20-60 years, who were either contraindicated for laparoscopy, or those were converted from laparoscopic to open procedure. Their written informed consent was taken before operation. Classical muscle-cut subcostal incision (MCSI) group was included 42 females and 18 males. While, the same length muscle-split subcostal incision (MSSI) group includes 39 females and 21 males. All patients with features of acute cholecystitis or jaundice, diabetic patients and those on chronic steroid use were excluded from the study.

All patients were investigated for confirmation of diagnosis and anesthetic fitness. Patients were randomized in two groups, muscle splitting (MSSI) and muscle dividing (MCSI) groups and except for the manner in which anterior abdominal wall was dealt with, the cholecystectomy was otherwise standard and same for both the group. Incision length was kept less than 12cm.

Surgical Procedure: A transverse subcostal incision was used in all cases. Anterior rectus sheath was divided in the line of the incision. Rectus muscle was cut along the line of incision in a muscle cutting group, but in muscle splitting group rectus muscle was split bluntly in the line of its fibers approximately 2.5 cm to the right of linea alba. Rectus muscle was then retracted medially and laterally to expose the posterior rectus sheath which was then divided vertically and peritoneal cavity entered in both of the groups. Intraoperatively, the following parameters were measured: the operative time calculated from the start of incision till the end of surgical operation, and the amount of blood loss by weighing the blood-soaked mops and swabs both before and after the procedure.

Postoperatively, we used visual analogue score (after explaining it to patients) with 10 degrees to evaluate the severity of postoperative pain, both at the night visit and

at the next morning visit. We also notified the duration of hospital stay. Then, we followed the cases for six weeks to check for signs of severe surgical site infection and incisional hernia. Both groups were compared, and the results assessed statistically.

Results

Patients were divided into two equal groups (60 patients in each). In the group Demographics of patients were comparable in each group as shown in Table 1.

Table 1: Demographics of Patients in Both Groups

	Females	Males	Mean age (years)	P value
MCSI	42	18	41.6	0.07
MSSI	39	21	42.8	0.08

Regarding operative findings, the mean operative time in general was higher in group MSSI (92.7min), than in group MCSI (86.4min), while the mean blood loss was much higher in group MSSI (12.3ml vs. 28.6ml), see table below.

Table 2: Operative time and blood loss in both groups

	Mean Operative Time (min)	Mean Operative Blood Loss (ml)
Group MCSI	86.4	28.6
Group MSSI	92.7	12.3
P value*	0.001	0.001

Used two-sample t-test*

Postoperative pain was assessed for 3 days following surgery, and was noticed to be higher in group MCSI than group MSSI, as following day 1 (3.44 Vs. 1.56), day 2 (1.78 Vs. 0.90), and day 3 (1.18 Vs. 0.76) as shown in Table 3.

Table 3: Mean visual analogue score for postoperative pain in both groups

Postoperative Days	Visual score in MCSI	Visual score in MSSI	P value*
1	3.44	1.56	0.001
2	1.78	0.90	0.001
3	1.18	0.76	0.001

Used two-sample t-test*

We reported earlier hospital discharge for patients in group MSSI, that 49 patients (81.6%) were discharged at the second postoperative day, in comparison to only 13 patients (21.6%) in group MCSI.

Most patients with group MCSI 28(46.6%) were discharged on the 3rd postoperative day, while only 9 patients (15%) from group MSSI left the hospital on that day. On the other hand, the 4th postoperative day, all the remaining patients from both groups were discharged home, as follows 19 patients (31.6%) and 2 patients (3.3%) from groups MCSI and MSSI, respectively.

Table 4: Number of patients fit for discharge in both groups

Postoperative Days	MCSI	MSSI	P Value*
2nd	13(21.6%)	49(81.6%)	0.001
3rd	28(46.6%)	9(15%)	0.006
4th	19(31.6%)	2(3.3%)	0.001

*Chi-square test was used.

Six weeks postoperative follow up showed a lower incidence of surgical complications in group MSSI. Surgical site infection occurred in 7 patients (11.6%) in group MCSI, vs. 4 cases (6.6%) in group MSSI, while incisional hernia documented in 3 patients (5%) in group MCSI, vs. just 1 patient (1.6%) in group MSSI, as shown in Table 5.

Table 5: Six weeks postoperative complications in both groups

	MCSI	MSSI	P value*
Wound infection	7	4	0.38
Incisional hernia	3	1	0.32

Chi-square test was used*

Discussion

In the present study observed that the blood loss in group MCSI is more than group MSSI, but with less overall postoperative time. Muscle cut is associated with division with all segmental blood vessels, and muscle fibers[7]. This may explain the increased blood losses. Regarding shorter operative time in group MCSI, it's likely due to the better access and view gained by muscle cutting[8,16], which may be reflected in a shorter duration required to accomplish the surgery.

The patients of group MSSI experienced less postoperative pain than those in group MCSI. Decrease in pain is mainly attributed to the splitting of rectus muscle rather division of muscle. When muscle is cut, many segmental blood vessels and nerves get divided which in turn make muscle spasm and leads to pain[7,16]. Merrill attributed less pain to intact vascularisation and innervation of the muscle with splitting incision[3].

Baguley also reported that muscle splitting technique appears to be superior in terms of postoperative pain and discomfort to the muscle dividing method[16]. Other authors reported similar results in regard to less pain and even less postoperative analgesics requirements. Many authors reported that the mean postoperative analgesic doses required for each patient is significantly less[12].

Patients were considered fit for discharge when they had no respiratory problem, moved bowel, no need of regular intake of analgesics, took food and drugs orally and were ambulatory[7]. In our study, 49 patients (81.6%) were discharged at second postoperative day, in comparison to only 13 patients (21.6%) in group MCSI. Thus group MSSI patients were fit for discharge earlier as compared to group MCSI patients. This was mainly because of less pain and early mobility.

Less postoperative pain encourages early ambulation, earlier discharge from hospital and faster return to work[17]. Baguley et al.[16] reported that 100% patients of muscle splitting group were fully mobile by day 3 as compared to 75% patients with muscle dividing group[16]. In this era of concern for the expense of health care delivery, strategies that reduce the length of hospitalisation and decrease duration of disability stimulate tremendous interest among the medical and lay communities. The muscle splitting incision is superior to muscle dividing incision in term of less pain, early mobility, less physiological alteration, decreased morbidity and hospital stay[7,14].

Wound infection was shown to be more common in group MCSI, most likely due to haematoma collection following blood vessels division, besides local ischemia that ensues. Wound infection is probably an important risk factor for the development of incisional hernia and wound dehiscence[8]. The local nerves divided by the cut through incisions increase the possibility of having postoperative incisional hernia[17]. Generally speaking, transverse and oblique incisions seem to cause less wound dehiscence than the midline and paramedian incisions[18]. Yet, as the subcostal incision has an oblique medio-proximal direction, it tends to cut most nerves, segmental blood vessels and muscle fibres perpendicularly. The partial denervation of the abdominal wall ensues with permanent muscle weakness and numbness[7]. Burger et al[8], found that muscle-split abdominal incisions cause less risk for wound dehiscence than their muscle cut surgical wound versions[8].

Conclusion

The muscle split subcostal incisional can be suitable for uncomplicated open cholecystectomy, with less blood loss, less postoperative pain, earlier discharge from hospital and less postoperative wound infection and less incisional hernia as compared to classical muscle cut subcostal incision.

Conflict of Interest: None

Source of Funnding: Personal

Ethical Clearance: The research belong to the tikrit university, college of medecin, department of surgery (all patients have written consent.

REFERENCES

1. Duca S., Bala O., Al Hajjar N., lancu C., Puia I., et. al., "Laparoscopic Cholecystectomy: Incidents And Complications. A Retrospective Analysis Of 9542 Consecutive Laparoscopic Operations", HPB 2003; 5(3): 152-158.
2. Verdeja R CA, Turcio A O, Zubia A CP, Norberto G JJ, Valles H AC, et al.,"Laparoscopic Cholecystectomy; Complications And Conversion To Open Cholecystectomy", Open Access J Surg. 2018; 9(3): 555763.
3. Naraynsingh V, Singh Y, Remy T.et al.,"Minilaparotomy Cholecystectomy – An Appropriate Alternative To Laparoscopic Cholecystectomy In Developing Nations", Tropical Gastroenterology 2010;31(4):312–316.
4. Manning RG, Aziz AQ., "Should Laparoscopic Cholecystectomy Be Practiced In The Developing World?", *Ann Surg*. 2009; 249:794–8.
5. Ibrahim S, Hean TK, Ho LS, Ravintharan T, Chye TN, et al., "Risk Factors For Conversion To Open Surgery In Patients Undergoing Laparoscopic Cholecystectomy", World J Surg 2006; 30(9): 1698-1704.
6. Sankpal D., "Clinical Study of Complications of Laparoscopic Cholecystectomy and Open Cholecystectomy", Journal of Medical Science and clinical Research 2016; 4(11): 13745-134651.
7. Singla S., Singla M., Singla M. et al., "Comparative Analysis of Muscle Splitting Versus Muscle Dividing Incision in Open Cholecystectomy", Journal of Evolution of Medical and Dental Sciences 2015; 4(93): 15896-15898.
8. Burger J. W. A., Riet M, Jeekel J., "Abdominal Incisions: Techniques And Postoperative Complications", Scandinavian Journal of Surgery. 2002; 91: 315–321.
9. Schirmer BD, Winters KL, Edlich RF, "Cholelithiasis and Cholecystitis", J Long Term Eff Med Implants 2005; 15 (3):329-38.
10. Keus F, Gooszen HG, Laarhoven CJHM, "Systematic Review: Open, Small-Incision Or Laparoscopic Cholecystectomy For Symptomatic Cholecystolithiasis", *Aliment Pharmacol Ther*. 2009;29,359–78.
11. Lacy PD, Burke PE, O'Regan M, Cross S, Sheehan SJ, Hehir D, Colgan MP, Moore DJ, Shanik GD, "The Comparison of Type of Incision For Transperitoneal Abdominal Aortic Surgery Based on Postoperative Respiratory Complications and Morbidity", Eur J Vasc Surg 1994;8:52–55.
12. Chalkoo M, Ahangar S, Duranni AM, Chalkoo S, Shah MJ, Bashir MI, "Mini-Lap Cholecystectomy: Modifications and Innovations In Technique", Int J Surg, 2010;8(2):112-7.
13. Balasubramanian A,Cheddie S, Naidoo M., "An Evaluation of Mini-Laparotomy Cholecystectomy in the Laparoscopic era: a Rural Experience", S Afr J Surg 2018;56(1):36-40.
14. Calvert NW, Troy GP, Johnson AG, "Laparoscopic Cholecystectomy:AGoodBuy?ACostComparison With Small Incision (Mini) Cholecystectomy", Eur J Surg. 2000;166(10):7826.
15. Mc Cloy R, Randall D, Schug SA, Kehlet H, Simanski C, Bonnet F, et al.,"Is Smaller Necessarily Better? A Systematic Review Comparing The Effects of Minilaparoscopic and Conventional Laparoscopic Cholecystectomy on Patient Outcomes", Surg Endosc 2008 Dec; 22(12):2541-53.
16. Baguley P, Gara C, Gagic N.,"Open Cholecystectomy: Muscle Splitting Versus Muscle Dividing Incision: A Randomised Study", J R Col Surg Edin1995;40:230-32.
17. Donati D, Brown SR, Eu KW, Ho YH, Seow-Choen F., "Comparison Between Midline Incision And Limited Right Skin Crease Incision For Right-Sided Colonic Cancers", Tech Coloproctol 2002; 6:1–4.
18. Waldhausen JH, Davies L., "Pediatric Postoperative Abdominal Wound Dehiscence: Transverse Versus Vertical Incisions", J Am Coll Surg 2000;190:688–691

Association of Idiopathic IUGR with Placental Histological Morphometry

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ABSTRACT

Background: Intrauterine growth restriction (IUGR) is a complex placental vascular disease with augmented perinatal morbidity and mortality caused by various fetal, maternal as well as placental factors. This study was conducted to find any association of whichever placental histo-morphometric findings to encounter any sole placental based issues influencing fetal growth and development, which might be derived from neither fetal nor maternal basis giving consideration for any probable analogous problem for prospect pregnancies.

Method: Placentas of 100 IUGR newborns (group-I) and another 100 from normal body weight newborns (group-II) were obtained between 2nd of February of 2018 and 31th of January 2019 to be studied histo-metrically for the number of: nuclei of syncytiotrophoblast cells, syncytial knots, chorionic terminal villi, blood vessels, and the perimeter and surface area of the villous sections, all were statistically evaluated.

Results: Morphometric data confirmed that placentas of group-I had significant higher number of syncytiotrophoblasts nuclei, knots, terminal villi, blood vessels, terminal villi perimeter and cross-sectional surface area than group-II.

Discussion: Encountered placental histological changes for idiopathic IUGR newborns raised suspicion it was caused by pure placental factors and could be compensation to adjust the functional requirement during placental insufficiency.

Conclusions: Newborns with idiopathic IUGR could be resulted from pure placental factors which might be ascertained by histological assessment of placental tissues.

Keywords: *Idiopathic IUGR, Placenta, Terminal villi perimeter, Terminal villi cross surface area, Syncytial knots.*

Introduction

Intrauterine growth restriction (IUGR) is still a significant problem worldwide [1], and problematical placental vascular disease ensuing a low birth weight and/or preterm delivery with increased perinatal morbidity and mortality [2-4]. IUGR may be originated by various feto-maternal and/or placental factors [2-5].

The placenta is the least celebrated human appendage, yet an attractive model for global medical investigations[6&7]. As placental growth is imperative in the ultimate health of the mother and her fetus, a complete knowledge about placental structures and physiology is surely required [8 & 9].

After birth, the placenta could be regarded like an investigational animal for wide assortments of making inquiries [10]. Nevertheless, it is the merely organ

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recognized to be produced in parenthood, then gets a distinctive fate[11].

About its constitution; placenta has tissues, in cooperation, from mother and fetus. The embryonic surface, chorion, which is created by trophoblasts, whereas the maternal surface is referred to as decidua basalis. The trophoblasts take in cytotrophoblasts along with syncytiotrophoblasts that build the chorionic villi collectively to offer an exchange plane course. Thousands of chorionic villi branching numerous times to be soaked in maternal blood lakes for transmission of gasses and nutrients [12 &13].

Material and Method

This work was carried out through Department of Anatomy, College of Medicine, Al-Mustansiriyah University, in assistance of Department of Gynecology and Obstetrics at Fatima Al-Zahraa Administrative Hospital, Al- Khadhraa Private Hospital and Al-Yarmook Teaching Hospital in Baghdad, Iraq. Permitted by the confined scientific committee of each of these medical institutes. A total of 200 mothers, along with their newborns and placentas were incorporated in this study. These mothers were admitted to delivery room for normal vaginal deliveries at these hospitals. All were chosen at term pregnancy (of 38-40 weeks), and non-smoker apparently healthy and normal women, according to their history, clinical assessments, laboratory tests and ultrasound check. Fetal state also was verified by Doppler ultrasonic exam. Any mother had difficult or delayed labor and any postpartum maternal death also had been ruled out from this work. A verbal consent was gained from each mother to be a component of this work. All fetal IUGR was considered to be idiopathic, given that there were no apparent maternal or fetal basis.

Placentas were divided into two groups. Each group consisted of 100 newborns with everyone own placenta. The 1st group holds placentas of infants having idiopathic IUGR (Group-I), whereas the 2nd group embraced placentas of infants having normal average body weight (Group-II), which was regard as the control group.

Placentas were right away examined grossly after being expelled, and tissues were taken from the central part of cotyledon at half way between the fetal surfaces and maternal and at middle of the widest diameter extending from the insertion of umbilical cord to the periphery of placenta [11 &12]. Every block was roughly 1×1×1 cm and was organized for schedule paraffin section to be fixed and stained by haematoxylin and eosin. Then, from every tissue block five sequential sections of about 5 µm thicknesses were obtained and inspected histologically by light microscopy [14&15]. Morphometric histological data were gained using computerized program specifically, *Motic Image Plus 3*, at different magnifications, and the estimated data of 6 histological parameters were taken randomly from 5 fields achieved from the center and four corners of each specimen, then images were imprisoned in high clarity using the built-in camera to obtain mean number of the followings parameters: (1) nuclei of syncytiotrophoblasts, (2) syncytial knots, (3) chorionic terminal villi and (4) cross-sectioned blood vessels of the villous core. Then after, three randomly selected terminal villi having dissimilar sizes "small, medium and large" were considered in every section and the following two factors were anticipated: (5) mean perimeter of the villous sections in µm and (6) mean villous surface area in 1 μm^2.

The estimated data were deliberated as mean ± Standard deviation (SD), then by means of "Paired Samples T- test" with the program namely "*Statistical Package for Social Sciences* SPSS Statistics Version 25". Statistical significance of the comparable variables were evaluated and p value was equal or less than 0.05[16].

Results

The morphometric data obtained from tissue images at 400× magnification revealed the followings: As shown in table 1 and figure 1, firstly, the nuclei of the coating syncytiotrophoblasts zone of IUGR group (Group-I) were significantly more packed than the control group (Group-II), forming nearly a continuous layer enveloping core of the villi. Secondly, the number of syncytiotrophoblast knots at the peripheries of villi was significantly superior in group-I too. Thirdly, group-I have significant higher number of chorionic terminal villi than group-II. In addition, there were significant more villous connective tissue cells and fibers, allowing diminutive intervillous spaces surrounding these villi. Furthermore, the number of blood vessels inside the core of villi was also significantly higher in group-I than group-II with extremely significant statistical difference. Lastly, the mean perimeter and cross-sectional surface area of the terminal villi was significantly higher in group-I too as in table 1 and figures 2 & 3 respectively. All mentioned mean differences between the groups were statistically highly significant with p value extremely less than 0.05.

Table 1: No. of Syncytiocytotrophoblast's nuclei, no. of Syncytiocytotrophoblasts knots, no. of villi and no. of blood vessels in placental tissues of fetuses having IUGR (group-I) and fetuses having normal wt. (control/group-II).

	Histological parameters	Groups	N	Mean ± SD	p value
1.	No. of Syncytiocytotrophoblast's nuclei	Group-I (IUGR)	100	14.567 ± 4.419	0.0001
		Group-II (Control)	100	9.132 ± 3.411	
2.	No. of Syncytiocytotrophoblasts Knots	Group-I (IUGR)	100	2.014 ± .337	0.0001
		Group-II (Control)	100	0.912 ± .276	
3.	No. of Villi	Group-I (IUGR)	100	11.209 ± 5.117	0.0016
		Group-II (Control)	100	9.132 ± 3.978	
4.	No. of blood vessels	Group-I (IUGR)	100	6.311 ± 1.402	0.0001
		Group-II (Control)	100	4.576 ± 1.236	
5.	Perimeter of the villi in µm	Group-I (IUGR)	100	143.612 ± 41.022	0.0001
		Group-II (Control)	100	112.004 ± 19.643	
6.	Sectional surface area of the villi in μm^2	Group-I (IUGR)	100	11345.674 ± 236.127	0.0001
		Group-II (Control)	100	7558.142 ± 504.652	

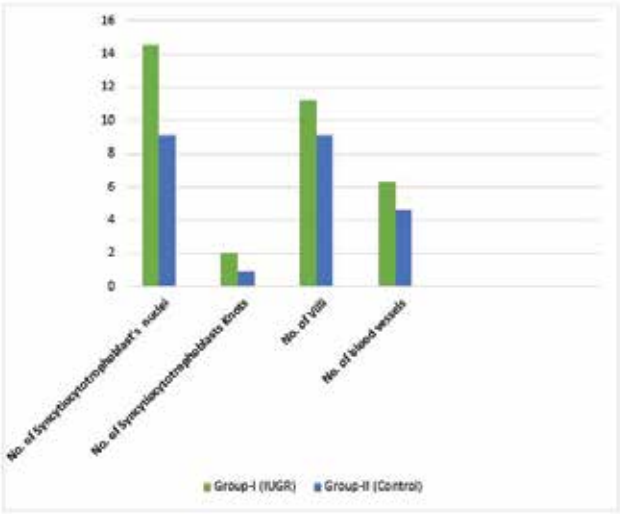


Figure 1: No. of Syncytiocytotrophoblast's nuclei, no. of Syncytiocytotrophoblasts knots, no. of villi and no. of blood vessels in placental tissues of fetuses having IUGR (group-I) and fetuses having normal wt. (control/group-II).



Figure 2: Perimeter of the villi in µm in placental tissue of fetuses having IUGR (group-I) and fetuses having normal wt. (control/group-II).

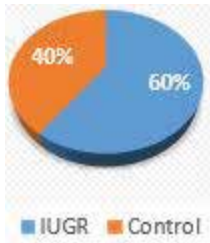


Figure 3: Sectional surface area of the villi in µm2 in placental tissue of fetuses having (group-I) and fetuses having normal wt. (control/group-II).

Discussion

Placenta is still an imperative matter of interest for medical researches [8&9], so it was preferred in the existing study. It is considered to be as a mirror for the fetal intrauterine state [17]. The vital triangle consisted of mother, fetus and placenta is regarded as an active balanced milieu, hence, any harm to one of them would surely influence the others [18&19]. So many previous studies had documented that a pure placental factor was the solitary cause in some IUGR cases [20].

Normal birth-weight neonates were considered to be the control group [21&22]. In this revision cases of IUGR due to apparent maternal and/or fetal factors were kept out, hence the included cases of IUGR were considered to be purely due to placental sources. Histological and morphometric studies of human placentas were looked upon by many researchers just as a meandering approach to study the histo-physiology of pregnancy [23]. This study

included three varieties of villi, depending on previous comparable work [23]. The program "Motic Image plus 3" which was used in this study, was exceptionally useful to quantify the asymmetrical and compound constitutions of the terminal chorionic villi pictures, and evaluate the data in a mathematically balanced method. Tissue samples were obtained just from the cotyledon just at midway between the fetal and maternal surfaces and in the middle of largest diameter between the cord insertion and periphery, since this practice was used by other workers, to stay away from any structural tissue variation between subchorionic and parabasal regions[24&25].

By examination of haematoxylin and eosin stained samples of mutually groups: Table 1 and figure 1 shows the syncytiocytotrophoblast's nuclei number was found to be increased in group-I, which might be as a compensatory means to tolerate placental insufficiency [26]. It had been stated that there is a higher syncytiocytotrophoblast's nuclei number in cases of stillbirth, poor fetal outcome and low birth weight [27&28]. Also augmented number of syncytial knots in group-I similar as results noticed in pre-eclampsia, toxaemia of pregnancy and idiopathic intrauterine growth retardation [29]. Profusion of syncytial knots are usually regarded as an indicator of oxidative stress in consequence of deprived fetal circulation [28]. The greater number of larger terminal villi containing more connective tissue cells and fibers in group-I which possibly be caused by diminished fetal villus perfusion producing activation and proliferation of fibroblasts within villous stroma [28 & 30]. The increased number of blood vessels in placentas within the villous core of group-I, which was regarded as a placental compensatory response to recover chronic low down blood perfusion and hypoxia [29 & 30]. Table 1 and figure 2 showed that the mean of perimeters of villous sections was increased in group-I which represented the feto-maternal substitution surface mimic what is seen in placentas of diabetic pregnant mothers [31]. Table 1 and figure 3 illustrated larger cross-sectional surface area, in placentas of group-I. This surface area signifies the crossing point for substitution between fetal and maternal flow, therefore, it is a milieu of medical investigate till now [29]. The instantaneous data in group-I were comparable to that of interruption in placental tissue maturation and they were just as compensatory mechanisms to get better placental function [29 & 31]. It might be concluded here that idiopathic IUGR, with the presence of apparently average healthy mothers, could be due to pure placental factors which might be ascertained by histological assessment of placental tissues.

Such study was assumed to view a number of morphometric histological microscopic modifications in the placenta, in casing of wholesome placental cause of IUGR in order to take care of the future pregnancy and to prevent as much as possible such similar IUGR condition for maintenance of fetal and mother optimal wellbeing as well as decreasing neonatal loss. Moreover, this instant results might confirm the idea of existence of a remarkably related ***"birth triangle***"; formed of fetus, placenta plus mother [32].

Ethical Clearance: Approved and granted from Al-Mustansiryia University, Al-Rusafa and Al-Karkh health Directorate application forms as a requirement to obtain PhD degree in Anatomy, Histology and Embryology. Research projects are reviewed and conducted ethically. This research is not published yet.

Source of Funding: This study was self-funded.

Conflict of Interest: The authors declare that they have no conflict of interest

REFERENCES

1. Bobbi Fleiss, Flora Wong, Fiona Brownfoot, Isabelle Shearer, Olivier Baud, David W Walker, Pierre Gressens and Mary Tolcos : Knowledge gaps and emerging research areas in intrauterine growth restriction-associated brain injury. Front. Endocrinol. doi:0.3389/fendo.2019.00188
2. Ahmed A, Perkins J: Angiogenesis and intrauterine growth restriction.Baillieres Best Pract Res ClinObstetGynaecol 2000, 14:981-998.
3. Maulik D, Evans JF, Ragolia L: Fetal growth restriction: Pathogenicmechanisms. ClinObstetGynecol 2006, 49:219-227.
4. Arroyo JA, Winn VD: Vasculogenesis and angiogenesis in the IUGRplacenta. SeminPerinatol 2008, 32:172-177.
5. Özkan S, Vural B, Dalçık C, Tas¸ A, Dalçık H: Placental expression of insulinlikegrowth factor-I, fibroblast growth factor-basic and neural celladhesion molecule in pregnancies with small for gestational agefetuses. J Perinatol 2008, 28:468-474

6. Brigitte Vollmer and Caroline Jane Edmonds : school age neurological and cognitive outcomes of fetal growth retardation or small for gestational age birth weight. Accepted on 06 March 2019 Front. Endocrinol. doi: 0.3389/fendo.2019.00186
7. Associations of Maternal Diabetes and Body Mass Index With Offspring Birth Weight and Prematurity. JAMA Pediatrics. February 25, 2019
8. Irwinda, Rima, Wibowo, Noroyono, Putri, Atikah Sayogo The Concentration of Micronutrients and Heavy Metals in Maternal Serum, Placenta, and Cord Blood: A Cross-Sectional Study in Preterm Birth. Journal of Pregnancy. 2019. 10.1155/2019/5062365
9. Marius Schmidt, Manfred Rauh, Matthias C. Schmid, Hanna Huebner, Matthias Ruebner, Rainer Wachtveitl, Nada Cordasic, Wolfgang Rascher, Carlos Menendez-Castro, Andrea Hartner and Fabian B. Fahlbusch : Influence of Low Protein Diet-Induced Fetal Growth Restriction on the Neuroplacental Corticosterone Axis in the Rat. Front. Endocrinol. doi: 10.3389/fendo.2019. 0124
10. Wong FTM, Lin C, Cox BJ. Cellular systems biology identifies dynamic trophoblast populations in early human placentas. Placenta. 2019 Jan15;76:10-18.doi: 0.1016/j. placenta.2018.12.012. Epub 2019 Jan 11.
11. Mongia SM, Jain SK,Yadav M. Placenta: The Wonder Organ. Indian Acad Forensic Med. 2011; 33:140-142.
12. Castellucci M, Kaufmann P. Chapter 7. Architecture of normal villous trees. Pathology of the human placenta. 5th Edition. Ed: Benirschke K, Kaufmann P, Baergen R. 2006; 121–173.
13. Ross M,Pawlina W. The placenta In: Histology A text and atlas with correlated cell and molecular biology© 1996-2014. 6thEd. 2011: 854-860.
14. Baker FJ, Silverton RE,Pallister CJ. Baker and Silverton's introduction to Medical Laboratory Technology. 7th Ed. 1998:182-242. UK; www Arnold publisher Comp.
15. Bancroft JD, Stevens A. (1987): theory and practice of histological techniques. Edinburgh: Churchill Livingstone. 20-81,107-121.
16. Daniel W. W. ***Biostatistics***: A Foundation for analysis in the health sciences, 9thEd. New York: John Wiley. 2008: 273-295.
17. Udainia A, Bhagwat SS, Mehta CD. Relation between Placental Surface Area Infarction and Foetal Distress in Pregnancy Induced Hypertension with its Clinical Relevance. J. Anat. Soc. India.2004;53 (1): 27-30.
18. Grantz KL, Kim S, Grobman WA, et al. Fetal growth velocity: the NICHD fetal growth studies. Am J Obstet Gynecol 2018; 219:285.e1.
19. Mlynarczyk M, Chauhan SP, Baydoun HA, et al. The clinical significance of an estimated fetal weight below the 10th percentile: a comparison of outcomes of <5th vs 5th-9th percentile. Am J Obstet Gynecol 2017; 217:198.e1.
20. Guttmacher AE, Maddox YT,Spong CY. The Human Placenta Project: Placental Structure, Development, and Function in Real Time. Available online 6 March 2014. www.journals.elsevier.com/placenta/recent-articles
21. Simpson L, Khati NJ, Deshmukh SP, et al. ACR Appropriateness Criteria Assessment of Fetal Well-Being. J Am Coll Radiol 2016; 13:1483.
22. Conde-Agudelo A, Villar J, Kennedy SH, Papageorghiou AT. Predictive accuracy of cerebroplacental ratio for adverse perinatal and neurodevelopmental outcomes in suspected fetal growth restriction: systematic review and meta-analysis. Ultrasound Obstet Gynecol 2018; 52:430.
23. Navbir P, Alka N, Gupta A. Histological changes in placentas in pregnancies complicated by pre-eclampsia and eclampsia and correlation with foetal outcome, Internat J Pharma& Bio Science. 2012;3(2): 0975-6299.
24. Chowdhury AH. Effect of insulin-treated established diabetes mellitus (EDM) on the gross morphology and terminal villus histology of human placenta. [MPhil Thesis].Dhaka 2002: 5-40.
25. Abbas H. A Morphometric and Histochemical Study of the Full Term Placenta In Relation To the Eccentric Umbilical Cord Insertion, "MSc thesis". 2008: 167-168.

26. Al-Allaf L, Jarjees M, Al-Nuaimy W. Histological Changes in Human Placenta in Prolonged Pregnancy. Journal of the Bahrain Medical Scociety. 2008; 20 (2): 60 – 67.

27. Biswas S. Placental changes in idiopathic intrauterine growth restriction. OA Anatomy 2013;1(2):11.

28. Histomorphological changes in placentas of pre-eclamptic mothers with reference to vasculosyncytial membrane thickness and syncytial knot formation. Journal of Rawalpindi Medical College (JRMC). 2012; 16(1): 51-54.

29. Navbir P, Alka N, Gupta A. Histological changes in placentas in pregnancies complicated by pre-eclampsia and eclampsia and correlation with foetal outcome, Internat J Pharma& Bio Science. 2012;3(2): 0975-6299.

30. Narasimha A, Vasudeva D S. Spectrum of changes in placenta in toxemia of pregnancy. Indian J PatholMicrobiol 2011; 54:15-20.

31. Jirkovská M. The morphology of villous capillary bed in normal and diabetic placenta. Recent advances in research on the human placenta. Dr. Jing Zheng Ed. 2012; 263-286.

32. Samia A. Eleiwe, Mohammed Hussein Assi, Shatha A.K. Al-Mashadany, Mohammed E. Ghanem : Neonatal Apgar score and placental histological morphometry: Is there any relationship? Journal of American Science 2014;10(9) http://www.jofamericanscience.org 165.

Influence of Low Power He-Ne laser on the Skin Thickness of Swiss Mice

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ABSTRACT

The application of laser in dermatology and skin therapy is a key issue for numerous developments in future. The helium–neon laser at 632.8nm wavelengths, with the power of 2 and 1.31 mW was applied on the mouse's skin at various time 10, 20 and 30 min for 20 days. The animals were divided into two groups; control group, which didn't radiate while the other group was divided in to three groups each one has two mice where it exposed to the laser. The histological analysis was used only for those groups and studied microscopically. Histological analysis showed a significant effect of laser and numerous differences between the two groups. The thicknesses of the epidermis layer for the control group comparing with other groups showed noticeable increasing. In addition the skin presents enhancing of the features and architecture of layers. So, the low power laser has a good effect and amazing tool to enhance skin layer and cells on it.

Keywords: *low power laser, He-Ne laser, skin enhancing.*

Introduction

The attractive properties of laser make it a useful tool for several applications. Most of lasers are using in biology, medicine and dermatology depends on advanced technology and innovative laser systems for diagnosis and therapy. Therapeutic laser is very special and has a clear picture to illustrate how the radiation interacts with tissues [(1)]. Numerous current therapeutic treatments can be quantified which means simply producing a beam of radiation different from ordinary light in several ways [(2)].

The skin is the largest organ in the human body and comprises about 16% of body weight. The average person can have about (1.8) meter squares of the skin-encased body, which may be introduced to harsh conditions [(3)]. Which shows the low-Powerful lasers effect on the cell. This vitro study focuses on the biostimulation fibroblasts by a low-Power Ga–As-Pulsed laser

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Light can be scattered or absorbed when it penetrates the tissue, and the extension of both processes depends on the type of tissue and the excitation wavelength. Absorption is mainly due to endogenous chromospheres, such as haemoglobin, myoglobin, and cytochromes. Scattering is generally the most relevant factor in the determination of light penetration into the tissue. Laser-tissue interaction is interesting due to it's the significant application in biomedical optics in both diagnostic and treatment purposes. Major aspects of the laser-tissue interaction, which has to be considered in biomedical studies, are the thermal properties of the tissue and the thermal changes caused by the interaction of light and tissue. These effects depend on the peak power and wavelength of the laser as well as the thermal properties of biological tissues. The laser can increase the temperature of cells. It results in denaturation of proteins, and collagen that leads to coagulation of tissue and it can necrotic cells [(2)]. Here we present photo-optical method that enables stimulation of skin cells by the low power laser (He-Ne laser, 632.8nm).

Materials and Method

Animals: This study is carried out in physics laboratories from the period of February to June 2018. Fourteen white Swiss mice (four males and ten females)

conducted in this work of 14 weeks, were kept in animal house of College of Sciences under condition (25–28 C) temperature and control light (12–12 hour) supplied with food and water ad libitum. Mice were maintained in cages (4 mice/cage), after 7 days of acclimatization, the animals were divided randomly into six experimental groups (n=2 of each group) and tow control group. As shown in the Table below (1).

He-Ne Laser Exposed: Laser system that used in this work was manufactured by Lambda Scientific, class I visible laser (I-Laser, Austerely), as shown figure (1).

Before laser exposed, the animals anesthetized by an injection of ketamine (80 mg/kg body weight). Then the hair of animals has been shaved to increase the power strike the skin. The region was exposed to the He-Ne laser beam (wavelength 632.8nm, power output = 2, 1.31 mW) with a 1mm diameter. The exposure time was 10, 20 and 30 min to achieve the preferred doses at present in table (1). The intensity of the laser was tuned and reduced by a red filter.



Fig. 1: The helium neon laser device 632.8 nm, red filter and laser power meter device (LP1).

Table 1: He-Ne laser (632.8 nm) parameters used for irradiation of the mice skin

Spot size or exposure (cm^2)	Spot diameter (Sd) (cm)	Energy of laser beam E (eV) x 10^{+13}	Energy density (ED) or Dose (J/cm^2)	Power density (PD) (W/cm^2)	Exposure (t) time (min)	Power (p) (mw)	Groups
X	X	X	X	X	X	X	Control
0.0079	0.1	2.0833	152.88	0.2548	10	2	Group one
0.0064	0.09	1.3644	122.82	0.2047	10	1.31	Group two
0.0064	0.09	0.6825	245.64	0.2047	20	1.31	Group four
0.0064	0.09	0.4549	368.46	0.2047	30	1.31	Group six

Histological Procedures: The histological technique done according to Bancroft and Steven [4]. Throughout several steps to form tissue paraffin blocks and sectioning the steps as the following:

1. Fixation
2. Dehydration
3. Clearing
4. Impregnation and embedding
5. Sectioning and cutting

Results

The microscopic examination of the skin tissue for the control group is expected to complete by a light microscope at different magnification (X 40 & x 100). The results show the typical structures of the mice's skin. The sections show the epidermis of skin compose of stratified squamous keratinized epithelium which composed of typical stratum includes from base to apex, which are stratum basale, stratum spinosum, stratum granulosum and stratum corneum, respectively illustrated in figures (2a). It show also the second layer of skin, the dermis below the epidermis compose of dense connective tissue include collagen fibres and rich blood vessels & nerve supply as showed in figure (2a). There are several hair follicles and sweat glands observed clearly in the dermis of skin as showed in figure (2b).

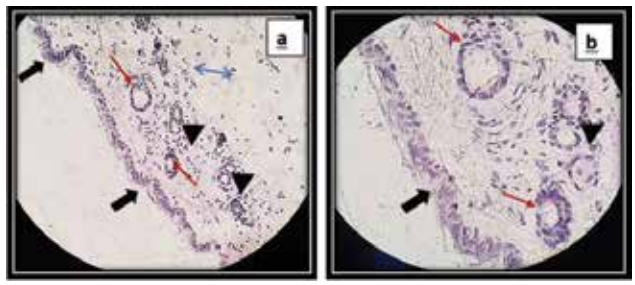


Fig. 2: General view of the skin cross section of the control group. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),▶(hair follicles),→(blood vessel). H & E stain, a (X 40) & b (X 100).

After skin exposed to laser it shows change in the different layers, but that change never effect on the size of cells and the wall between cells still apparent. So, these test group shows increase the thickness of the epidermis layer comparing with different proportion for the control group, this effect clearly appears in the figure (3a). The group one is illuminate by laser at 2 mW and time 10 minutes, the epidermal thickening on the rate of proliferating cells of superficial layer, with increase the mitotic activity of cells and large size cells appeared

different area of epidermis; refer to hyperkeratosis of epidermal layer as show in figure (3a, 3b and 3c).

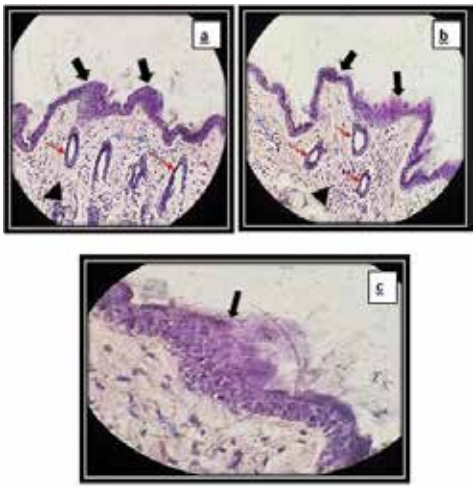


Fig. 3: General view of the skin cross section of the group one. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),►(hair follicles),→(blood vessel). H & E stain, a,b (X 40) & c (X 100).

After reducing the laser power to 1.31 mW and time of exposure 10 minutes (i.e. the group two). The results illustrate slightly modify on epidermal layer and showing increase the thickness of these layer which noticeably in figure (4b), stratum corneum revealed a thickening with deattached cells of superficial layer of epidermis as shown figure (4a) and, a high rate of mitotic activity of epidermal cells at stratum besale as shown figure (4b). Despite of the thickness increase of the epidermis but, the cells kept the same and get a good adhesion between of them of a different stratum. The epidermis and dermis appeared in firm attachment of together as showed in figure (4c).

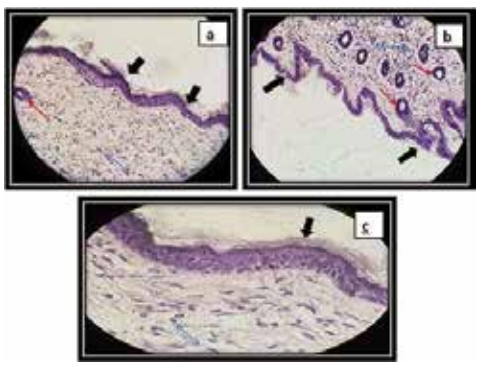


Fig. 4: General view of the skin cross section of the group two. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),►(hair follicles),→(blood vessel). H & E stain, a,b (X 40) & c (X 100).

To get more information about the time exposure we increase it to 20 minutes with the same power, which is called the group three. That result shows significantly enhancing of the skin features comparing with that other groups. However, it shows the slight increases of the epidermis thickness and appearing well architecture of the skin composition. At present the in figure, (5a) epidermis cells of stratum corneum are more danced. The attaching between the epidermis and dermis is good and reflect enhancing the rate of mitotic activity of cells in stratum basale as present in figure (5c).

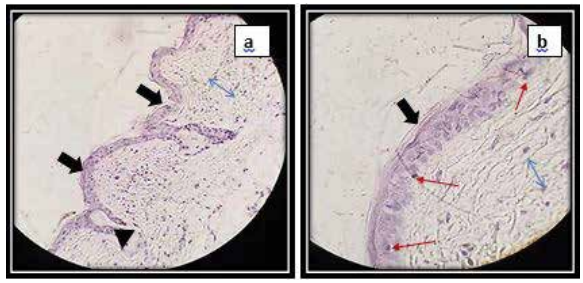


Fig. 5: General view of the skin cross section of the group three. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis), ► (hair follicles), → (blood vessel). H & E stain, a (X 40) & b (X 100).

When the time of strike increasing to 30 minutes at 1.31 mW or the group four, there is noticeable effect on the shape of cells and it is found the merging in the cell wall. This effect not good for the tissue cells this merging is the evidence for abnormal cell growth. Furthermore, the vacoulation in cells in the epidermis is referring to precede the cells death as showed in figure (6a). De-attach the cells and sub layers of stratum cornum was clear in this group with irregular increase in thickness of the epidermis and, also found in thickening with spilt part of superficial layer of corneum. A number of inflammatory cells and leukocytes appear spread in the parenchyma of dermis refer to damage of blood vessels and inflammation case, showing a decrease of the activities of epidermal, as showed in figure (6c).

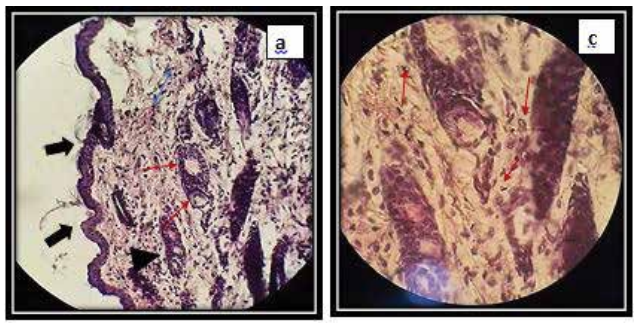


Fig. 6: General view of the skin cross section of the group four. Showing the different thickness of the layer tissue, ➡ (epidermis layer), ↔ (dermis),►(hair follicles),→(blood vessel). H & E stain, a (X 40) & c (X 100).

Discussions

One objective of the present study was to assess the effect of He-Ne laser irradiation on the thickness skin layer of mice therefore we monitor increase of the thickness layers with help of histological measurements of desire and undesired effect obtained. The results suggest that a low dose of red light (He-Ne laser, 632.8 nm) has significant enhancing of the skin features comparing with that doesn't illuminated groups. However, it shows the slightly increases of the epidermis thickness and appearing well architecture of the skin composition specially in figure (1). The attaching between the epidermis and dermis its good and reflect enhancing of the rate of mitotic activity of cells in stratum basale hair growth in Swiss albino mice skin. These results agreement with earlier reports which demonstrate that exposure to low-level laser radiation leads to augmentation in proliferative and synthesizing activity of cells [5, 6].

Our findings suggest that the He-Ne laser was more effective laser, and significant difference was observed in terms of the doses within same laser groups and our results were in line with previous studies. That have shown that wavelength is an important factor in controlling cell growth [7, 8], that explain the cells proliferation in the epidermis of our study, also the He-Ne laser have a positive on healing hard palate wounds regardless of the radiation dose as shown in figure 3. Low power with He-Ne laser was deemed more effective compared to another laser light in terms of fibroblast proliferation and collagen fiber density. However, further robust randomized clinical studies are required [9, 10].

The significant increasing is found at a dose of 2.548 J/cm2, however, the dose 4.094 J/cm^2 has a little change of the thickness. On the other hand, it is found in the inhibition of hair growth due to increase in follicles with exposure to the He-Ne laser for both doses. That indicates to the enhancement of hair growth related to skin improving. However, exposure to the He-Ne laser at a dose of 4.094 J/cm^2 caused no significant change [11].

Effects of low-level helium-neon laser radiation were compared on thickness skin layers of mice those dosages of 6.141 J/cm^2 during a 30 min exposure every day, 4.094 J/cm^2 during a 20 min and 2.047 J/cm^2 during a 10 min exposure. No significant differences in effect were observed between laser-exposed region and control exposed. He-Ne laser irradiation of increases certain aspects of healing in the early stages, but not to such a degree as to be clinically applicable. More detailed research is indicated to obtain optimal exposure levels necessary to accelerate effect significantly. These results to similar to Surinchak et.al when they did vitro study[12].

The application of the He-Ne laser 10 mw at 2.548 J intensity for 20 days caused a gradual increase. Furthermore, microscopic examinations revealed that the laser-irradiated skin changed. The release of stratum granule from epidermis to hair follicle, and produced blood vessel thrombosis of the dermal capillary plexus[13]. A previous study report an increase in cell proliferation and collagen production using specific and somewhat arbitrary laser settings with the helium neon (He-Ne) and gallium arsenide lasers, but none of the available studies address the mechanism, whether photo thermal, photochemical, or photomechanical, whereby low power may exerting its effect. Some studies, especially those using He-Ne lasers, report improvements in surgical wound healing in a rodent model; however, these results have not been duplicated in animals such as pigs, which have skin that more closely resembles that of humans. In humans, beneficial effects on superficial wound healing found in small case series have not been replicated in larger studies [14].

Our results showed that a particular laser irradiation stimulates fibroblast proliferation, without impairing of layers skin. These results to similar to Pereira et [15].

The influence of low-intensity polarized visible laser radiation on the acceleration of skin wound healing. Low-level laser therapy (LLLT) at adequate wavelength, intensity, and dose can accelerate tissue repair. However, there is still unclear information about light characteristics, such as coherence and polarization. Some studies indicate that linearly polarized light can survive through long propagation distance in biological tissue Histological analysis showed that the healing of irradiated wounds was faster than that of non-irradiated wounds [16].

Conclusion

The low power helium–neon laser is representing the future of dermatology and the therapeutic application with numerous other applications. The results that found indicate skin tissue can enhanced by using low power

laser. The time and power density represent the good tool to make that enhancing. Histological analysis displays the results that group illuminated at time 20 minutes and power 1.13 mW had a good changes in the architecture of skin. That refer to the optical effect of laser on the skin might change the future of dermatology.

REFERENCE

1. Ansari MA, Mohajerani E. Mechanisms of laser-tissue interaction: optical properties of tissue. Journal of Lasers in Medical Sciences. 2011;2(3):119.
2. Niemz MH. Laser-tissue interactions: fundamentals and applications: Springer Science & Business Media; 2013.
3. Rinnerthaler M, Streubel MK, Bischof J, Richter K. Skin aging, gene expression and calcium. Experimental gerontology. 2015;68:59-65.
4. Suvarna KS, Layton C, Bancroft JD. Bancroft's Theory and Practice of Histological Techniques E-Book: Elsevier Health Sciences; 2018.
5. Yu H-S, Wu C-S, Kao Y-H, Chiou M-H, Yu C-L. Helium–neon laser irradiation stimulates migration and proliferation in melanocytes and induces repigmentation in segmental-type vitiligo. Journal of investigative dermatology. 2003;120(1):56-64.
6. Karu T, Pyatibrat L, Kalendo G. Biostimulation of HeLa cells by low-intensity visible light. V. Stimulation of cell proliferationin vitro by He− Ne Laser irradiation. Il Nuovo Cimento D. 1987;9(12):1485-94.
7. Moore P, Ridgway TD, Higbee RG, Howard EW, Lucroy MD. Effect of wavelength on low-intensity laser irradiation-stimulated cell proliferation in vitro. Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery. 2005;36(1):8-12.
8. Carrinho PM, Renno ACM, Koeke P, Salate ACB, Parizotto NA, Vidal BC. Comparative study using 685-nm and 830-nm lasers in the tissue repair of tenotomized tendons in the mouse. Photomedicine and Laser Therapy. 2006;24(6):754-8.
9. Fahimipour F, Mahdian M, Houshmand B, Asnaashari M, Sadrabadi AN, Farashah SEN, et al. The effect of He-Ne and Ga-Al-As laser light on the healing of hard palate mucosa of mice. Lasers in medical science. 2013;28(1):93-100.
10. Evans DH, Abrahamse H. Efficacy of three different laser wavelengths for in vitro wound healing. Photodermatology, photoimmunology & photomedicine. 2008;24(4):199-210.
11. Shukla S, Sahu K, Verma Y, Rao K, Dube A, Gupta P. Effect of helium-neon laser irradiation on hair follicle growth cycle of Swiss albino mice. Skin pharmacology and physiology. 2010;23(2):79-85.
12. Surinchak JS, Alago ML, Bellamy RF, Stuck BE, Belkin M. Effects of low-level energy lasers on the healing of full-thickness skin defects. Lasers in surgery and medicine. 1983;2(3):267-74.
13. Kim YG, Pak SC, Lee SR. Hairless mouse epidermal antioxidants and lipid peroxidation assessed by He-Ne laser. Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery. 2000;27(5):420-6.
14. Posten W, Wrone DA, Dover JS, Arndt KA, Silapunt S, Alam M. Low-level laser therapy for wound healing: mechanism and efficacy. Dermatologic surgery. 2005;31(3):334-40.
15. Ribeiro MS, Da Silva DDFT, De Araújo CEN, De Oliveira SF, Pelegrini CMR, Zorn TMT, et al. Effects of low-intensity polarized visible laser radiation on skin burns: a light microscopy study. Journal of clinical laser medicine & surgery. 2004;22(1):59-66.
16. Pereira AN, Eduardo CdP, Matson E, Marques MM. Effect of low-power laser irradiation on cell growth and procollagen synthesis of cultured fibroblasts. Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery. 2002;31(4):263-7.

Evaluation of Polycystic Ovarian Syndrome Women as a Result of Clomiphene Treatment

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ABSTRACT

Polycystic ovary syndrome (PCOS) is a disorder that affects a woman's hormone levels Clomiphene citrate is used generally as an initial treatment. In the present study, LH, FSH, testosterone, progesteron and oestrogen were analysed for the women undergoing clomiphene in Iraq. Total 73 infertile PCOS women (age ranging from 19-33) were enrolled in the study and they were divided into 3 groups depending on the clomiphene treatment where, group 1 patients (n=21) were given 50mg, group 2 (n=23) were given 100mg and group 3 (n=28) were given 150mg dose of clomiphene. The serum leutinizing hormone and testosterone found to be decreased after treatment, while follicle stimulating hormone and estrogen showed the opposite trend. When various parameters are studied such as ovary size, number of follicles, endometrium layer, it was found that, ovarian size after treatment they are decreased but did not show any significant difference.

Keywords: *Polycystic ovary syndrome, clomiphene, leutinizing hormone, testosterone*

Introduction

Infertile women about 20-40% are having ovulatory disorders and PCOS is the most common cause of ovulatory dysfunction, which represents approximately 70% of cases[1,2]. Clomiphene citrate is used generally as an initial treatment[3]. Clomiphene citrate utilization shows discrepancy between the high rates of ovulation (60-85%) and the much low rates of conception (20-40%) per cycle[1,4]. In case of pregnancies where we use clomiphene citrate, 7-13% shows multiple gestations[1,2,4]. The women taking Clomiphene citrate shows certain common side effects such as 20% vasomotor symptoms, 5% adnexal tenderness, 3% nausea, 1% headache, and rarely blurring of vision of scotoma[2]. The ovarian hyperstimulation syndrome (OHSS) incidence in patients treated with clomiphene citrate is rare, but it may lead to multiple follicular development with OHSS risk and in patients with PCOS shows multiple pregnancies[1,5].

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The polycystic ovary syndrome (PCOS) approximately accounts for 75% of the cases and is the commonest cause of anovulatory fertility[6]. In the patients with PCOS the first agent to be introduced in general practice for ovulation induction is clomiphene citrate (CC) and is still considered the first therapeutic option for PCOS[7]. The choice of clomiphene is because relatively safe nature, can be administered easily, and is inexpensive. It is important to know that the first line treatment is diet and exercise[8-10]. Women with PCOS shows various metabolic disorders including increased serum levels of luteinizing hormone (LH), testosterone, and prolactin which could influence women health in long term[11-13]. The clomiphene citrate with an injection of human chorionic gonadotropin administration is one of the most common therapies[14]. In women with PCOS clomiphene is used to improve ovarian function, menstrual pattern and glucose metabolism[15-16].

Estrogen compounds and clomiphene have structural similarity which may have negative effect on endometrial thickness[16-17]. For the treatment of infertility in male clomiphene citrate is most commonly prescribed. In the hypothalamus and pituitary, clomiphene citrate which is synthetic nonsteroidal drug which acts as an antiestrogen and competitively binds to oestrogen receptors. The normally low levels of oestrogen on the male hormone axis are blocked which results in increased secretion

of GnRH, FSH and LH. These hormone's enhanced output increases testosterone production and sperm production[18]. In the present study, LH, FSH, testosterone, progesteron and oestrogen were analysed for the women undergoing clomiphene in Iraq.

Material and Method

Enrollment of the Patients: Total seventy three infertile patients (age 19-33) with polycystic ovary syndrome (PCOS) were enrolled in the present study. Oral consent was obtained before enrollment.

Treatment of Clomiphene: The enrolled patients were randomly divided into three groups on the bases of their clomiphene treatment. The patients were given Clomiphene at various doses such as 50mg (n=21), 100mg (n=23) and 150mg (n=28).

Blood Collection and its Separation: The blood was collected before (pre-treatment sample) and after (post-treatment sample) treatment to check its effect. The collected samples were centrifuged at 3000 rpm for 10 minutes, and serum was separated within 30 minutes from the time of blood collection. Serum was aliquots in an Eppendorf tube and frozen in the deep freeze at -40°C.

Serum of all patients was subjected for the estimation of the luteinizing hormone and FSH estimation. The estimation of Testosterone, progesteron and oestrogen were carried out as per manufacturer's instructions (VIDAS® system, Biomerieux, Italy).

Statistical Analysis: The results were represented as mean ± Stand error (n=21). The data were processed in the Microsoft excel program and graphpad prism 5 (version 5.01).

Results

In the present study we took total 73 infertile patients with age ranging from 19-33. These all patients are suffering with polycystic ovary syndrome (PCOS). These are divided into 3 groups depending on the clomiphene treatment where, group 1 patients (n=21) were given 50mg clomiphene, group 2 (n=23) were given 100mg and group 3 (n=28) were given 150mg dose of clomiphene. The blood was collected before (pre-treatment sample) and after (post-treatment sample) treatment to check its effect. Luteinizing hormone, FSH, Testosterone, progesteron and oestrogen from blood Serum of all patients was studied. The serum leutinizing hormone and follicle stimulating hormone are determined it is found that before treatment the LH levels were high which fall after the treatment and they shows significant level of difference. As the concentration of clomiphene is increased level of LH shows difference i.e. low value. It shows that high concentration of clomiphene (150 mg) shows high level of significance.

When serum FSH was determined we can find that FSH levels were low before treatment and which increases after treatment. The clomiphene concentration at 150 mg shows increase in FSH levels but show non-significant difference. When LH and FSH ratios are calculated together clomiphene concentration at 150 mg shows good results i.e. lowered level of both LH and FSH, and hence shows significant level of difference.

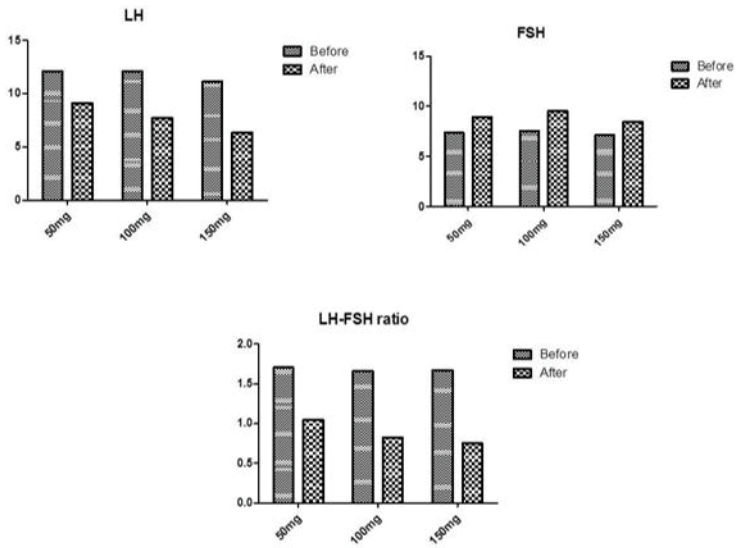


Figure 1: Serum LH and FSH levels and their ratio

We also analyzed the testosterone, progesterone, oestrogen levels, we found that before treatment the testosterone levels were high, which get lowered after the clomiphene treatment, which showed significant difference. The oestrogen levels were low before treatment which are increased after treatment, where concentration of clomiphene did not show any significant difference but after treatment if compared to before treatment, all the concentrations shows significant difference level.

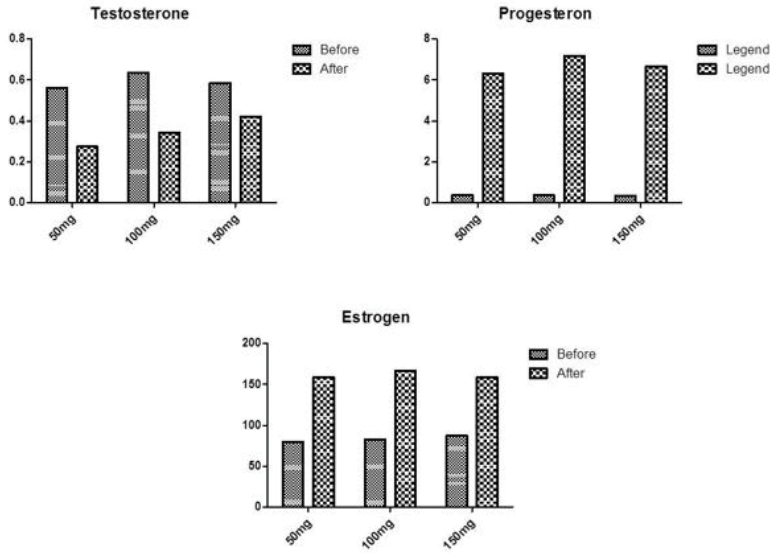


Figure 2: Serum testosterone, progesterone and estrogen levels

When various parameters are studied such as ovary size, Number of follicles, Endometrium layer, it was found that, ovarian size after treatment they are decreased but did not show any significant difference. When number of follicles is determined before and after treatment it showed significant difference. Endometrium layer when determined showed non-significant difference level.

Table 1: Effect of various concentrations of clomiphene on ovary size, number of follicles and endometrium layer

Parameter	Treatment	50mg	100mg	150mg
Ovaries size	Before	17.14 ± 1.19	16.06 ± 1.12	15.39 ± 1.59
	After	14.25 ± 1.79	14.01 ± 1.81	13.64 ± 1.63
Number of follicles	Before	13.90 ± 1.86	13.13 ± 1.35	13.71 ± 2.08
	After	18.33 ± 1.15	17.47 ± 0.94	17.53 ± 0.744
Endometrium	Before	4.29 ± 1.10	3.52 ± 1.47	4.14 ± 1.11
	After	6.45 ± 0.57	6.58 ± 0.95	6.4 ± 0.70

Discussion

In the present study total 73 patients with age ranging from 19-33 were selected. All these patients are suffering with polycystic ovary syndrome (PCOS). These are divided into 3 groups, group 1 patients (n=21) were given 50mg clomiphene, group 2 (n=23) were given 100mg and group 3 (n=28) were given 150mg dose of clomiphene. Further blood samples are drawn and tested for serum FSH, LH levels and testosterone, progesterone and estrogen levels are determined.

In the present study, we found nonsignificant difference in FSH and significant difference in LH. Where, Sheikh-El-Arab et al[19] found significantly higher values of FSH (p-0.02), and had significantly thicker endometrium (p-0.02). Rebecca et al[20] found that significant increase in LH and FSH levels in the clomiphene citrate group if compared with control group (P<0.01: P<0.02). Serum thyroid levels in CC-treated group is higher as compared to the placebo group (P<0.01).

Safeer et al[21] found that serum testosterone showed highly significant increase (P<0.05), serum FSH showed non- significant increase which is same like present study report. Gonzales et al[22] showed highly significant increase in the testosterone serum level (P<0.05), and increase in mean serum level of FSH (P<0.1).

Shekoufeh et al[23] found that, in some experiment group FSH significantly reduced if compared to control and in group (p<0.001). The results also showed that estrogen level was increased significantly in all groups (p<0.001). Also, the progesterone levels in all groups decreased significantly if compared to control (p<0.001). Kerin et al[24] and Dicky et al[25] also found similar results like present study.

Ethical Clearance: The blood was collected from AL_ Numan hospital after their investigation. Oral consent was taken before enrolled the patients in the study.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Kousta E, White DM, Franks S. Modern use of clomiphene citrate in induction of ovulation. Human Reproduction Update 1997, 3:359–365.
2. American College of Obstetricians and Gynecologists ACOG Practice Bulletin. Management of infertility caused by ovulatory dysfunction. Obstetrics and Gynecology 2002, 99, 347–358.
3. Yarali H, Zeyneloglu HB. Gonadotrophin treatment in patients with polycystic ovary syndrome. Reproductive BioMedicine Online 2004, 8, 528–537.
4. Dickey RP, Holtkamp DE. Development, pharmacology and clinical experience with clomiphene citrate. Human Reproduction Update 1996, 2, 483–506.
5. Gelety TJ, Kerin JF, Surrey ES. Ovarian hyperstimulation syndrome. Infertility and Reproductive Medicine Clinics of North America 1992, 3, 795–809.
6. Adams J, Polson DW, Franks S. Prevalence of polycystic ovaries in women with anovulation or idiopathic hirsutism. Brithis Medical Journal 1986, 293, 355–359.
7. Thessaloniki ESHRE/ASRM- sponsored PCOS consensus workshop group. Consensus on infertility treatment related to polycystic ovary syndrome, Fertil Steril 2008; 89 (3): 505-522.
8. Crosignani PG, Colombo M, Vegetti W. Somigliana E. Gessati A. Ragni G. Overweight and obese anovulatory patients with polycystic ovaries: parallel improvements in anthropometric indices, ovarian physiology and fertility rate induced by diet. Human Reproduction 2003, 18, 1928–1932.
9. Norman RJ, Noakes M, Wu R, Davies MJ, Moran L, Wang JX. Improving reproductive performance in overweight/obese women with effective weight management. Human Reproduction Update 2004, 10, 267–280.
10. Pasquali R, Gambineri A. Role of changes in dietary habits in polycystic ovary syndrome. Reproductive BioMedicine Online 2004, 8, 431–439.
11. Berek JS. Berek & Novak's Gynecology. 14th Ed. Philadelphia, Lippincott Williams & Wilkins; 2005.
12. Speroff L, Fritz MA. Clinical Gynecologic Endocrinology and Infertility. 7th Ed. Philadelphia, Lippincott Williams & Wilkins; 2005a.
13. Speroff L, Fritz MA. Clinical Gynecologic Endocrinology and infertility. 7th Ed. Philadelphia, Lippincott Williams & Wilkins; 2005b.
14. Biljan MM, Mahutte NG, Tulandi T, Tan SL. Prospective randomized double-blined Trial of the correlation between time of administration and antiestrogenic effects of clomiphene citrate on reproductive end organs. Fertil Steril 1999; 71: 633- 638.
15. Madankumar R, Tsang J, Lesser ML, Kenigsberg D, Brenner S. Clomiphene citrate induced ovulation and intrauterine insemination: effect of timing of human chorionic gonadotropin injection in relation to the spontaneous LH surge on pregnancy rates. J Assist Reprod Genet 2005; 22: 155-159.
16. Mitwally MF, Casper RF. Aromatase inhibitors in ovaulation induction. Semin Reprod Med 2004; 22: 61-78.

17. Gerli S, Gholami H, Manna C, Di Frega AS, Vitiello C, Unfer V. Use of ethinyl estradiol to reverse the antiestrogenic effects of clomiphene citrate in patients undergoing intrauterine insemination: a comparative, randomized study. Fertil Steril 2000; 73: 85-89.

18. Stuart S. Howards; Treatment of Male Infertility; The new England Journal of Medicine, 1995; 332 (5): 312-7.

19. Sheikh-El-Arab ME, Elgindy E. Comparison between two clomiphene citrate protocols for induction of ovulation in clomiphene resistant polycystic ovary syndrome. Middle East Fertility Society Journal, 2014, 19:243-247.

20. Rebecca ZS, Barbara SS, Maria B, Gloria P, Ronald SS. A controlled comparison of the efficacy of clomiphene citrate in male fertility. American Fertility Society, 1988, 49(5).

21. Safeer Z, Sibgha Z, Shoaib MK. Evaluation of effects of clomiphene citrate on serum testosterone & FSH levels and seminal parameters in idiopathic oligospermia. D:/Biomedica, 2009, 25(Bio-13):48-51.

22. Gonzales GF. Basal serum testosterone as an indicator of response to clomiphene treatment in human epididymis, seminal vesicles and prostate; Andrologia, 2002; 34 (5): 308-316.

23. Shekoufeh A, Hossein KJ, Zahra KJ, Mozhgan M. Comparison of the effects of ginger extract with clomiphene citrate on sex hormones in rats with polycystic ovarian syndrome. Int J Reprod Biomed; 2017, 15(9): 561-568.

24. Kerin JF, Liu JH, Phillipou G, Yen SS. Evidence for a hypothalamic site of action of clomiphene citrate in women. J Clin Endocrinol Metab 1985; 61: 265-268.

25. Dickey RP, Olar TT, Taylor SN, Curole DN, Rye PH. Sequential clomiphene citrate and human menopausal gonadotrophin for ovulation induction: comparison to clomiphene citrate alone and human menopausal gonadotrophin alone. Hum Reprod 1993; 8: 56-59.

Variance Analysis of Acute Myocardial Infarction Clinical Pathway in The Era of National Health Insurance

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ABSTRACT

Acute myocardial infarction (AMI) was responsible for 7.4 million deaths worldwide and could cause complications, disability, productivity loss with high cost. Since Indonesia has implemented the National Health Insurance, cost efficiency in maintaining clinical practice quality is needed. Clinical pathway is a tool for maintaining quality of clinical process and cost by setting intervention based on time and sequence. Analysis of variance was carried out to evaluate the implementation of clinical pathway. Data from medical and billing record were reviewed and analyzed by Clinpath Evaluation Tool version 2.0. Characteristic of patient, average utilization of medical treatment and clinical tests, and drugs utilization were obtained from this tool. Hospital has played a good role in maintaining quality of health services. This can be seen from the accordance between clinical practice and clinical pathway in majority of the medical treatments and drugs administration. Average length stay was 4.65 days with the median of 6 days, and this was close enough with clinical pathway. Administration of oxygen and isotonic fluid were the highest average utilization in clinical practice. Nitrate and anti-platelet were the major drugs used in medication. Wide variations only occurred in laboratory tests (variation: 86.96%) and should be evaluated, considering variation could affect quality of services and moreover on the cost of treatment.

Keywords: *clinical pathway; myocardial infarction; implementation pathway; variance analysis.*

Introduction

As Indonesia has been entering the era of National Health Insurance in 2014, the quality of health services while maintaining cost efficiency became one of the biggest issues in health care delivery. The National Health Insurance in Indonesia introduced new health care financing policy from fee for service to case-based scheme. This financing method was called Indonesian Case Base Group (INA-CBG) tariff and based on the Minister of Health Regulation number 52 and 64, 2016. INA-CBGs uses codification system from diagnosis and clinical procedure or clinical pathway from certain disease[1,2].

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The new Health Insurance in Indonesia brought challenge to health care provider. Health care provider needs to use resources efficiently to reduce service's cost while still maintain the quality in patient care. Clinical pathway is one of the most popular disease management tools to overcome this problem[3]. Clinical pathway provides sequence and timing of healthcare practitioner's intervention to achieve outcome therapy with optimal efficiency[4]sequencing and timing of interventions by healthcare professionals for a particular diagnosis or procedure. It is a relatively new clinical process improvement tool that has been gaining popularity across hospitals and various healthcare organisations in many parts of the world. It is now slowly gaining momentum and popularity in Asia and Singapore. Clinical pathways are developed through collaborative efforts of clinicians, case managers, nurses, and other allied healthcare professionals with the aim of improving the quality of patient care, while minimising cost to the patient. Clinical pathways have been shown to reduce unnecessary variation in patient care, reduce delays in

discharge through more efficient discharge planning, and improve the cost-effectiveness of clinical services. The approach and objectives of clinical pathways are consistent with those of total quality management (TQM. Research in Hong Kong and Singapore stated that the implementation of clinical pathway for AMI impacted the decreasing length of stay variation, mortality rate, and complication rate[4]sequencing and timing of interventions by healthcare professionals for a particular diagnosis or procedure. It is a relatively new clinical process improvement tool that has been gaining popularity across hospitals and various healthcare organisations in many parts of the world. It is now slowly gaining momentum and popularity in Asia and Singapore. Clinical pathways are developed through collaborative efforts of clinicians, case managers, nurses, and other allied healthcare professionals with the aim of improving the quality of patient care, while minimising cost to the patient. Clinical pathways have been shown to reduce unnecessary variation in patient care, reduce delays in discharge through more efficient discharge planning, and improve the cost-effectiveness of clinical services. The approach and objectives of clinical pathways are consistent with those of total quality management (TQM.[11]. Other research also found that implementation of clinical pathway can decrease clinical practice variation and cost of treatment[5,6]acute myocardial infarction (AMI.

Acute myocardial infarction (AMI) is one of the manifestations of coronary heart disease (CHD) and part of cardiovascular diseases (CVDs). Cardiovascular diseases were the cause of 31% deaths globally and 17.7 million people were estimated to die from CVDs in 2015. Among the 17.7 million, 7.4 million deaths were caused by coronary heart disease[7]. In Indonesia, coronary heart disease is the highest cause of death, which was the cause of 14.2% deaths in 2016[8]. Coronary heart disease became the global burden and also impacted the economy. In United States, myocardial infarction caused 1.1 million hospitalizations and costed at least US$ 450 billion[9]. Besides death, AMI can cause complications, disability, and productivity loss[10].

Clinical pathway should be evaluated constantly to maintain quality from the healthcare provider. Variance analysis could be used to evaluate and analyze the implementation of clinical pathway. Variance is clinical practice deviation from the standard in clinical pathway[12]. Deviation in this study includes variation of length of stay, timing of intervention, and drugs administration. The purpose of this study is to present clinical practice variance for acute myocardial infarction as basic evaluation of the clinical pathway.

Material and Method

This research was conducted in private hospital in Bogor. Data were collected prospectively from medical record and billing unit from October 2016 to March 2017. Medical record and billing unit in hospital provided patient's data recapitulation digitally, and then the recapitulated data became the data source in this study. Date of birth, sex, payment method, and date of patient's admission and discharge were gathered from medical record. Doctor specialist visit (frequency of doctor's visit), medical treatment, laboratory test, radiology, and drugs administration were gathered from billing record.

All inpatient acute myocardial infarction with code ICD-10 I21.9 were included in this study. An exclusion criterion was an inpatient that had secondary diagnosis. All data recapitulations were analyzed by Clinical Pathway Evaluation Tool version 2.0. This tool is in public domain. The information that can be obtained from this tool were characteristic of patient (age, sex, payment method, and length of stay), average utilization of medical treatment and clinical tests, and drugs utilization. Analysis variance were carried out by comparing average utilization and standard clinical pathway in hospital.

Result

General Characteristic: There were 233 patients with acute myocardial infarction from October 2016 to March 2017. Patients that had secondary diagnostic were excluded and 10 patients were left to be analyzed. Among 10 patients, 8 patients were male (80%) and 2 patients were female (20%) with the average age of 60.2 years old (range from 42-75 years old). 90% patients choose National Health Insurance as their payment method and 10% patients payed privately. Average length of stay (ALOS) was 4.65 days with the median of 6 days (range from 2-7 days).

Medical Treatment Utilization: Utilization can be interpreted as the amount of clinical practice that were given to all patients from patient's admission to discharge

or per one period of care. Medical treatment variation was cardiopulmonary resuscitation. The highest average utilization was administration of isotonic fluids and the lowest was ECG diagnostic, which were 14.8 and 1.0, respectively. Other average utilization of medical treatment can be seen in Table 1.

Table 1: Medical Treatment Utilization

Medical Treatment	Utilization according to the clinical pathway	Average Utilization in clinical practice
ECG diagnostic	1.0	1.0
Oxygen delivery	3.0	7.6
IV isotonic fluid	7.0	14.8
ECG serial	5.0	5.3
Specialist's visit	7.0	6.5
Vital sign monitoring	7.0	3.9
Cardiopulmonary resuscitation	-	0.1

Drugs Utilization: The main principal for AMI medication is to restore blood flow in blood vessel to the heart as soon as possible. Drugs that were used according to the clinical pathway were drugs from classification of nitrate, anti-platelet, anti-coagulant, statin, beta blocker, ACE inhibitor, angiotensin receptor blocker (ARB), anti-depressant, and anti-inflammatory steroid. Beside drugs that were included in clinical pathway, patients were also given other drugs such as gastroprotective drugs, drugs for diabetes, antibiotic, anti-hypertensive and diuretics. This study only included patients that did not have secondary diagnosis, but evidently there were still some other drugs that were given to patients. Average utilization for medication was presented in Table 2.

Table 2: Drugs Utilization

Drugs Classification	Utilization according to the clinical pathway	Average Utilization in clinical practice
Nitrate	+	28.5
Anti-platelet	+	17.0
Anti-coagulant	+	3.1
Statin	+	3.0
β-blocker	+	2.3

Conted…

Angiotensin Receptor Blocker (ARB)	+	1.1
Anti-anxiety	+	3.1
Laxative	+	0.8
Gastroprotective drugs	-	2.1
Diabetes drugs	-	1.5
Antibiotic	-	0.4
Anti-hypertensive	-	0.5
Diuretics	-	0.6

Laboratory and Radiology Utilization: The laboratory test that was included in clinical pathway was only troponin test. Troponin test was used as diagnostic test to diagnose AMI. But according to data, laboratory tests that were received by patient were not only troponin test, but also routine blood test, creatinine, urea nitrogen (BUN), glucose test, test for Na, K and Cl, HDL, LDL, total cholesterol, SGOT and SGPT. Radiology was not included in clinical pathway, but there was radiology utilization for thorax. Laboratory and radiology average utilization are presented in Table 3.

Table 3: Laboratory and Radiology Utilization

Laboratory	Utilization according to the clinical pathway	Average Utilization in clinical practice
Troponin T	1.0	0.6
Blood test	-	1.0
Creatinine	-	0.6
BUN	-	0.6
Glucose test	-	0.6
Na, K, Cl	-	0.2
HDL and LDL	-	0.4
Total cholesterol	-	0.4
SGOT and SGPT	-	0.2
Thorax	-	0.2

Discussion

AMI is caused by reduction of blood flow to the heart. Reduction of blood flow was caused by atherosclerosis and vasoconstriction[13]. Average Length stay (ALOS) for

AMI patient in hospital was in the range of 6-7 days. In this study, ALOS was 4.65 days with the median of 6 days. ALOS was shorter than length of stay in clinical pathway, but from the median, it can be indicated that most patients were treated in hospital for around 6 days, and this was in accordance with the clinical pathway. The compliance for length of stay was 70%. Average utilization of specialist's visit was 6.5 meanwhile the average length of stay was 4.65. This means that specialist could visit patient more than once per day.

AMI can be detected by analyzing troponin. Troponin is a biomarker that will increase in blood level in myocardial ischemic condition. Patients with chest pain for 20 minutes or more and wasn't getting better after the nitroglycerin was delivered, were suspected to have AMI. Patients then will get ECG diagnostic to decide immediate treatment[9,13,14]. In clinical pathway, AMI was detected by chest pain, ECG, and troponin. ECG diagnostic should be done once but troponin test was conditional in the first day of patient admission. Average utilization of ECG diagnostic and troponin test were 1.0 and 0.6. If every patient received ECG diagnostic and troponin test for one time, then the average utilization should be 1.0 in the first day admission. The compliance of ECG diagnostic was 100%, while compliance of troponin test was 66.67%. The variance of troponin test occurred because there were patients who took troponin test in second day of admission while in clinical pathway, patient could not take troponin tests in the second day of admission.

During treatment, vital sign and ECG should be monitored every day until the patient is discharged. Average utilization for vital sign and ECG were 3.9 and 5.3, respectively. This indicates that some patient got ECG monitoring for more than once per day. This was likely because AMI patients were treated in ICU or HCU room and need to be monitored closely. Oxygen and isotonic fluids also were administered during treatment. Oxygen should be administered for the first three days since admission and the rest days were conditional. Meanwhile isotonic fluids should be administered every day until the patient is discharged. Average utilization for oxygen administration was 7.6 and average utilization for the first three days ranged from 1.3 to 3. This signifies that oxygen administration was in accordance with the clinical pathway, and oxygen was delivered for more than once per day. Average utilization for isotonic fluid was 14.8, with the range from 0.2 to 4.2 per day. Administration of isotonic fluid was also in accordance with the clinical pathway and each patient was administered with it at least once per day.

Drugs for AMI patients were delivered during patient's stay and after the patient's discharge. Major treatment for patient during hospital stay was the combination of anti-platelet aspirin, nitrate and statin. Anti-platelet $P2Y_{12}$ inhibitor (e.g. clopidogrel) and anti-coagulant can be added as major treatment for patients depending on patient's condition. Morphine and β-blocker also considered to be delivered for relieving chest pain[13,14]. In AMI clinical pathway, patients got combination of dual anti-platelet (aspirin and $P2Y_{12}$ inhibitor), anti-coagulant, and statin as major treatment and it is slightly different from the literature. Drugs from the classification of ACE inhibitor, ARB, β-blocker, nitrate, morphine, laxative, and anti-depressant were for conditional utilization. Meanwhile drugs that were given after the patient was discharged were dual anti-platelet, nitrate, statin, ACE inhibitor, ARB, or β-blocker.

The highest drug utilization was drugs from nitrate and anti-platelet classification, which were 28.5 and 17.0, respectively. Anti-coagulant (utilization 3.1) and statin (utilization 3.0) were the third and fourth highest but their total utilizations were far from nitrate and anti-platelet. From the utilization, it can be indicated that this result was different than clinical pathway. Dual anti-platelet, anti-coagulant, and statin should be the highest utilization because they should be administered to patients every day until the patient is discharged. ALOS was 4.65, therefore if patients at least received drugs once per day, drugs utilization should be 4.65. But from the result, drug utilization for anti-coagulant and statin did not reach 4.65 and this means that patients did not receive anti-coagulant and statin every day. Drugs utilization might be different than the clinical pathway, but actually in accordance with literature. Literature stated that nitrate could be given as major treatment, and practically nitrate was highly given to patient.

There were patients who received gastroprotective drugs, antibiotics, diabetes drugs, and anti-hypertension and edema drugs. These drugs were not listed in clinical pathway therefore it is considered as variations. Furosemide was known as medication for heart failure. Heart failure was usually caused by myocardial damage and the consequence of arrhythmia or other ventricular

complications. Alongside with other anti-hypertensive drugs such as amlodipine, furosemide also used for hypertensive patients[13,15,16]. This study only included patients who did not have secondary diagnosis, but practically there were patients who received anti-hypertension, edema, antibiotics and diabetes drugs. This means that there were patients who had diabetes, hypertension or heart failure and infection during treatment in hospital.

As for gastroprotective drugs, there are literature that stated using these drugs for handling adverse drugs reaction. Adverse effect of anti-platelet drugs is an increased risk of bleeding, commonly in gastrointestinal (GI) tract. Gastroprotective drugs such as proton pump inhibitor (e.g. pantoprazole and omeprazole) can be used to ameliorate GI tract[17,18]anesthesiologists encounter many patients who are receiving drugs that affect platelet function as a fundamental part of primary and secondary management of atherosclerotic thrombotic disease. There are several antiplatelet drugs available for use in clinical practice and several under investigation. Aspirin and clopidogrel (alone and in combination. This was possibly the main reason for the use of gastroprotective drugs in some patients.

There were a lot of variations in laboratory test. AMI clinical pathway only included troponin test, but practically other laboratory tests were given during patients stay in hospital. Laboratory variations included routine blood test, creatinine, urea nitrogen, glucose test, Na, K, Cl, HDL, LDL, total cholesterol, triglyceride, SGOT and SGPT. Variations in laboratory test reached 86.96%. There was also utilization in radiology, which was thorax. Radiology was not included in the clinical pathway therefore thorax was considered as variation.

Conclusion

Hospital has played a good role in maintaining quality of health services. This can be seen from the accordance between clinical practice and clinical pathway in majority of medical treatment and drugs administration. Wide variations only occurred in laboratory tests, where the variation reached 86.96%. This variation should be evaluated considering variation could affect the quality of services and moreover on the cost of treatment. This is because maintaining quality and cost are very important for the continuity of private hospital, especially in this Indonesian National Health Insurance era.

Acknowledgement

This research was supported by Directorate of Research and Community Empowerment Universitas Indonesia.

Conflict of Interest: The authors declare that they have no competing interest.

Source of Funding: This research was funded by Directorate of Research and Community Empowerment Universitas Indonesia through grant program for students who conducted research, which was called International Indexed Publication and Students' Thesis Grant with grant letter number 2180/UN2.R3.1/HKP.05.00/2018.

Ethical Clearance: This research has passed ethical clearance from Faculty of Public Health Universitas Indonesia, with ethical clearance number 670/UN2.F10/PPM.00.02/2018.

REFERENCES

1. Regulation of Health Minister Republic of Indonesia Number 52. *Permenkes No 52 Tahun 2016 Tentang Standar Tarif Pelayanan Kesehatan Dalam Penyelenggaraan Program Jaminan Kesehatan*.; 2016.
2. Regulation of Health Minister Republic of Indonesia Number 64. *Permenkes No 64 Tahun 2016 Temtang Perubahan Atas Peraturan Menteri Kesehatan Nomor 52 Tahun 2016 Tentang Standar Tarif Pelayanan Kesehatan Dalam Penyelenggaraan Program Jaminan Kesehatan*.; 2016.
3. Kinsman L, Rotter T, James E, Snow P, Willis J. What is a clinical pathway? Development of a definition to inform the debate. *BMC Med*. 2010;8(31):8-10. doi:10.1186/1741-7015-8-31
4. Cheah J. Clinical pathways--an evaluation of its impact on the quality of care in an acute care general hospital in Singapore. *Singapore Med J*. 2000;41(7):335-346. http://www.ncbi.nlm.nih.gov/pubmed/11026801.
5. He XY, Kate Bundorf M, Gu JJ, Zhou P, Xue D. Compliance with clinical pathways for inpatient care in Chinese public hospitals. *BMC Health Serv Res*. 2015;15(1):1-9. doi:10.1186/s12913-015-1121-8

6. Leuven KU, Medicine EB. Defining pathways. *J Nurs Manag*. 2006;14:553-563. doi: http://dx.doi.org/10.1111/j.1365-2934.2006.00702.x

7. WHO. Cardiovascular Diseases (CVDs) - Key Facts. http://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds). Published 2017.

8. Ministry of Health Indonesia. *Indonesia Sample Registration System*.; 2016. http://www.healthdata.org/indonesia.

9. Reed GW, Rossi JE, Cannon CP. Acute myocardial infarction. *Lancet*. 2017;389(10065):197-210. doi:10.1016/S0140-6736(16)30677-8

10. Mohseni J, Kazemi T, Maleki MH, Beydokhti H. A Systematic Review on the Prevalence of Acute Myocardial Infarction in Iran. *Hear View*. 2017;18(4):125-132. doi:10.4103/HEARTVIEWS.HEARTVIEWS

11. Chan PH, Hai SH, Chan KW, et al. Implementation of AMI clinical pathway for uncomplicated acute myocardial infarction at a local hospital : three years experience, outcomes and impacts AMI In-hospital Mortality. 2009. http://spo.escardio.org/eslides/view.aspx?eevtid=48&fp=P535.

12. Dalton P, Hons B, Hons M, Macintosh DJ, A FAO, Pearson B. Variance analysis in clinical pathways for total hip and knee joint arthroplasty. *J Qual Clin Pract*. 2000;20(4):145-149.

13. Van De Werf F, Bax J, Betriu A, et al. Management of acute myocardial infarction in patients presenting with persistent ST-segment elevation. *Eur Heart J*. 2008;29(23):2909-2945. doi:10.1093/eurheartj/ehn416

14. Anderson JL, Morrow DA. Acute Myocardial Infarction. *N Engl J Med*. 2017;376(21):2053-2064. doi:10.1056/NEJMra1606915

15. Casu G, Merella P. Diuretic Therapy in Heart Failure - Current Approaches. *Eur Cardiol Rev*. 2015;10(1):42-47. doi:https://doi.org/10.15420/ecr.2015.10.01.42

16. Lip GYH, Lydakis C, Beevers DG. Management of patients with myocardial infarction and hypertension. *Eur Heart J*. 2000;21(14):1125-1134. doi:10.1053/euhj.1999.2206

17. Hall R, Mazer CD. Antiplatelet drugs: A review of their pharmacology and management in the perioperative period. *Anesth Analg*. 2011;112(2):292-318. doi:10.1213/ANE.0b013e318203f38d

18. Oprea AD, Popescu WM. Perioperative management of antiplatelet therapy. *Br J Anaesth*. 2013;111(SUPPL.1):3-17. doi:10.1093/bja/aet402

Indoor Particulate Matter (PM_{10}) and Health Risk on Junior High School Students in Depok

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ABSTRACT

Poor indoor air quality is found to be related to the prevalence of respiratory disorders in children. School aged children spend 6-8 hours in classroom. Therefore, air quality and its health risk in classroom need to be considered. In this study, we measured the level of PM_{10} in three junior high schools and its health risk assessment. The mean level of indoor PM_{10} in three schools were 0.215 mg/m^3, 0.075 mg/m^3, 0.229 mg/m^3 respectively. The level of indoor PM_{10} in two schools was higher than outdoor. The exposure of PM_{10} in two schools was estimated to inflict health risk therefore it needed to be maintained at a safe threshold of 0.142 mg/m^3. This study concluded that indoor air quality in all junior high schools was poor and estimated to inflict health risk on students.

Keywords: *PM10; health risk; school; student*

Introduction

Indoor air pollution is found to be higher than outdoor and associated with various respiratory diseases. The high rate of indoor air pollution is related to around 2 million deaths in developing countries and 4% of global disease burden. Poorly ventilated rooms cause indoor and outdoor pollutants to accumulate indoors from time to time[1,2]. Nowadays, humans spend most of their time indoors[2-4]. One common indoor air pollutant is PM_{10}. The level of health risk due to PM_{10} exposure in classrooms is found to be associated with the prevalence of respiratory disorders such as asthma, wheezing, bronchitis, lower respiratory tract infections, and impaired lung function in children[3,5-8]. In addition, exposure to particulate matter was also reported to affect lung development in children[9-11].

In Depok, the prevalence of asthma (6.4%) was found higher than the province and national. Particularly, the prevalence of asthma in the 5-14 years old children was 4.6%[12]. Children are susceptible to air pollution due to higher respiratory frequency and physical activity, also development of the respiratory system related to puberty[1,13]. This group spends 65-90% indoors, including 6-8 hours in classroom[1,14,15]. Classrooms tend to have four times higher occupancy density than offices, inadequate ventilation, and building conditions increase the risk of more polluted air. Identification and control of indoor pollution will reduce both short and long-term health impacts[1,14,16]. Hitherto, there has not been research on PM_{10} exposure and its health risk on students of junior high school in Indonesia. Therefore, it is important to study the exposure of PM_{10} in schools and its health risk on students of junior high school to encourage environmental health management in school that suits student characteristic.

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Method

Health risk assessment was conducted by referring to the *Risk Assessment and Management Handbook* 1996[17,18]. The sampling locations were 10 classrooms and three fields from three junior high schools, randomly selected. The concentration of PM_{10} was measured using DustTrak™ II Aerosol Monitor 8532 for one hour each point. The size of ventilation openings and classroom

were measured. A survey of 357 junior high school students was conducted to obtain data of body weight, height, and activity pattern that represent the population of junior high school student in Depok. The weight and height was also measured. The activity pattern was collected through questionnaires to obtain the frequency of exposure and duration of exposure. The concentration of PM_{10}, activity pattern, and body weight were used in equation 1 to obtain chronic daily intake of PM_{10} (CDI, mg/kg/day).

Equation 1:

$$\text{CDI} = \frac{C \times R \times t_E \times f_E \times D_E}{W_b \times t_{\text{avg}}}$$

The mean concentration of indoor PM_{10} (C, mg/m^3) was analyzed for each school. The inhalation rate (R, m^3/hour) of the students was based on inhalation rate of 11-16 year olds, 15.7 m^3/day[19]. Junior high schools in Depok city apply school hours 6 hours/day (tE, hour /day), 5 days/week. Based on the 2017/2018 academic calendar set by the West Java Education Office, school days were 218 days/year, including the exam days which then reduced by the mean of absence day according to the survey to obtain frequency of exposure (fE, day/year). Duration of exposure (D_E) based on the compulsory period of junior high school education, 3 years. The mean of student body weight (Wb, kg) was obtained. The average daily period of carcinogenic exposure was duration of exposure for 365 days per year (tavg, D_E x 365 days/year). The daily intake value would be used for the calculation of Hazard Quotient (HQ) using equation below.

Equation 2:

$$\text{HQ} = \frac{CDI}{RfC}$$

The RfC value of PM_{10} was not provided by Integrated Risk Information System (IRIS) so this research used a safe daily intake reference value based on an annual guideline of PM_{10}, the default of exposure factors for adult recommended by U.S. EPA 2014[18], and the *Exposure Factors Handbook* 2011[19]. The annual guideline of PM_{10} is 0.5 mg/m^3, according to the National Ambient Air Quality Standards (NAAQS) U.S. EPA in 1997. The reference value of PM_{10} safe intake obtained was 0.009 mg/kg/day. Then the risk management for the population was conducted if HQ > 1 by calculating a safe threshold value for PM_{10} based on the mean and the 10th percentile of the students body weight.

Results

PM_{10} Concentration: The selected schools are located in different sub-districts, namely Cimanggis (school A), Tapos (school B), and Beji (school C). The mean percentage of V/C in three schools was 14.39%, 14.50% and 29.65%, did not differ statistically. Regulation of Health Minister of Republic of Indonesia No. 1429/2006 on Requirements of Environmental Health in School sets the percentage of V/C in classroom at 20%. The concentration of PM_{10} in three schools was shown Table 1, the highest concentration of indoor PM_{10} was found in school C, located in the city center with busy main highway was 0.229 mg/m^3. The concentration of indoor PM_{10} between the three schools was statistically significant (p = 0.000). Measurement of indoor and outdoor PM_{10} was carried out at different hour but the same day. The highest value of I/O PM_{10} was found in school A, 3.12 and statistically significant (p = 0.000). The level of measured PM_{10} were compared with several guidelines, i.e. National Ambient Air Quality Guidelines (NAAQS) U.S. EPA, WHO air quality guidelines, Government Regulation of Republic of Indonesia No.41/1999 on Environmental Management (PP RI No. 41/1999), Regulation of Health Minister of Republic of Indonesia No. 1077/2011 on Guideline for Air Sanitation in House (Permenkes RI No. 1077/2011).

Table 1: The Concentration of PM_{10} in Three Schools

Parameter	School			Guidelines	
	A	B	C	[1)]NAAQS U.S. EPA 1997, [2)]NAAQS U.S. EPA 2012,	[3)]PP RI No. 41/1999, [4)]Permenkes RI No. 1077/2011
	Mean ± SD				
PM_{10} (mg/m^3)					
Indoor (I)	0.215 ± 0.123	0.075 ± 0.246	0.229 ± 0.583		[4)]0.70, 24 hours
Outdoor (O)	0.069 ± 0.527	0.094 ± 0.209	0.218 ± 0.152	[1)]0.15, 24 hours, [2)]0.05, 1 year	[3)]0.15, 24 hours

Conted…

I/O (p value)	3.116 (0.000)	0.798 (0.000)	1.050 (0.000)		
Temperature (^{0}C)					
Indoor (I)	30.04 ± 0.99	30.08 ± 1.03	30.07 ± 0.61		[4]18-30
Outdoor (O)	43.98 ± 2.34	33.53 ± 0.35	36.4 ± 0.85		
Humidity (% Rh)					
Indoor (I)	69.85 ± 5.19	68.99 ± 5.13	65.72 ± 4.36		[4]40-60
Outdoor (O)	27.43 ± 5.36	52.73± 1.18	44.46 ± 3.36		

Health Risk Assessment: The risk assessment was carried out on the exposure for three academic years to the population of junior high school student in Depok. The respondents consisted of 157 males (44%) and 200 females (56%) with characteristics as shown in Table 2. One school day was 6 hours long not included additional activities or lessons after school hours.

Table 2: Student Characteristic and Activity Pattern

Variabel		Min-Max	Mean ± SD
Age (years)		10.23 - 17.16	13.95 ± 0.82
Body Weight (kg)	W_b	22 - 89.5	47.90 ± 10.84
Frequency of exposure (day/ year)	f_E	188 - 218	215.41 ± 4.35
Duration of exposure (year)	D_t	1 - 3	1.60 ± 5.35
Time of exposure (hour/day)	t_E	6	
Inhalation rate (m^3/day)	R	15.7	

The non-carcinogenic health risk of PM_{10} exposure to the students was HQ > 1 in School A and C, as shown in Table 3. The exposure of PM_{10} was estimated to have health effects so risk management is needed by setting a safe threshold of 0.192 mg/m^3 (for Wb = 47.9 kg) and 0.142 mg/m^3 (for Wb = 35.5 kg).

Table 3: Chronic Daily Intake dan Health Risk of PM_{10}

PM_{10}	School		
	A	B	C
Intake (CDI, mg/day)	0.011	0.004	0.011
Health Risk (HQ)	1.118	0.390	1,191

Discussion

PM_{10} Concentration: The concentration of indoor and outdoor PM_{10} were found to be highest in school C and exceeded the standard value of 24-hour and annual referring to NAAQS U.S. EPA 1997 and 2012, PP RI No. 41/1999, and Permenkes RI No. 1077/2011. It is located in the city center and adjacent to a busy main highway. Traffic activity is one of the sources of indoor and outdoor particulate matters due to the burning of fossil materials from motorized vehicles. Another research on indoor PM_{10} reported that highway dust was a major component of indoor PM_{10} and associated with high levels of indoor PM_{10}[8]. The I/O ratio at school C indicated that indoor PM_{10} might be sourced from the classroom such as particles attached to students or resuspension of deposited particles[6,20]. In addition, the chemical component of PM_{10} might indicate the sources of pollutants and could be identified further[6,8,21].

High indoor PM_{10} yet low outdoor PM_{10} was found at School A. The level of indoor PM_{10} exceeded the guideline of 24-hour and annual referring to NAAQS U.S. EPA 1997 and 2012, PP No. 41/1999, and Permenkes No. 1077/2011. Low level of outdoor PM_{10} might be caused by the rain that occurred a day before measurement at School A. It was expected to dissolve outdoor PM yet less affect on indoor. This study did not record meteorological conditions but several studies reported that meteorological conditions such as wind and rain can reduce the concentration of PM[22]. By considering its environment characteristics, PM might be sourced from traffic, not cemented school field, or attached to students[8,23]. Similar to School C, indoor PM_{10} might be sourced from the classroom and trapped in due to deposited particles or inefficient room cleaning and inadequate ventilation leading to the accumulation of indoor PM. Resulting in, School A had the highest I/O ratio for PM_{10}. The mean percentage of V/C in School A was not in accordance with Permenkes RI No. 1429/2006.

Meanwhile, indoor PM_{10} in School B which located in the residential showed lower concentration. However, the indoor PM_{10} were found to exceed the guideline of

24-hour PM_{10} referring to Permenkes RI No. 1077/2011 and annual referring PM_{10} to NAAQS U.S. EPA 1997. In residential areas, PM_{10} sourced from vehicles, biomass burning, cooking activities, and unpaved yards. The concentration of indoor PM_{10} in School B was lower than outdoor PM_{10} and the I/O ratio was the least among three schools. This might indicate low contribution of indoor sourced PM_{10} or good room cleanliness but might not related the percentage of V/C. The mean percentage of V/C at school B was not in accordance with Permenkes RI No. 1429/2006.

Health Risk Assessment: Health risks due to $PM1_0$ exposure to students were estimated in Schools A and C. This study estimated health risk for junior high school students based on annual mean of PM_{10} (50 mg/m^3) set by NAAQS U.S. EPA 1997. The U.S. EPA has revised the guideline to 150 mg/m^3 for 24 hours because of insufficient evidence of long-term exposure on public health. However, some studies reported association of long-term exposure of PM_{10} and respiratory problems in children i.e., study in Mexico finding an increase in PM_{10} significantly correlated with decreased lung function of children and a study in Utah showed a positive correlation with PM_{10} reduction and decreasing hospital visits, asthma, and bronchitis in children[16,24]. In addition, WHO recommends annual PM_{10} 50 mg/m^3 and $PM_{2.5}$ 25 mg/m^3 expected to reduce the risk of premature death by 6%[25]. The health risk of PM_{10} might be quantified based on its chemical components. Research in China and Malaysia reported long-term exposure of Cr in PM_{10} posed a risk of cardiovascular and respiratory diseases including lung cancer in children[8,26]. Health risk arising in School A and C could be managed by controlling the level of PM_{10} at a safe threshold of 0.142 mg/m^3 during normal school hours. The level of health risks would be higher in individual with low weight so that the 10th percentile of bodyweight 35.5 kg was set to calculate a safe threshold for 90% of the student population. The modification on time, frequency, and duration of exposure were not considered because they are mandatory and associated to academic quality.

Conclusions

The concentration of indoor PM_{10} in all schools exceeds the standard value set by NAAQS U.S. EPA 1997 and 2012, Permenkes RI No. 1077/2011, and PP RI No. 40/1999. The quantitative health risk assessment of PM_{10} for 3 years of exposure in School A and C estimated the health risk to students (HQ> 1). Therefore, we recommend managing a safe threshold of PM_{10} at 0.142 m/m^3 as by conducting air quality monitoring, provision of room air purification facilities in classrooms, and planning of school location to pollutant sources.

This research can be developed by monitoring several quality parameters in the long run, simultaneously, and considering the meteorology condition to obtain comprehensive air quality data. Health risks assessment can be improved by analyzing the components of PM, using advanced analytical methods, and involving epidemiological studies.

Acknowledgment

The author gratefully acknowledge the Universitas Indonesia for providing financial support for this research through *Hibah Riset Penelitian Tugas Akhir Year 2018* and generosity of various participants.

Conflict of Interest: The authors declare that there is no conflict of interests.

Ethical Clearance: This study was approved by the ethic board of Faculty of Public Health, Universitas Indonesia (No.: 458/UN2.F10/PPM.00.02/2018).

REFERENCES

1. Annesi-Maesano I, Baiz N, Banerjee S, Rudnai P, Rive S. Indoor air quality and sources in schools and related health effects. J Toxicol Environ Heal - Part B Crit Rev. 2013 Dec 03;16(8):491-550.
2. Leung DYC. Outdoor-indoor air pollution in urban environment: challenges and opportunity. Front Environ Sci. 2015 Jan 15;2(69):1–7.
3. Rovelli S, Cattaneo A, Nuzzi CP, Spinazzè A, Piazza S, Carrer P, et al. Airborne particulate matter in school classrooms of northern Italy. Int J Environ Res Public Health. 2014 Jan 27;11(2):1398-421.
4. World Health Organization. Health Effects of Particulate Matter: Policy implications for countries in eastern Europe, Caucasus and central Asia. Copenhagen. http://www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf

5. Pražnikar ZJ, Pražnikar J. The Effects of Particulate Matter Air Pollution on Respiratory Health and on the Cardiovascular System. Slov J Public Heal. 2012 Nov 7;51(51):190–199.

6. Alves C, Nunes T, Silva J, Duarte M. Comfort parameters and particulate matter (PM10 and PM2.5) in school classrooms and outdoor air. Aerosol Air Qual Res. 2013;13;1521–1535.

7. Madureira J, Paciência I, Rufo J, Ramos E, Barros H, Teixeira JP, et al. Indoor air quality in schools and its relationship with children's respiratory symptoms. Atmos Environ. 2015 Oct;118:145–56.

8. Mohamad N, Latif MT, Khan MF. Source apportionment and health risk assessment of PM10 in a naturally ventilated school in a tropical environment. *Ecotoxicology Environmental* Safety. 2016 Feb;124:351–362.

9. Gauderman, W. J., et al. (2002). Association between air pollution and lung function growth in southern California children: results from a second cohort. *Am J Respir Crit Care Med*, *166*(1), 76–84.

10. Mahyuddin N, Awbi HB, Alshitawi M. The spatial distribution of carbon dioxide in rooms with particular application to classrooms. Indoor and Built Environment. 2014;23(3):433–448.

11. Shaughnessy R, Nevalainen A, Moschandreas D. Carbon Dioxide Concentrations In Classrooms and Association With Student Performance: A Preliminary Study. Proceedings; 2005;373–376.

12. Ministry of Health Republic of Indonesia. (2013). *Riskesdas dalam Angka Provinsi Jawa Barat 2013*.

13. Nève V, Girard F, Flahault A, Boulé M. Lung and thorax development during adolescence: Relationship with pubertal status. Eur Respir J. 2002;20:1292–8.

14. Bo, M., Salizzoni, P., Clerico, M., & Buccolieri. Assessment of indoor-outdoor particulate matter air pollution: A review. Atmosphere. 2017;8(136):1-18.

15. Zwoździak A, Sówka I, Worobiec A, Zwoździak J, Nych A. The contribution of outdoor particulate matter (PM1, PM2.5, PM10) to school indoor environment. Indoor Built Environ. 2015 Dec;24(8):1038–1047.

16. Rojas-Martinez R, et al. Lung function growth in children with long-term exposure to air pollutants in Mexico City. Am J Respir Crit Care Med. 2007;176(4):377–84.

17. National Research Council. Risk assessment in the federal government: Managing the process. National Academic Press. Washington D.C: The National Academies Press; 1983.

18. US-EPA. Framework for Human Health Risk Assessment to Inform Decision Making. 2014;76. https://www.epa.gov/sites/production/files/2014-12/documents/hhra-framework-final-2014.pdf

19. U.S. EPA. Exposure Factors Handbook: 2011 Edition. Washington DC. National Center for Environmental Assessment. 2011 Sept.

20. Madureira J, et al. Source apportionment of CO2, PM10 and VOCs levels and health risk assessment in naturally ventilated primary schools in Porto, Portugal. Building and Environment. 2016 Feb 01;196:198–205.

21. Fromme H, et al. Particulate matter in the indoor air of classrooms-exploratory results from Munich and surrounding area. Atmospheric Environment. 2007 Feb:41(4):854-866.

22. Wang J, Ogawa S. Effects of Meteorological Conditions on PM2.5 Concentrations in Nagasaki, Japan. Int. J. Environ. Res. Public Health. 2015 Aug 03:12: 9089-9101.

23. Chuersuwan N, Nimrat S, Lekphet S, Kerdkumrai T. Levels and major sources https://doi.org/10.1016/j.envint.2007.12.018

24. Pope CA, et al. Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. JAMA. 2002 Mar 06;287(9):1132–1141.

25. World Health Organization. WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide: global update 2005. WHO Regional Office for Europe. Copenhagen; 2006.1–496 p. http://whqlibdoc.who.int/hq/2006/WHO_SDE_PHE_OEH_06.02_eng.pdf?ua=1

26. Wei, X., Gao, B., Wang, P., Zhou, H., & Lu, J. Pollution characteristics and health risk assessment of heavy metals in street dusts from different functional areas in Beijing, China. Ecotoxicology and Environmental Safety. 201;112:186–192.

Analysis of Typhoid Fever Clinical Pathway Implementation in the Era of National Health Insurance in Indonesia

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ABSTRACT

Starting in November 2016, pricing policy for private hospital in Indonesia was specifically set in a fixed tariff called INA-CBGs (*Indonesian Case Base Groups*). PMI Hospital which was affected by INA-CBGs regulation built Clinical Pathway for Typhoid fever in order to cope with the challenge. It admitted 705 cases in less than a year in 2016 yet it was claimed that the reimbursement for each case was still lower than the hospital cost. Study aimed to explore variation of medical practices based on Clinical Pathway considering INA-CBGs 2016 pricing policy. Cases included in the study were 156 cases with homogenous severity level chosen from October 2016 to March 2017. Historical data was taken from hospital information system including medical record and billing details. Data was processed using ClinPath V.2.0 tools developed by Faculty of Public Health Universitas Indonesia resulting in distribution of variation. Variation resulted in Length of Stay was (4.27 days) and it was expected to be 4-5 days in clinical pathway while not all patients utilized the same procedure within one period of care. There were also non-value added diagnosis such as Complete Urine (0.01) and Electrolyte test (0.01) included. Consumption of antibiotic (0.28) which consisted of 25 different trade names from different structures resulted in various tariff of services. Variation drives medical cost resulted in tariff increment. Typhidot test can be taken into consideration and the use of later generation of antibiotics are recommended considering affordability and availability.

Keywords: *Clinical Pathway, Medical Practice, Compliance, Typhoid Fever, Variation*

Introduction

Shifting system from fee for services to Case Base Groups had given new insight for hospitals to be more efficient in spending their resources without putting aside their service quality[1]. Started in 2016, tariff for private hospital for each case group was set in fixed amount and was prospectively reimbursed by BPJS (Independent pooling organization for national health insurance)[2]. PMI (Indonesian Red Cross) Hospital is a type B private hospital with 264 beds as a referral hospital for inpatient care in local area[3]. During the enactment of INA-CBGs 2016 pricing policy, hospital claimed that reimbursement offered by BPJS (third party payer) was quite lower than the cost made by the hospital.

Typhoid fever frequently happened in Bogor area (where PMI hospital is located). In 2016, there were 18.797 cases of Typhoid fever in Bogor and it was distributed among various age groups[4]. It was recorded that Typhoid fever cases in PMI hospital alone was 705 admissions in less than a year[3]. Those numbers showed that PMI hospital had both the opportunity as well as the challenge to manage its resources in a more efficient way. In order to answer the challenge, PMI hospital has established their own Clinical Pathway for Typhoid fever. Length of Stay for homogenous cases of Typhoid fever were found to be 1 up to 6 days. Studies in several countries showed that prospective payment system (e.g. INA-CBGs) would affect Length of Stay, type of services and consequently the medical cost[5–8]. Implementation of INA-CBGs pricing policy supported with clinical pathway was expected to reduce non-value added activities yet variation still existed. Thus, a more in depth analysis needed to be conducted to elaborate which medical practices induced more variation to the service.

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Method

This study took place at PMI Hospital located in Bogor, West Java. This study used quantitative approach to identify variation in medical practices and was elaborated using descriptive statistics. Distribution of patients' characteristics included age, sex, payment methods (JKN/National Health Insurance, Private Insurance, Out of Pocket), and inpatient accommodation (class I, II, III, VIP, VVIP). Data for identifying Length of Stay were also taken from the duration between admissions to the discharge date. Data taken from medical record was then recapitulated and digitized by medical record unit. Another set of data were taken from billing unit, for example billing details. Medical and medical supporting services details were then classified as Laboratory, Consultation, Doctor Visits, and Procedure. Drugs were also classified using ISO (*Informasi Spesialite Obat*) for its therapeutic functions. Fragmented data were connected using registration number. Data selection resulted in 156 homogenous cases with the same severity level (without any complication and comorbidity). Data was processed using a public domain software ClinPath V.2.0 built by Universitas Indonesia. Variation showed in LOS, Average utilization of medical and medical supporting services, and various medical consumption of drugs, and average tariff for services then be compared to hospital clinical pathway.

Results

Since its initial implementation, Typhoid fever clinical pathway has not been evaluated. According to the hospital internal consensus, Length of Stay (LOS) for Typhoid fever was 4-5 days and patients were planned to be discharged with doctors' approval. Several medical activities e.g. anamnesis, physical assessment, diagnostic examinations, procedures, monitoring up to discharge planning were supposed to be conducted within LOS.

Average Length of Stay for homogenous cases was 4.27 days with maximum stays up to 6 days and the least stays were 3 days. Vast majority of patients paid services using Indonesian National Health Insurance/ JKN (74 patients), 37 patients paid out of pocket, and 19 patients paid via Private Health Insurance, they were mostly workers and were insured by the companies' third party payers e.g Admedika, Inhealth, Antam, Sinar Mas, Sampoerna. Five patients were discharged against advice and the rest of 151 patients were discharged with doctor's approvals. Hospitals provided patients with their accommodation of choice. Fifty three patients chose to utilize class I, 27 patients chose class II, 34 patients chose VIP class, and lastly 19 patients preferred VVIP class (See Table 1). Various medical services were used in treating patients with Typhoid fever. Doctor visits were given 4 times (once per day) in clinical pathway while only 0.39 of the services was practically performed by the Internists during the stays. Average tariff of doctor visits was IDR 94.739. The data shows that average utilization of consultation was 0.02 and average tariff for each consultation was IDR 79,839. Complete blood test was utilized 0.06 times (IDR 78,537).

Table 1: Characteristics of Patients with Typhoid Fever

Items	Cases
Number of Cases (N)	156
LOS (Days)	
ALOS	4.27
Minimum	3
Maximum	6
Age (Years of Age)	
Average	24
Minimum	1
Maximum	82
Sex (%)	
Male	45.51
Female	54.49
Payment Methods (N)	
JKN	74
Private Insurance	19
Out of Pocket	37
Hospital Staff	1
Other	25
Discharge Status (N)	
With Approval	151
Against Advice	5
Type of Accommodation	
I	53
II	27
III	34
VIP	23
VVIP	19

Complete urine test (0.01) and Electrolyte (0.01) tests were also conducted and average tariff for both services were each IDR 45,969 and IDR 319,000. Medical Procedures e.g. Crystalloid IVFD average utilization was 0.04 while it must be done every day (4 times during stays), each service was worth IDR 161,333. Nursing care was given with average utilization of 0.39 (4 times in clinical pathway). Nursing care included monitoring body temperature, nutrition intake, and personal hygiene. The service average tariff was IDR 56,669. Tariff for Injection was IDR 49,493 and was given 0.37 times during 1 period of care (See Table 2).

Table 2: Average Utilization in Medical and Medical Supporting Services

Items	Clinical Pathway	Clinical Practice	Hospital Tariff (IDR)
Visits by Specialist	4	0.39	94,739
Consultation	-	0.02	79,839
Diagnostic Examination			
Complete Blood Test	1	0.06	78,573
Widal/tubex	1	-	-
IgM Salmonella	-	0.02	251,304
SGOT	-	0.02	48,000
SGPT	-	0.02	47,677
Complete Urine Test	-	0.01	45,969
Electrolyte (Na, K, Cl)	-	0.01	319,000
Medical Procedure			
Crystalloid IVFD	4	0.04	161,333
Oxygen	*4	-	-
Electrocardiogram	-	0.01	57,955
Nursing Care	4	0.39	56,669
Injection	-	0.37	49,493

Note: (*) Not necessarily mandatory. Tariff was counted using 2016 value of money (1 USD=IDR 13,519)

Recommended antibiotics in hospital clinical pathway were mostly broad spectrum (Quinolone and Cephalosporin) (see Table 3) although, these were not used in medical practices. Hospital also suggested using Proton Pump Inhibitor (PPI) and practically used was Omeprazole with different types of brands (0.30).

Table 3: Average Consumption of Drugs Based on Clinical pathway

Drugs	Clinical Pathway	Clinical Practice
During stays		
Quinolone	+	-
Cephalosporin	+	-
PPI	+	+
Discharge Planning		
Chloramphenicol Oral	+	-
Cephalosporin Oral	+	-
PPI	+	+

Note: + Drugs recommended by hospital CP or utilized in clinical practice, - not utilized in clinical practice

Drugs used for discharge planning were consumed starting on the last day of stays up to consecutive days after discharge (See Table 3). Variation included antibiotics classified not only in quinolone (with 4 variation in trade names) and cephalosporin (25 different trade names), but also from other lines and generations.

Table 4: Average Consumption of Drugs

Drugs Therapeutic Classification	Clinical Pathway	Medical Practice
Adsorbents	-	0.33
Analgesic	-	1.11
Analgesic Opioid	-	0.03
Anti-Dysrhythmia	-	0.01
Anti-Histamine	-	0.74
Anti-Hypertensive	-	0.05
Anti-Inflammatory	-	0.30
Anti-Platelet	-	0.01
Anti-Spasmodic	-	0.07
Antibiotic	-	0.72
Antibiotic (Skin & respiratory Infection)	-	0.49
Antiemetic	-	0.80
Antipyretic	-	0.06
Antithyroid	-	0.32
Bronchodilator	-	0.19
Digestive system	-	0.14
Laxative	-	0.01
Probiotic	-	0.53
Vitamin	-	0.06

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Anti-Depressant	-	0.13
Vasoconstrictor	-	0.05
Adenoreceptor	-	0.08
Relaxant	-	0.03
Diuretic	-	0.02
Vasodilator	-	0.03
Decongestant	-	0.01
Anti-Diabetic	-	0.01
Compounding Medicine	-	<0.01

Several drugs were also given to the patients with typhoid fever e.g. Adsorbent classified drugs (0.33 tablet). There were also two kinds of painkiller used in practice, Analgesic (1.11) and Opioid Compound (0.03). Anti-Hypertensive e.g. Amlodipine (0.05), Anti-Inflammatory such as Triamcolone and Dexamethasone (0,3 tablet), Anti-Platelet in the form of Clopidogrel (0.01), Anti-Spasmodic as in Otilonium Bromide and Hyoscine Butylbromide (0.07). Other therapeutic drugs were also consumed as shown (See Table 4).

Discussion

Typhoid fever can be detected by using microbiological procedure, serological procedure and other examination e.g. PCR test[9]. PMI Hospital suggested widal test for diagnosing Typhoid fever on the first day of patient's admission. This test only results on moderate sensitivity and specificity and can only be done on day 6-12 for specific antibody O or H and might show negative result up to 30.0% of proven culture[10]. Typhidot IgM however has 75.0% of sensitivity and 60.7% of specificity which made it more accurate in diagnosing Typhoid fever than widal test did[11]. Average tariff for Typhidot IgM in PMI Hospital was IDR 251.304, higher than the tariff for Widal test in hospitals in the nearby area, which were IDR 55.000 for private hospital and IDR 52.000 for public regional hospital[12,13]. Despite the higher tariff for Typhidot IgM test, hospital took the test accuracy into consideration.

Diagnosis tests out of hospital clinical pathway e.g. SGOT/ SGPT became ineffective because patients with Typhoid fever subsequently experienced clinical sign in which their level of enzymes increased due to endotoxicity, immune mechanism, and the consumption of drugs[9]. Complete urine test is commonly used to detect excessive substances in blood excreted in the urine and infection related to urinary tract infections[14–16] *Salmonella typhi* can be detected through urine culture for its Vi antigen and be best detected using PCR method without any bacteriological changes interference[17,18]. Nonetheless, high tariff for PCR test was still one of the considerations.

Mostly used quinolone was Levofloxacin 500 mg (IDR 1,500) because it was more affordable than other quinolone such as Levofloxacin IV Fluids (IDR 105,600) or Lexa IV fluids 750 mg (IDR 422,400). Ciprofloxacin used by hospital had the lowest tariff (IDR 867) known for more severe adverse effect including nausea, nerve damage, and further myasthenia gravis[19]. Clinical Pathway recommended patients with Typhoid fever to be given antibiotic per day of stay. However, average consumption of 25 different Cephalosporin (antibiotics) varied. Average tariff also varied from IDR 1,573 up to IDR 369,930. Frequently consumed antibiotics was 1 gm of Ceftriaxone given via injection (IDR 18,700). Each gram of Ceftriaxone injection can be used for both adult or pediatric patients[9]. As study resulted that the youngest patient suffered from Typhoid fever was a 1-year-old and the oldest was a 82-year-old. Ceftriaxone is also more active against gram negative bacteria and less active against positive bacteria[20]. Thus, ceftriaxone was mostly used (average utilization 4.61) to treat patients with Typhoid rather than other Cephalosporin drugs. However, Ciprofloxacin (belongs to Fluoroquinolone) had higher rate of Salmonella infection eradication than Chloramphenicol (90% compared to 89%)[21].

Consumption of PPI drugs was not necessarily needed unless there were adverse effect e.g. intestinal injury of a non-steroidal anti-inflammatory drugs (NSAIDs)[20]. On that account, average consumption of PPI drugs was only 0.30. Other therapeutic drugs namely Adsorbent containing Loperamide HCL (0.33) was used to control acute non-specific diarrhea associated with inflammatory bowel disease which often happens to patient with Typhoid. There were 3 types of laxatives used which worked differently. Dulcolax containing bisacodyl (average utilization 0.02) works in stimulating mucosal sensory nerves, consequently increasing peristaltic contraction of colon[20]. Mycrolax cointaining Sucrose (average utilization 0.02) works in creating bulk and increasing amount of water in the system, and Lactulax, a non-absorbable sugar/disaccharide (0.01)

used to treat constipation by pulling water out into colon also to reduce ammonia in blood to treat liver disease[20]. Lactulax was the most expensive laxative (IDR 125,400) among the other two Mycrolax (IDR 24,063) and Dulcolax (1,580).

Commonly used analgesic was paracetamol (7,42) with average tariff (IDR 205) per tablet. It was used to reduce temperature which followed Salmonella infection. Anti-inflammatory was also used in 17 different trade names. The most consumed Anti-inflammatory was Triamcolone (0.78) which worked by suppressing inflammation due to enteric infection. Antiemetic was also consumed by patients with Typhoid fever. There were 14 trade names consisted of mostly Ondansentron worked by blocking serotonin receptor resulting in suppression of nausea and vomiting[22]. Other drugs which has no direct effect to Typhoid fever treatment were also given to patient.

Conclusion

Variation persistently happened despite the enactment of INA-CBGs 2016 Pricing Policy. Variation happened in medical supporting service (laboratory). Typhidot was the most proper test used to support Typhoid fever diagnosis in patients considering affordable tariff and availability of resources. Consumption of both various kind of therapeutic drugs and trade names including various antibiotics and other unnecessary drugs such as anti-depressant, Bronchodilator, Vasodilator, etc. was considered a non-value added activity. These induced additional costs which resulted in tariff increment. Hospital might suffer financial loss due to disproportionate fixed reimbursement set in INA-CBGS 2016 Pricing Policy. This can be averted by regularly evaluating clinical pathway based on medical practice and increase professionals' concordance in delivering services for typhoid fever.

Acknowledgement

The authors acknowledge both Faculty of Public Health and Directorate of Research and Community Engagement Universitas Indonesia for supporting the study and publication processes.

Conflict of Interest: The authors state that there are no conflict of interests included in the study.

Source of Funding: Study was funded by Directorate of Research and Community Empowerment Universitas Indonesia (DRPM UI) through International Indexed Publication and Students' Thesis Grant (Hibah PITTA 2018) on 2180/UN2.R3.1/HKP.05.00/2018 agreement number.

Ethical Clearance: This research has already passed ethical clearance done by Faculty of Public Health Universitas Indonesia Ethical Committee with reference number 671/UNF.F10/PPM.00.02/2018.

REFERENCES

1. Ministry of Health. *Ministry of Health Regulation No. 59 /2014 Tentang Standar Tarif Pelayanan Kesehatan Dalam Penyelenggaraan Program Jaminan Kesehatan*.; 2014.
2. Ministry of Health. Ministry of Health Regulation No. 64/2016 Tentang Perubahan Atas Peraturan Menteri Kesehatan Nomor 52 Tahun 2016 Tentang Standar Tarif Pelayanan Kesehatan Dalam Penyelenggaraan Program Jaminan Kesehatan. 2016:1096.
3. Medical Record PMI Hospital. *Typhoid Fever*. (2018).
4. Regional Health Office. *Annual Report of Regional Health Offices*. Bogor; 2015.
5. Nurwahyuni A, Sjaaf AC, Hapsari WP, Nugraha RR. Compliance with Clinical Pathway for Cesarean Section Before and After the Implementation of JKN in Hospital X. 2018;2018:29-40. doi:10.18502/kls.v4i9.3555
6. Loustalot F. Variation in Hospital Inpatient Charges by Payer in Houstin, Texas. *Arbor Cienc Pensam Y Cult*. 2006;6. doi:10.16953/deusbed.74839
7. Peters KE. A National Study of the Effects of Providers and Users on Length of Stay in Home Health Care : A Multilevel Approach. *Résumé thesis*. 2003. doi:10.16953/deusbed.74839
8. Vancura KK. Hospital Laboratory Testing Influenced by Prospective Payment System. 2017. doi:ProQuest Number : 10656116
9. Ministry of Health. Ministry of Health Decree No. 364/ 2006 ttg Pedoman Pengendalian Demam

Tifoid_2.pdf. *Minist Heal decree No 364/2006 tentang Pedoman Pengendali Demam Tifoid*. 2006:41.

10. WHO. Background document : The diagnosis, treatment and prevention of typhoid fever. *Commun Dis Surveill Response Vaccines Biol*. 2003:2-48. www.who.int/vaccines-documents/.
11. Keddy K, Sooka A, Letsoalo M, et al. Sensitivity and specificity of typhoid fever rapid antibody tests for laboratory diagnosis at two sub-Saharan African sites. *Bull World Health Organ*. 2011;89(9):640-647. doi:10.2471/BLT.11.087627
12. Afiah Clinic. Servises & Tariff : Widal. http://klinikafiah.co.id/tarif-laboratorium/. Published 2018. Accessed March 17, 2019.
13. Local Government Regulation. Perda Bogor No. 8 Tahun 2014 Seri C Nomor 1. 2014:0-93.
14. Simerville JA, Maxted WC, Pahira JJ. Urinalysis: A comprehensive review. *Am Fam Physician*. 2005;71(6):1153-1162. doi:10.1097/PEC.0b013e318235e950
15. U.S. National library of Medicine. Urinalysis. https://medlineplus.gov/urinalysis.html24. Published 2016. Accessed August 24, 2018.
16. University of Utah. Urinalysis. WebPath : The Internet Pathology Laboratory for Medical Education. https://library.med.utah.edu/WebPath/TUTORIAL/URINE/URINE.html. Published 2018. Accessed August 24, 2018.
17. Wain J, House D, Zafar A, et al. Vi Antigen Expression in Salmonella enterica Serovar Typhi Clinical Isolates from Pakistan. *Society*. 2005;43(3):1158-1165. doi:10.1128/JCM.43.3.1158
18. wasihun AG, Wlekidan LN, Gebremariam SA, et al. Diagnosis and Treatment of Typhoid Fever and Associated Prevailing Drug Resistance in Northern Ethiopia. *Int J Infect Dis*. 2015;35:e96-e102. doi:10.1016/j.ijid.2015.04.014
19. US National Library of Medicine. Ciprofloxacin. https://medlineplus.gov/druginfo/meds/a688016.html. Published 2018. Accessed August 25, 2018.
20. US National Library of Medicine. Ceftriaxone. https://pubchem.ncbi.nlm.nih.gov/compound/5479530#section=Top. Published 2018. Accessed August 27, 2018.
21. Liberti A, Loiacono L. Ciprofloxacin versus chloramphenicol in the treatment of salmonella infection. *Int J Antimicrob Agents*. 2000;16(3):347-348. doi:10.1016/S0924-8579(00)00262-4
22. Medicine UNLof. ONDANSETRON-ondansetron tablet, orally disintegrating. https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=81366c85-c6c9-4a9a-9fe5-cdd8c2d19f74. Published 2018. Accessed August 27, 2018.

Analysis of Primary Health-Care Resource Preparedness for Implementation of Maternal HIV Screening in Indonesia's Urban Areas

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ABSTRACT

The Indonesian goverment's minimum service standard (MSS) indicator stipulates that 100% of pregnant women in the country must undergo HIV checks. in 2017, however only 7% of pregnant women underwent such checks. The same condition applies to Depok City, where in 2016 only 3.6% of pregnant women were screened. Because 86.6% antenatal examinations are done within primary-care facilities, this study has to analyzed the preparedness of primary health-care resources in the implementation of HIV screening for pregnant women.The research used qualitative method with in-depth interview, FGD and document review. The Study found that human resource workers trained in HIV programs were not available at every Public Health Center (PHC) and private primary health-care (PPHC) had no such workers were trained on HIV. Roughly half (17 of 35) of PHCs Primary health care capable of HIV screening for maternal. No PPHC facilities especially inpendent midwife practice had such capabilities The number of reagents was found to be inadequate at the PHCs, and no reagents at all were found at prprivate care facilities. Counselling media was found to be lacking at both types of primary care facilities. Conclusion the implementation of HIV screening in primary health care facilities is not yet ready according to the MSS. Regulations that require PPHC facilities to be capable of HIV screening and government support for the availability of resources (especially training and reagents) are require for the achievement of the MSS.

Keywords: *HIV screening, minimum service standards, urban areas, Indonesia*

Introduction

HIV screening for pregnant women is an important strategy for the prevention of mother-to-child transmission of HIV and is mandatory in areas with widespread and concentrated HIV epidemic status[1.] Pregnant women in particular should be screened because more than 90% of pediatric HIV cases are occur through vertical infection[2,3,4]. Globally, the numbers of HIV-infected women continue to increase.The same situation applies to Indonesia, where 2,573 women had HIV in 2015 and by 2016 that numbered had increased to 15,151 women (36% of total HIV cases)[5,6]. The Indonesian goverment has thus established a minimum service standard (MSS) that recognize pregnant women as a high risk population for contracting HIV. Under the MSS, 100% of pregnant women should under go standardized HIV testing including screening[7,8].

In terms of coverage of pregnant women screened for HIV in Indonesia only 570,424 (7%) of pregnant women were screened during from antenatal visits which were conducted on a total 5,355,710 pregnant women[9]. The same condition applies to Depok City, an urban area, where the coverage of HIV testing for pregnant women in 2016 was only 1,839 pregnant women(3.98%) from coverage of K1(first visit) antenatal visit of 46,201 and K4 (4th visit) of 43,924[10,11]. These figures indicates a missed opportunity, since HIV-positive pregnant women are likely unaware of their status, despite having visited health services. Because of the large numbers of pregnant women in Indonesia, the need for HIV screening is considerable.

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A 2016 data survey of the national health indicator states that 86.6% antenatal examination performed at primary care consisting of Public Health Centers (PHCs) and their related networks, private clinics and independent practice midwives. Specifically, 40.2% of these exams were carried out by independent practice midwives and 82.4% of the antenatal health workforce consisted by midwives[12]. This condition shows that primary health care facilities are still the main service in the provision of antenatal examinations.

The inclusion of HIV screening for pregnant women in MSS indicator of HIV health care service and antenatal care providers mostly done in primary health care as well as thedemand for such facilities is higher than the supply which add to the Indonesian government's obligation to allocate necessary resources to support the implementation of screening programs. Researchers thus should analyze the preparedness of primary health-care resources in the implementation of maternal HIV screening in Indonesia.

Method

The study used a qualitative method, with in-depth interviews, focus group discussion with semi structured interviews and document review. A total of 43 informants participated in the study including policy-makers, activity implementers and beneficiaries. The research was conducted from November 2017 to January 2018.

Results

Human Resources: The human resources required for the implementation of HIV screening are include health-care workers who have competencies in accordance with their profession and have been trained in HIV/AIDS programs [7].

PHCs, the primary-care of the government, have a fewer number of trained HIV/AIDS workers than the total number of health personnel available, as shown in table 1 as follows:

Table 1: Trained health-care personnel on HIV in PHCs in Depok City 2017

Personnel Type	Total	Trained	%
Doctors	134	26	19.4
Nurses	146	12	8.21
Midwives	182	28	15.3
Laboratory analysts	36	10	27.8
Recording and Reporting staff (RR)		9	

Source: P3M section, 2017, processed data

Trained personnel is not yet available in all PHC Among 35 PHCs, only 30 PHC have counselors (includings doctors, nurses and midwives), ten have trained laboratory analysts and nine PHCs have specialized recording and reporting (RR) personnel. Because of the low number of workers executing (RR) personnel, the RR process is mostly done by counselors who obtain on- the -job training from the Health Office. The low numbers of trained health personnel, the heavy workloads of these personnel and the process of transferring trained personnel who does not match the needs of the program have affected the poor coverage of pregnant women to be screened for HIV and have also become an obstacle to the availability of human resources in the PHCs. As one informant noted,

> *-----only a few human resources are trained, and they also have other duties, so if these workers aren't available then, the HIV screening for pregnant women gets postponed---* (KPKM-1)

In addition, human resources workers who are trained in private primary health-care (PPHC) facilities esspecially independet midwife practice, are not yet available. This condition has occured because of to the lack of specific training for private service workers even through 82.4% of antenatal examination conducted by midwives and 40,2% are done in independent practice midwives, only about 27.1% of such examinations are done in PHCs[12].

Facilities: Facilities for the implementation of HIV screening include health-care facilities, reagents and media counseling.

Only 17 PHCs were found to be capable of providing comprehensive HIV screening to pregnant women in 2017. Even though trained human resources workers were distributed in 30 PHCs, this situation may have arisen because reagents and human resources who are capable of performing laboratory sample examination were only available at 17 PHCs.

These 17 PHCs thar were able to perform HIV screening faced several obstacles only 13 PHCs that had trained analysts, HIV screening services were only offerd on limited days and waiting times were too long. The limited service hours and long waiting times made pregnant women reluctant to be referred to PHCs for HIV screening. As one informant noted,

---- Pregnant women whoare checked for HIV here are often lazy about being referred to PHC for VCT (voluntary counseling abd testing) because it's far away, waiting times are long,they might be too lazy tostand in line and they.re only available in the morning while they're working--- "(BPM-1)

PPHC facilities capable of HIV screening for pregnant women do not yet exist for various reasons: the goverment's socialization of service is mot yet, trained personnel are not yet available and the government is still focused on the availability of services at the PHCs.

The supply of reagents is essential for the implementation of HIV screening for pregnant women. for PHC is obtained from The central and regional governments determine the need for reagents for PHCs based on the planning needs proposed by PHCs through The Health Office. But the goverment's provision of reagents remains focused on the needs of PHCs, so the number of reagents the government provides has not matched the estimates of total pregnant women because only 27.1% of pregnant women have had their antenatal visits at the PHCs [12]. One constraint among several is that the reagents PHC receive are often approaching their expiration datebecause of delays in the delivery of reagents from the central government as well as technical constraints in the process of procuring of reagents at the central and regional levels.

Another important factor in the process of disseminating information about HIV screening for pregnant women is the availability of counseling media at both PHCs and PPHC facilities is still lack where special counseling media on the prevention of mother-to-child HIV transmission is generally unavailable.

Discussion

Both human resources and facilities, are important in the implementation of the goverment's policy, the limitations of both will hamper will hamper the successfull implementation[13,14].

The low numbers of trained health personnel in PHCs and in the private sector, especially the midwives, have affected the implementation of the program. The aim of Education and training for health personnel is to improve compliance in implementation and supplement the skills of health workers in providing counseling about HIV infection and give workers the ability to handle medical care effectively[15]. The lack of trained health personnel and health worker's heavy workloads, both affect the utilization of VCT services[16]. Thus, increasing the numbers of health workers who are engaged in this field will also increase the number of pregnant women who undergo HIV screening. Research indicates that the existence of trained health workers,esspecially doctors, who are able to provide counseling,influences affect pregnant women's willingness to undergo HIV screening [171819].

The National Health Indicator's 2016 data survey found that 84% of personnel who provided antenatal care were midwives and 40.2% of these independent practice midwives only 27.1% of such examinations were performed in PHCs[12]. This finding indicates that increased coverage of pregnant women who undergo HIV screening will require the involvement of health personnel in both public and private sectors and midwives should be the priority target for such training. Cooperation with professional organizations in socializing programs and training will be required in order to increase the active participation of private healthcare personnels.

In terms of facilities, the main factors to affect the implementation are the lack of PPHC facilities that can conduct comprehensive HIV screening and the limited capacity of PHCs. research suggests that the unavailability of both human resources and facilities and long waiting times at service sites are obstacles to HIV screening during pregnancy [202122].

The absence of PPHC facilities that are capable of screening pregnant women for HIV strongly affects the coverage of screening because it is difficult to reach all pregnant women. For example PHCs are provide only 27.1% of services, while private health care provide the remainder. 40.5% of antenatal visits are done by independent practice midwives. PPHC facilities must be involved, including in the provision of reagents for private services. The integration of HIV services with health-care services in general, both in the public and private sectors, is needed to achieve the objectives of the implementation, such integration is is a necessary for more effective and efficient service [2324].

Counseling media on HIV screening for pregnant women is still lacking both in government and PPHC

facilities. The media that can be used for information, education, and communication include *Mother and Child Health* (MCH) book and social media because every pregnant woman is required to have an MCH book. The use of social media as a bridge to disseminate information about HIV screening for pregnant women can increase public knowledge of the importance of this program which will ultimately reduces stigmas and increase the scope of screening itself [25].

Conclucions

Primary health-care resources that can conduct HIV screening of pregnant women according to MSS are not yet available. Insufficient numbers of human resources workers have been trained for such screenings in public primary health-care facilities, (in this case is the PHCs), and no trained human resources workers yet exists in PPHC facilities esspecially midwives. Only 17 PHCs are able to conduct HIV screening for pregnant women and no PPHC facilities currently have this ability. The numbers of reagents for HIV screening have not yet been adjusted tomatch the estimated needs of pregnant women because the avaibility of reagnets is still tied to the needs of the PHCs. Different counseling media in both public and private primary health-care facilities are still lacking.

HIV screening for pregnant women is part of the MSS which assesses the performance of local governments, so that the central government can provide resources to both private and public primary health-care fascilities. For the MSS to be properli implemented HIV services must be integrated into other health systems, regulations that must require primary health-care workers to be able to perform HIV screening for pregnant women and the government must commit to providing the necessary resources including training and reagents.

Acknowledgement

The Authors would like to acknowledge faculty op public health Universitas Indonesia and Depok City public health office for their support

Conflict of Interst: The authors declare that they is no conflict interests.

Ethical Clearance: The study received approved by the Ethics Assessment Team of the Faculty of Public Health of Universitas Indonesia based on Letter No. 565/UN2. F10/PPM.00.02/2017 dated November 6, 2017.

Source of Funding: This study was sponsorred by Universitas Indonesia through Indexed International Publication for Student's Final Project Funding

REFERENCES

1. Eline, LM * SH, Weert1 YW van, Oomen1 P, et al. Antenatal screening for HIV, hepatitis B and syphilis in the Netherlands is effective. *BMC Infect Dis*. 2011;11:185. doi:10.1186/1471-2334-11-185
2. Kak L, Chitsike I, Luo C, Rollins N. Opportunities for Africa's Newborns 113 Prevention of mother-to-child transmission of HIV/AIDS programmes III. 2005. http://www.who.int/pmnch/media/publications/aonsectionIII_7.pdf. Accessed September 14, 2017.
3. Chou R, Cantor A, Bougatsos C, Zakher B. *Screening for HIV in Pregnant Women: Systematic Review to Update the U.S. Preventive Services Task Force Recommendation*. Agency for Healthcare Research and Quality (US); 2012. http://www.ncbi.nlm.nih.gov/pubmed/23256219. Accessed September 14, 2017.
4. Lindsay L keenan. No. 185-HIV Screening in Pregnancy. *J Obstet Gynaecol Canada*. 2017;39(7):e54-e58. doi:10.1016/J.JOGC.2017.04.009
5. WHO. WHO | Number of women living with HIV. *WHO*. 2016. http://www.who.int/gho/hiv/epidemic_status/cases_adults_women_children/en/. Accessed August 21, 2017.
6. Subdit HIV, AIDS&PIMS IM of H. Analyze situation and Indicators of HIV and STI Program, 2017. 2017.
7. Indonesian Ministry of Health. *Minister of Health Regulation No. 43 Year 2016 on Minimum Service Standards for Health*.; 2016. http://hukor.kemkes.go.id/uploads/produk_hukum/PMK_No._43_ttg_Standar_Pelayanan_Minimal_Bidang_Kesehatan_.pdf. Accessed August 14, 2017.
8. *Government Regulation No. 2 of 2018 on Minimum Service Standards*.; 2018. http://ditjenpp.kemenkumham.go.id/arsip/ln/2018/pp2-2018bt.pdf. Accessed April 12, 2018.

9. Didik Budijanto drh, Hardhana B, Yudianto M, et al. Indonesia Health Profile 2016. *Yoeyoen Aryantin Indrayani SDs; B B Sigit; Sinin*. 2017. http://www.depkes.go.id/resources/download/pusdatin/lain-lain/Data dan Informasi Kesehatan Profil Kesehatan Indonesia 2016 - smaller size - web.pdf. Accessed December 18, 2017.

10. P2M DCHO. *Analyze Situation of HIV/AIDS Programme at Depok City Year 2017*.; 2017.

11. Depok City Health Office. *Depok City Health Profile 2017*. Depok; 2017. www.dinkes.depok.go.id. Accessed August 6, 2017.

12. Balitbangkes IM of H. *Principles of National Health Indicator Survey Results (SIRKESNAS)*.; 2016.

13. Winarno B. *Public Policy: Theory and Process*. 1st ed. Yogyakarta: Media Pressindo.; 2007.

14. Agustino L. *Basics of Public Policy*. Bandung: Alfabeta; 2006.

15. Hardy LM. *HIV Screening of Pregnant Women and Newborns*. (Committee on Prenatal and Newborn Screening for HIV Infection IOM, ed.). Institute of Medicine; 1991. http://www.nap.edu/catalog/1746/hiv-screening-of-pregnant-women-and-newborns.

16. Obermeyer CM, Osborn M. The utilization of testing and counseling for HIV: A review of the social and behavioral evidence. *Am J Public Health*. 2007;97(10):1762-1774. doi:10.2105/AJPH.2006.096263

17. Youngleson MS, Nkurunziza P, Jennings K, et al. Improving a Mother to Child HIV Transmission Programme through Health System Redesign: Quality Improvement, Protocol Adjustment and Resource Addition. *PLoS One*. 2010;5(11). doi:10.1371/journal.pone.0013891

18. Elsheikh IE, Crutzen R, Van den Borne HW. Perceptions of Sudanese women of reproductive age toward HIV/AIDS and services for Prevention of Mother-to-Child Transmission of HIV. *BMC Public Health*. 2015;15:674. doi:10.1186/s12889-015-2054-1

19. Anugwom E, Anugwom K. Socio-cultural Factors in the Access of Women to HIV/AIDS Prevention and Treatment Services in South-southern Nigeria. *Iran J Public Health*. 2016;45(6):754-760. http://www.ncbi.nlm.nih.gov/pubmed/27648418%5Cnhttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5026830.

20. Rogers AJ, Weke E, Kwena Z, et al. Implementation of repeat HIV testing during pregnancy in Kenya: a qualitative study. 2016. doi:10.1186/s12884-016-0936-6

21. Kwapong GD, Boateng D, Agyei-Baffour P, Addy E a. Health service barriers to HIV testing and counseling among pregnant women attending Antenatal Clinic; a cross-sectional study. *BMC Health Serv Res*. 2014;14(1):267. doi:10.1186/1472-6963-14-267 [doi]

22. Edwards III CG, Shaharkansy I. *The Policy Predicarment : Making and Implementing Public Policy*.; 1980.

23. Unger J-P, De Paepe P, Green A. A code of best practice for disease control programmes to avoid damaging health care services in developing countries. *Int J Health Plann Manage*. 2003;18(S1):S27-S39. doi:10.1002/hpm.723

24. Bcheraoui C El, Zúñiga-Brenes P, Ríos-Zertuche D, et al. Health system strategies to increase HIV screening among pregnant women in Mesoamerica. *Bio Med Cent*. 2018. doi:10.1186/s12963-018-0162-8

25. Taggart T, Grewe ME, Conserve DF, Gliwa C, Roman Isler M. Social Media and HIV: A Systematic Review of Uses of Social Media in HIV Communication. *J Med Internet Res*. 2015;17(11):e248. doi:10.2196/jmir.4387

Getting Married to a Suspected Bisexual Man: A Silent Mode of HIV transmission among Married Women in Indonesia

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ABSTRACT

A married woman is susceptible to contract HIV from her husband if he practices unsafe sex, especially with other men. Unsafe sexual practice (heterosexual and homosexual sex) are the major factors of significant increase of HIV in Indonesia for the last decade. The aim of this study is to reveal one woman's story about living with HIV. She contracted from her husband after he was unsafe sex with men.

Feminist Participatory Action Research was conducted in 2017 with HIV positive women, health workers from public and private organisations. Qualitative research methods were used in line with purposive sampling method and thematic analysis.

Men who have sex with men (MSM) may contract HIV through unsafe homosexual practices. Women need to be informed about the risk factors of contracting HIV and Prevention of Mother to Child Transmission-PMTCT of HIV services. In addition, compulsory antenatal HIV testing is urgently needed to early diagnosis of HIV among pregnant women and a non-discriminatory practice of comprehensive Prevention of Mother-to-Child Transmission of HIV (PMTCT) services is urgently required to prevent HIV transmission for infants.

Keywords: *MSM, bisexual man, a married woman, mother to child transmission, PMTCT service, Indonesia*

Introduction

In the past decade, four out of every 10 people diagnosed with HIV in Indonesia were women and the highest number of late stage of HIV (AIDS) suffers are married women or housewife [(1)]. Married women are considered a neglected group in HIV prevention in Indonesia [(2, 3)]. As a consequence of the lack of focus on married women, they have become a 'silent majority' of new HIV-positive cases [(1)]. In Indonesia, the majority women living with HIV find out their HIV status after their husband or children die, or after they themselves become ill [(4-6)]. Unsafe sexual practices are now the main cause of increases in HIV rates in Indonesia [(1, 7).] There is a little knowledge about lived stories of a married woman who is more likely to contract HIV from their husband who experiences to have unsafe sex practice with other men in Indonesia context.

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Method

Research Paradigm and Methodology: Feminism is chosen as our epistemological stance and Feminist Participatory Action Research (FPAR) as the research methodology. Feminism includes a philosophical belief system that addresses who can be the real knower of women's problem and solution and care for the relationships between the female researcher and the research participants [(8, 9)]. Feminist research also seeks to contribute to women's empowerment [(10)], as women have the potential means to contribute to the development of collective consciousness, through their active participation, shared knowledge, and collaboration in the research itself [(9, 11)]. Within FPAR, three main dimensions of social transformation allow the necessary place and space to reposition gender, race and class, "to excavate indigenous cultural knowledge and generate voices"; and "to deploy intersectionality as an analytic tool for transformation" [(12)], pp 331. In addition, focusing gender and diversity of women's experience and voices are an integral part of this FPAR in challenging a patriarchal culture [(13)].

Participants: This study is a part of the whole study of FPAR that was conducted in 2017 with a group of 18 HIV-positive women, a group of 26 health workers, and a group of nine NGO workers. The voices of these groups were travelled visually to the final group of 12 stakeholders related to HIV in Palembang. Purposive sampling was undertaken to recruit participants in Palembang (capital city of South Sumatra) Indonesia.

Data Collection and Analysis

The methods used included informal or "go-along" or informal interviews [14], focus group discussions and participant observations over four months in Palembang. In addition, participatory visual methods were used during the Focus Group Discussions and interviews. These methods allowed for HIV-positive women and other groups to express their thoughts through visual representations, such as drawing, collages and mind-mapping [15-18]. The data collection was conducted by the first author, who was born and raised in Indonesia and was fluent in the local dialect of Palembang. Thematic analysis and reflective analysis were then conducted.[13, 19-22].

Result

Preventing Mother-to-child Transmission: Mira recalled the time when she started to feel that the labour was coming. Her pain was excruciating, and the contraction came closer to each other. Psychologically, she felt very worried that her baby would be infected with HIV during delivery. Mira, accompanied by Kuyung then rushed to the emergency unit at a public hospital. At the admission, she reported her HIV status: "I am positive HIV, I needed a Caesarean Operation". The admission nurse at that time, however, did not believe her and Mira insisted for the nurse to contact the Voluntary, Counselling and Testing (VCT) centre where she and her husband had been treated for HIV. The nurse contacted the VCT centre and got confirmation of Mira' status. She was scheduled to have the caesarean.

During the waiting time, or at about 6 pm, Mira felt her contractions intensified. Yet the nurses kept telling her that she would be fine. Two hours later, at about 8 pm, Mira had delivered her baby naturally. She felt very tired and shaken and after her delivery Mira realised she did not have any meals or drinks since 2 pm as a requirement for the surgery. Following the delivery of Toleh, Mira's second child, both the mother and baby were transferred to the maternity ward and shared her in-patient room with other female patients.

Vulnerability and discriminatory practice: During her recovery process, Mira recalled some incidents when she received blame, discriminatory treatments from the nurses. For example, one of the nurses had asked her "*you knew that you were HIV-positive, why did you decide to be pregnant and deliver your baby?".* Other nurses would give signs to her peers of her HIV status, mocking on Mira, while Mira was present in the room. At the same time, Mira felt hopeless. She was angry and disappointed with the treatment she received, but there was not much she could do then hoping for some 'empathy' from the nurses, midwives or doctors at the hospital. After a few months of her recovery, she asked about a family planning of Intra Uterine Devices in the same hospital, however, she got rejection after she disclosed her HIV status. Fortunately, after 18 months of being treated with a preventative HIV medication, her son, was declared HIV free.

HIV vulnerability: deception in marriage: During her second pregnancy in 2015, Mira recalled going to the community health centre to have a check on her vaginal rashes and itchiness. The test results confirmed she had syphilis and HIV. Her CD4 count of 350 cells/$mm^{3.}$ Feeling shocked, Mira told Kuyung and demanded for Kuyung to take a blood test. Kuyung was diagnosed HIV with a CD4 count of 450 cells/mm^3. Mira or Kuyung was likely to be infected with HIV about four years ago year [23]. Both Mira and Kuyung were referred to the VCT clinic for Antiretroviral treatment and accessed PMTCT services to prevent HIV to Toleh.

Mira was not sure who whether she or her husband acquired the HIV or syphilis first by saying "I did not know, who got it first, he [Kuyung] is a man". At some point, Mira was also suspicious she might have acquired HIV from an unsterile syringe used by one of the staff at a family planning clinic. A year prior to her problem, Kuyung had told her about having genital itch and there were reddish-brown sores around his genital area.

HIV vulnerability: norms on heterosexual marriage: To gain further understandings on MSM in Palembang, the first author decided to seek further information and meeting peer support workers and outreach HIV workers who had been working with bisexual and gay communities

and health workers in VCT centres. Learning from lived stories of the insiders, the authors became aware of life of MSM in Palembang that may differ from MSM from other countries, like New Zealand. MSM, either bisexual or gay man, may contract to HIV through unsafe sex practice, have relationship with a female partner and not all of MSM may disclose their sexual orientation and HIV status to their male and female partners.

Discussion

In Mira and Kuyung's marriage, there was a complex interplay of deception, stigma around homosexuality, heterosexual morality and HIV stigma in health setting. Kuyung might have engaged in homosexual sex prior to him marrying Mira, yet there was no knowledge whether Kuyung continued his sexual practice with men after his marriage with Mira. Kuyung also had never disclosed his sexual orientation to Mira nor had he ever seek to do an HIV test although he was infected Syphilis one year prior to Mira.

This spouse was eager to seek Caesarian Section and disclose their HIV status, however they were failed to get one. The risk of Mother To Child Transmission can be reduced from up to 50 % without accessing any treatments to less than 5% by women accessing effective treatment during pregnancy, safe labour practice, and formula milk-feeding (or breastfeeding with certain rules) through PMTCT services [24, 25]. Caesarian section is seen main alternative for safe delivery for pregnant women living with HIV in limitted CD4 and viral load test [25]. We suggest in Mira and Kuyung's life were embedded to their 'perception of susceptibility' [26]. Mira, and most Muslim women, are taught that being a mother is prestigious and a high status job in Islam as per the famous hadith: "Paradise lies at the feet of the mother" [27].

HIV among MSM may bridge HIV transmission to married women as this present study also highlights being a bisexual and gay men was a considered as a lifestyle choice by participants. Being bisexual and gay man is perceived as 'abnormal' and 'sinful' within the discourse of heterosexual morality [28, 29], hence, bisexual and gay men in Indonesia may give up and decided to getting married to adhere to heterosexual normality in Indonesia [29]. To reduce social risk on their gayness, MSM generally did not open about their sexual orientation in public space, including to their female partners [29]. Unfortunately, unsafe homosexual practices may contribute the significant increase of HIV among MSM in Indonesia [1, 7, 30]. The risk of HIV transmission through anal sex is 18 times higher than vaginal sex without use of condom [31], however, the rate of condom use, which is effective for preventing HIV and other STIs, is very low amongst married couples [7, 32].

Preventing HIV among men having sex with men is still complex as their sexual practices are perceived as immoral and sinful. Consequently, this may actively prevent them from seeking HIV tests or disclosing their sexual orientation to their wives or other sexual partners [28, 29, 33]. As a result, unsafe heterosexual and homosexual relationship, a long period of asymptomatic HIV and deception within marriage may result in 'silent' HIV epidemic among Indonesian women. Another threat of this complexity of HIV transmission is a new mutation of HIV virus or recombinant strain of HIV is more likely to be occurred in Indonesia, like a recent study case among MSM in China [34].

Conclusion

This paper indicates that sexual transmission of HIV occurs among married women and men in a number of ways, including unsafe sexual practice between a married woman with a husband who has sex with men. Consequently, heterosexual married women have become a 'silent majority' of new HIV-positive cases. The notion of the shame, sinful, a hidden life-style about being a bisexual or gay man means that people do not talk about HIV and homosexual sex within a marriage. Unfortunately, there is limited HIV screening of pregnant women meaning women unknowingly pass HIV to their babies. Consequently, women need to be informed about the web of risk factors of contracting HIV within a deception and unsafe sex practice of men having sex with men with their heterosexual partners. Women should be empowered to make responsible decisions in their own right to reduce contracting HIV from their partner and transmitting HIV to their babies. In order to reduce of the risk of mothers transmitting HIV to their children and to enhance their early access to PMTCT services, these services need to be aware and address these gender discriminatory factors in their training and policies.

Ethical Clearance: AUTE on 7 March 2017 (Reference No. 17/22), Sriwijaya University (Reference No. 39/ keprsmhfkunsri/2017) on 15 March 2017

Conflict of Interest: None declared

Source of Funding: New Zealand Auckland University of Technology, and the University of Sriwijaya.

Acknowledgements

Thank you to participants & MFAT New Zealand Scholarship in AUT: Margaret, Sacha,, Prerna, and Ruth.

REFERENCE

1. MOH. Report of Situation Analysis of HIVAIDS in 2017. Jakarta: The Indonesian Ministry of Health; 2017.
2. Najmah, Andajani S, Davies SG. HIV-positive mothers left behind: Insider Indonesia; 2017 [Available from: https://www.insideindonesia.org/hiv-positive-mothers-left-behind.
3. Praptoraharjo I, Suharni, Pudhiati SR, Dewi EH, Safika I. HIV-AIDS Policy and Health System in Indonesia - a Document Review. Yogyakarta: PKMK FK UGM; 2016. Available from: http://www.kebijakanaidsindonesia.net/id/hasil-penelitian/1393-kajian-dokumen-kebijakan-hiv-aids-dan-sistem-kesehatan-di-indonesia.
4. Imelda JD. Disease interpretations and response among HIV-positive mothers. Antropologi Indonesia. 2015:4-16.
5. Ismail R, Voss JG, Woods NF, John-Stewart G, Lowe C, Nurachmah E, et al. A Content Analysis Study: Concerns of Indonesian Women Infected With HIV by Husbands Who Used Intravenous Drugs. Journal of the Association of Nurses in AIDS Care. 2018:10.
6. Rahmalia A, Wisaksana R, Meijerink H, Indrati AR, Alisjahbana B, Roeleveld N, et al. Women with HIV in Indonesia: are they bridging a concentrated epidemic to the wider community? BMC research notes. 2015;8(1):1.
7. Praptoraharjo I, Suharni, Pudhiati SR, Dewi EH, Safika I. A Model of HIV Prevention through Sexual Transmission: In Primary Health Service Puskesmas and The Coverage. Yogyakarta: PKMK FK UGM; 2016. Available from: http://www.kebijakanaidsindonesia.net/id/hasil-penelitian/1393-kajian-dokumen-kebijakan-hiv-aids-dan-sistem-kesehatan-di-indonesia.
8. Guba EG, Lincoln YS. Paradigmatic controversies, contradictions, and emerging confluences. In: Denzin NKL, editor. The Landscape of qualitative research. Thousand Oaks: SAGE; 2008.
9. Crotty M. The Foundations of Social Research: Meaning and Perspective in the Research Process: SAGE; 1998.
10. Hesse-Biber SN. Feminist Research, Exploring, Interrogating and Transforming the Interconnections of Epistemology, Methodology and Method. In: Hesse-Biber SN, editor. The handbook of Feminist Research. Thousands Oak: SAGE; 2012.
11. Lykke N. Feminist studies, a guide to intersectional theory, methodology and writing. New York: Routledge; 2010.
12. Lykes MB, HershBerg RM. Participatory Action Research and Feminism: Social Inequalities and Transformative Praxis. In: Hesse-Biber SN, editor. Handbook of Feminist Research: Theory and Praxis. Thousand Oaks, California: SAGE Publications; 2012.
13. Reid C, Frisby W. Continuing the journey: Articulating dimensions of feminist participatory action research (FPAR). In: Reason P, Bradbury H, editors. Sage handbook of action research: Participative inquiry and practice. 22008. p. 93-105.
14. Carpiano RM. Come take a walk with me: The "Go-Along" interview as a novel method for studying the implications of place for health and well-being. Health & place. 2009;15(1):263-72.
15. Fraser KD, al Sayah F. Arts-based methods in health research: A systematic review of the literature. Arts & Health. 2011;3(2):110-45.
16. Leavy P. Method meets art: Arts-based research practice. New York: Guilford Publications; 2015.
17. Mitchell CM, Sommer M. Participatory visual methodologies in global public health. Global Public Health. 2016;11(5-6):521-7.
18. Aldridge J. Participatory research: Working with vulnerable groups in research and practice. Great Britain: Policy Press; 2015.
19. Saldana J. The coding manual for qualitative researchers. Los Angeles: Sage; 2016.

20. Lykes MB, Crosby A. Feminist practice of action and community research. In: Hesse-Biber SN, editor. Feminist research practice: A primer. Thousand Oaks, California: SAGE publications; 2014. p. 145-81.

21. Williams J, Lykes MB. Bridging theory and practice: Using reflexive cycles in feminist participatory action research. Feminism & Psychology. 2003;13(3):287-94.

22. Terry G, Hayfield N, Clarke V, Braun V. Thematic analysis. In: Willig C, Rogers WS, editors. The Sage handbook of qualitative research in psychology. 2nd Edition. London: SAGE; 2017. p. 17-37.

23. Lodi S, Phillips A, Touloumi G, Geskus R, Meyer L, Thiébaut R, et al. Time from human immunodeficiency virus seroconversion to reaching CD4+ cell count thresholds< 200,< 350, and< 500 cells/mm3: assessment of need following changes in treatment guidelines. Clinical infectious diseases. 2011;53(8):817-25.

24. Holden S. AIDS on the agenda: adapting development and humanitarian programmes to meet the challenge of HIV/AIDS. UK: OXFAM; 2003.

25. MOH. National Management Guidelines of Prevention of HIV and Syphilis from mothers to children. Jakarta: Directorate of maternal and children health, Ministry of Health of Indonesia; 2015.

26. Davidson A. Social Determinants of Health, a Comparative Study. Canada: Oxford; 2015.

27. Pappano MA, M. Olwan D, editors. Muslim Mothering: Global Histories Theories, and Practices. Canada: Demeter Press; 2016.

28. Andajani S, Lubis D, Graham-Davies S. Razia Terhadap LGBT Sebagai Agenda Moralitas Palsu: Kajian Pemberitaan Media di Indonesia (Raid on LGBT as a False Morality Agenda: Study of Media Coverage in Indonesia). Jurnal Perempuan. 2015;20(4):97-107.

29. Stephen M, Grierson, J and Hidayana I.M. Belonging, community and identity- Gay men in Indonesia. In: Bennett LR, Davies SG, editors. Sex and Sexualities in Contemporary Indonesia: Sexual Politics, Health, Diversity and Representations. London: Routledge; 2015. p. 29.

30. Pisani E. The wisdom of whores: Bureaucrats, brothels and the business of AIDS. New York: W.W Norton & Co; 2010.

31. Body Positive Inc. Lets Talk about HIV-Gay Men's Sexual Health. In: Gerard H, editor. 2016. Available in https://www.youtube.com/watch?v=mOlYWlC5Ysk

32. MOH. National Report-Basic Health Survey (RISKESDAS) 2013. Jakarta: National Institute of Health Research and Development, MOH; 2013.

33. Davies SG. Indonesia's anti-LGBT panic 2016 [cited 2016 17 August]. Available from: http://www.eastasiaforum.org/2016/07/15/indonesias-anti-lgbt-panic/.

34. Wu J, Meng Z, Xu J, Lei Y, Jin L, Zhong P, et al. New emerging recombinant HIV-1 strains and close transmission linkage of HIV-1 strains in the Chinese MSM population indicate a new epidemic risk. PloS one. 2013;8(1):e54322.

mHealth Development for Village Midwives to Improve the Performance of the Maternal Health Program in the Babakan Madang Sub-District, Bogor, Indonesia

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ABSTRACT

Maternal mortality rate is still high in Indonesia, supported by a decrease in K1 coverage. This incident often involves pregnant women who have not received services from the village midwife. An electronic application has been developed to improve the midwives' performance; however, since their workload is extremely high, many field activities, outreach, and mapping of pregnant women have not been well carried out. Village midwives will be equipped with an electronic application (mHealth) that will also be used by health cadres so that all pregnant women in the village can be mapped. With a better data collection mechanism for pregnant women, a map could be produced in all villages and the data could produce more accurate program objectives, such as identifying pregnant women in high-risk condition and preparing a better work plan. Moreover, maternal health performance can also be known immediately in real time by stakeholders, especially by the head of the sub-district and the public health center.

Keywords: *maternal health, midwife, mobile health*

Introduction

Maternal mortality rate (MMR) is an important indicator for improving maternal health status. The number of mothers who died due to complications from pregnancy and childbirth decreased from 532,000 in 1990 to 303,000 in 2015. More than 800 women die every day due to pregnancy and childbirth complications[1]. Efforts to reduce maternal mortality are still a priority in Indonesian health development. The causes of maternal deaths in several countries were 72.5% direct and 23.5% indirect[2]. In 2015, Bogor had a maternal mortality rate of 69, consisting of 2 pregnant women's deaths, 17 childbirth deaths, and 31 postnatal death; three deaths in the Babakan Madang sub-district contributed to the city's number. Maternal mortality in Bogor had several direct (such as bleeding) and indirect causes (such as maternal nutritional status, poor maternal knowledge, and the mothers' ages, either too old or too young). Late decision making, referring, and case handling are often factors that are found in obstetric complications cases[3]. Information regarding the targeted number of pregnant women in a work area is still lacking. Some pregnant women were not recorded because they were not accessed by health services.

As the spearhead of services in the work area, midwives have heavy workloads, which means that individual outreach is often not carried out optimally. Health information technology (HIT) has the potential to improve individual health, quality, costs, and greater care. Research conducted in assessments that provide health information found that 92% of the latest health HIT articles reached positive conclusions. It also found smaller benefits and services, and many more were initial users[4].

Data quality and documentation are needed to provide safe and appropriate services for the mother. For a long time, paper was used to record and report patient health and epidemiological data. However, with

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the advent of technology, paper is slowly being replaced by electronic media[5]. mHealth is a part of eHealth that extensively covers electronic and digital health processes through telephones, computers, and the internet. In Kenya, mHealth was using to send text messages about malaria case management to rural clinicians. In Tanzania, information was exchanged via SMS between pregnant women and health facilities, which increased skilled birth attendance to 60% compared to 47% in a control group[6]. Ethiopia has used mHealth in the MCH field, especially in referral cases. Health workers are receptive to mHealth because it eases their work, which has made many health workers outside of MCH request mHealth development in their fields, such as immunization, family planning, and other disease services[7].mHealth has attracted attention as a means of supporting material, newborn, and child health in developing countries, and research to assess the impacts of health interventions is increasing[8].

To improve the maternal health program in Babakan Madang, mHealth was developed to assist the recording and reporting of maternal health activities. This tool is used by midwives and the community (cadres) in data collection for pregnant women; recording and reporting maternal health services is carried out to improve the midwives' performance. Midwives and workers in health centers can monitor maternal health and anticipate risks that will arise through the application. In addition, maternal health performance can also be known immediately in real time by stakeholders, especially by the head of sub district and the head of the health center.

Method

System Development: The methodology used in the development of this application is rapid application development (RAD), which combines various structured techniques with prototyping and joint application development techniques to accelerate the system development process. There are three stages in RAD: requirement planning, design workshop, and implementation. Requirement planning involves a needs analysis that explores problems and determines solutions. The design workshop explains how the business process flows in the use of the mobile health system. Implementation refers to the introduction of the socialization system that has been formed. This mHealth model uses the Open Data Kit platform.

Implementation: The system is implemented using a research operational approach. Implementation is carried out by identifying problems related to lack of system management control, which is caused by training resource issues, as well as an incomplete data and information from midwives. Work with partners to introduce this new implementation strategy into the health system and facilitate implementation, as well as an evaluation, as needed.

In Babakan Madang's community service program, target users, such as midwives, cadres, health centers, and village officials, are trained to use an mHealth application. Each user is given a form relating to health data that needs to be recorded. The form consists of the Mother Data Collection Forms and reporting forms for cadres at integrated health pots (Posyandu) level, the Maternal Care Form for midwives, and the Reporting Form for Vital Registration for village officials. Recorded data is then reported by sending data via mHealth application to the server. Reports can be monitored by midwives, community health centers, and village officials via the mHealth website.

Results

The maternal health program is currently still documented and reported manually by midwives. Midwives work independently from the data collection process for pregnant women, history, examination, recording of examination results, early detection of risk factors, and reporting data. The number of duties that a midwife has means that she cannot guarantee that all her work will be done optimally, so it is normal if the maternal health program's coverage is still low.

Input Requirements Analysis: The identified input components include health service facilities, health resources, funding, and stakeholders and organizations' support. In this case, health service facilities are health centers where data are reported (database), and health resources are midwives in five villages and health cadres that assist midwives during the data collection process with the inclusion criteria of having a smartphone (Android). Funding is the incurred cost during mobile health use, namely the loss of data and hosting packages. Stakeholders and organizations' support come from health centers and related health offices that encourage system development, and facilities and infrastructure that assists midwives and cadres in increasing maternal health programs' coverage.

Process Requirement Analysis: In the process of filling the mother's card in as primary data on maternal health services, the midwife must initial data collection of pregnant women to get first visit (K1) coverage according to the target. After the initial data collection, the midwife checks the mothers who come to health care facilities on a regular basis. From the results of routine examinations, the midwife can detect any risk factors that could endanger the mother and fetus's health so that they can be prevented or anticipated early. The process series was carried out independently by the midwife until the data was reported to the public health center regularly every month.

Mobile health development will empower health cadres to assist midwives in carrying out data collection. The cadre will record pregnant women by visiting pregnant women's homes thoroughly and using mobile phone-based applications. Therefore, when the mother is registered, she can go to the health care facility to conduct an examination, which be the midwife's responsibility. The examination results will be documented using web-based applications or a mobile phone; this will ease the work, so the midwife's performance is expected to be more optimal and maternal health services' coverage can increase.

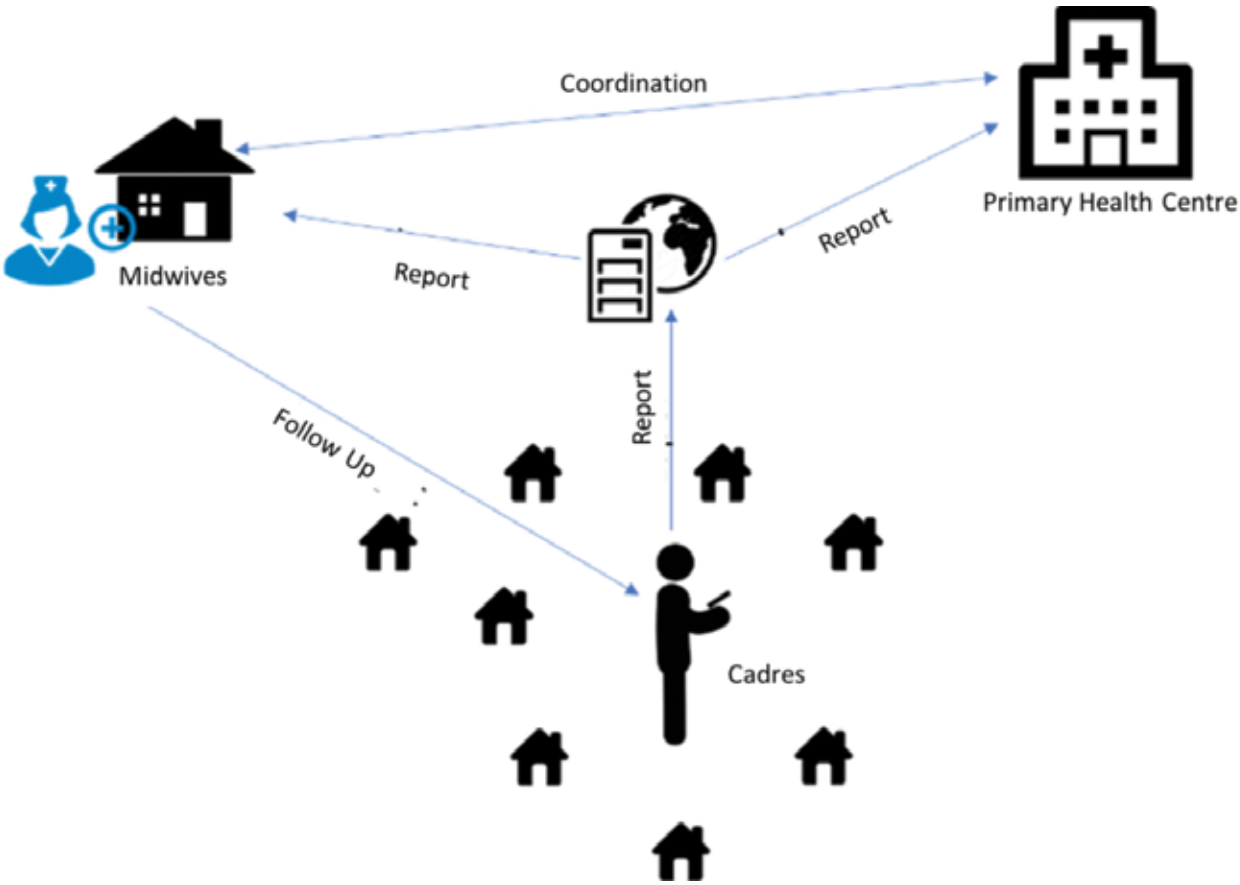


Figure 1: Workflow design of mHealth

Output Requirement Analysis: As previously explained, the recorded inspection results are reported every month as local monitoring for the maternal program report. Midwives must recapitulate manually, which some have called a burden that takes a lot of time and feels less efficient. For this reason, the development of mobile health applications aims to facilitate the maternal data recording and reporting process by making it web-based or done on a mobile phone. In addition, the application can facilitate reading data by displaying a dashboard that can be adjusted according to the level of the reader (Head of Public Health Center, Coordinator Midwife and Health Office). Based on needs from users, we developed several forms to facilitate both midwives and cadres regarding recording and reporting activities. For midwife, we created the form for recording and reporting on maternal health. As for cadre users, we developed seven forms to facilitate the recording and reporting activities at integrated health post (Posyandu).

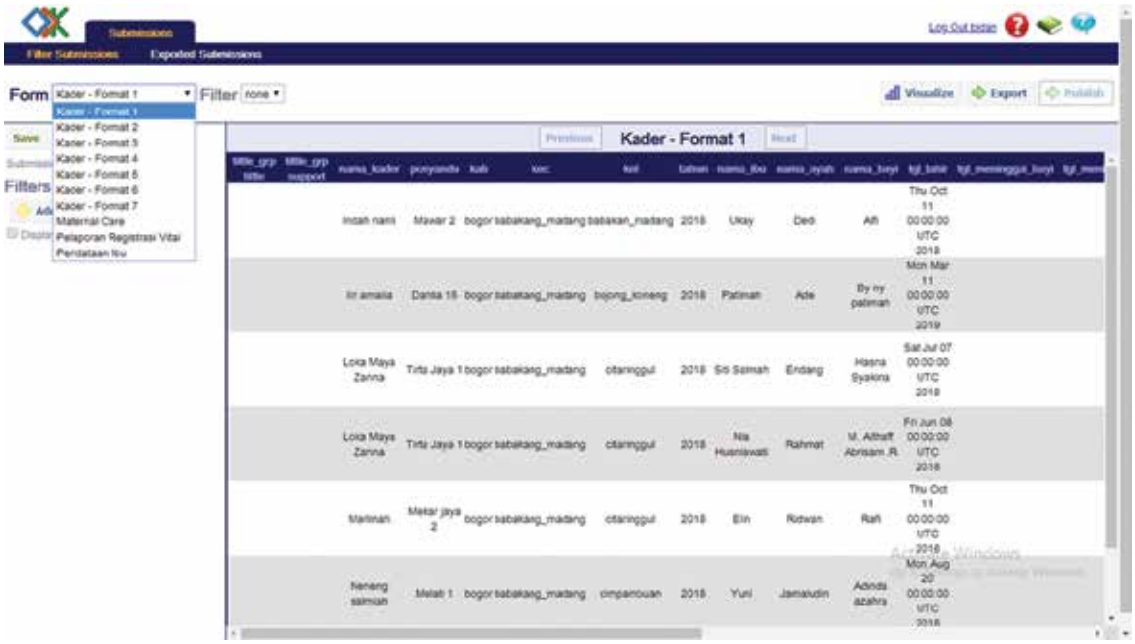


Figure 2: Monitoring tools

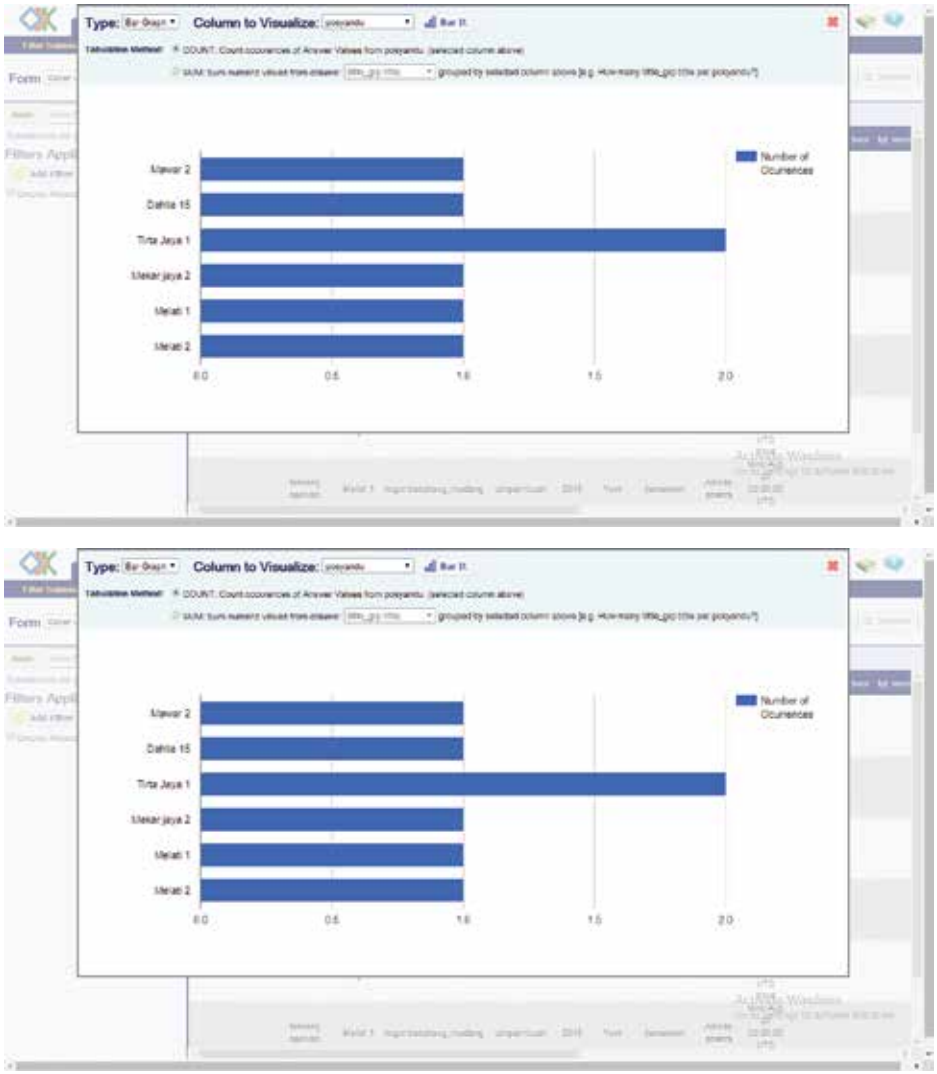


Figure 3: Direct data visualization

Discussion

Research conducted on eight choices made online in Indonesia shows that mobile phone use in health services bring positivity. The perceived benefits reported are: (i) ease of contact between patients, midwives, and supervisors; (ii) increased time efficiency due to the ability to coordinate visits; and (iii) if complications occur, assistance is only one call away[9]. At present, almost all communities, both rural and urban, use smartphones. Moreover, health workers and midwives have used hand phones in patient referral systems. As an example of using mHealth in the field of maternal health, India uses a Mother and Child Tracking System that registers pregnant women and children using cell phones so that they get scheduled services. Uganda uses the UNICEF Birth Registration System with rapid SMS to maintain an electronic database center so that data are less confusing and more efficient[10]. According to the study about mHealth intervention's role in maternal and child health service delivery, findings from a randomized controlled field trial in rural Ethiopia showed that short message service-based mobile telephone intervention could indeed improve the effectiveness of frontline health worker, primarily in improving access to antenatal care, delivery services, and postnatal care. The number of ANC visits and percentage of deliveries attended by health workers improved, and also facilitated the work process of frontline health workers[11].

This research is in accordance with previous studies relating to the use of electronic devices to help improve the performance and quality of workers, especially in the health sector, such as the Indian health service system and the Mosoriot Record System in Kenya, which states that enabling electronic devices can increase employee productivity and satisfaction, save time, and provide better quality data[12].Activities carried out in several developing countries gave the same results. The level of poverty and a decrease in the quality of life of the community[13]. mHealth has also been developed as a surveillance tool for research conducted in Sub-Saharan Africa[14].

There is some positive evidence for the effect on mHealth interventions on outcomes, such as ANC attendance, skilled attendance at birth, and oral contraception utilization[15]. It is evident that mHealth use can increase effectiveness and security for village officials and equipment. Since cadres can immediately send collected data to the server, the midwife and officials can immediately recapitulate the results and take the next step, resulting in more time.

Conclusion

mHealth was implemented in Babakan Madang to improve the performance of midwives in the public health center. The work process was carried out using an electronic-based mHealth application (web and android). Initial data collection was assisted by cadres to reach all pregnant women in the Puskesmas work area. This makes midwife work more effective because master data is available as a reference in providing services, so the midwives can immediately conduct anamnesis and examination. Thus, the performance of midwives can increase because the process of digitizing the maternal health program can ease their work.

With the mHealth application, the system of recording maternal health programs becomes more efficient and effective because it implements a paperless system in real-time, so that the resulting data becomes more accurate. In addition, coverage of pregnant women who are recorded is expected to increase because the data collection process is assisted by cadres. Mobile phone solutions may save the lives of women and their newborns, and may contribute to the achievement of Millennium Development Goals 4 and 5; therefore, they should be considered by maternal and child health policy makers in developing countries[16]. mHealth interventions targeted at pregnant women can be an effective solution to increase service utilization to improve maternal and neonatal outcomes. Integration of mHealth into the healthcare system can pave the way to improved decision making on how best to implement mHealth interventions[17].

Source of Funding: This is a community engagement program that fully supported by Directorate of Research and Community Engagement (DRPM) Universitas Indonesia.

Conflict of Interest: The authors declare that there is no conflict of interests regarding this article or research.

Ethical Clearance: This research has obtained ethical permission from the ethics commission in the Public Health Faculty Universitas Indonesia register number 659/UN2.F10/PPM.00.02/2018.

REFERENCES

1. Unicef. Unicef Data: Maternal Mortality Fell by Almost Half Between 1990 and 2015. United Nations Children's Fund (UNICEF) [US]. 2017.
2. Lale Say, Doris Chou, Alison Gemmill, Özge Tunçalp, Ann-Beth Moller, Jane Daniels, A Metin Gülmezoglu, Marleen Temmerman LA. WHO global causes matarnal death lancet 2014. Lancet Glob Heal. 2014;Vol 2(Global causes of maternal death: a WHO systematic analysis):e323–33.
3. Dinas Kesehatan Kabupaten Bogor. Laporan Kinerja Pemerintah Kabupaten Bogor. 2015.
4. Buntin MMB, Burke MMF, Hoaglin MCM, Blumenthal D. The benefits of health information technology: A review of the recent literature shows predominantly positive results. Health Aff. 2011;30(3):464–71.
5. Medhanyie AA, Spigt M, Yebyo H, Little A, Tadesse K, Dinant GJ, et al. Quality of routine health data collected by health workers using smartphone at primary health care in Ethiopia. Int J Med Inform. 2017;101:9–14.
6. Dusabe-Richards JN, Tesfaye HT, Mekonnen J, Kea A, Theobald S, Datiko DG. Women health extension workers: Capacities, opportunities and challenges to use ehealth to strengthen equitable health systems in southern Ethiopia. Can J Public Heal. 2016;107(4–5):e355–61.
7. Medhanyie AA, Moser A, Spigt M, Yebyo H, Little A, Dinant G, et al. Mobile health data collection at primary health care in Ethiopia: A feasible challenge. J Clin Epidemiol. 2015;68(1):80–6.
8. Nurmatov UB, Lee SH, Nwaru BI, Mukherjee M, Grant L, Pagliari C. The effectiveness of mHealth interventions for maternal, newborn and child health in low– and middle–income countries: Protocol for a systematic review and meta–analysis. J Glob Health. 2014;4(1):1–8.
9. Noordam AC, Kuepper BM, Stekelenburg J, Milen A. Improvement of maternal health services through the use of mobile phones. Trop Med Int Heal. 2011;16(5):622–6.
10. Labrique AB, Vasudevan L, Kochi E, Fabricant R, Mehl G. mHealth innovations as health system strengthening tools: 12 common applications and a visual framework. Glob Heal Sci Pract. 2013;1(2):160–71.
11. Atnafu A, Otto K, Herbst CH. The role of mHealth intervention on maternal and child health service delivery: findings from a randomized controlled field trial in rural Ethiopia. mHealth. 2017;3:39–39.
12. Blaya JA, Fraser HSF, Holt B. E-health technologies show promise in developing countries. Health Aff. 2010;29(2):244–51.
13. Marcolino MS, Oliveira JAQ, D'Agostino M, Ribeiro AL, Alkmim MBM, Novillo-Ortiz D. The impact of mHealth interventions: Systematic review of systematic reviews. J Med Internet Res. 2018;20(1).
14. Brinkel J, Krämer A, Krumkamp R, May J, Fobil J. Mobile phone-based mHealth approaches for public health surveillance in sub-Saharan Africa: a systematic review. Int J Environ Res Public Health. 2014;11(11):11559–82.
15. Ilozumba O, Abejirinde IOO, Dieleman M, Bardají A, Broerse JEW, Van Belle S. Targeting strategies of mHealth interventions for maternal health in low and middle-income countries: A systematic review protocol. BMJ Open. 2018;8(2):1–7.
16. Lund S, Hemed M, Nielsen BB, Said A, Said K, Makungu MH, et al. Mobile phones as a health communication tool to improve skilled attendance at delivery in Zanzibar: A cluster-randomised controlled trial. BJOG An Int J Obstet Gynaecol. 2012;119(10):1256–64.
17. Sondaal SFV, Browne JL, Amoakoh-Coleman M, Borgstein A, Miltenburg AS, Verwijs M, et al. Assessing the Effect of mHealth Interventions in Improving Maternal and Neonatal Care in Low- and Middle-Income Countries: A Systematic eview. PLoS One. 2016;11(5):e0154664.

The Influence of Dental Health Education on the Gingival Health of Students at STIKES Muhammadiyah Palembang

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ABSTRACT

Students often suffer from gingivitis due to stress and lack of awareness of the need to maintain good oral hygiene. One strategy for improving the behaviors to maintain good oral hygiene is Dental Health Education (DHE). This study aimed to analyze the influence of DHE on the gingival health of students in STIKES Muhammadiyah Palembang. This study was quasi-experimental with a pre-test and post-test design. Sampling was accomplished with the total sampling method, which resulted in the inclusion of 36 students in the first level of midwifery at STIKES Muhammadiyah Palembang. This study used a simulation method of tooth brushing and the study instruments consisted of a gingival examination and knowledge questionnaire. The measurements from pre-test to post-test showed that the students' knowledge of oral hygiene improved and their severity of gingivitis decreased, according to their gingival index scores. The results of the Wilcoxon test analysis showed $p<0.05$, meaning that there were significant differences in students' knowledge and gingival health before and after participating in DHE. Thus, the study results revealed that DHE had a significant influence on gingival health.

Keywords: *Dental Health Education; gingival health; students.*

Introduction

People who are classified as "students" range in age from late adolescence (18-21 years) to early adulthood (22-24 years) and are currently registered and studying at a College. As students transition from their late teens to early adulthood, they are at an age at which they should be able to adapt to various demands and new environments[1]. In terms of their growth and development, students often have oral hygiene problems, especially of the gingiva. Oral hygiene is a very important means of preventing these problems, particularly because some problems develop specifically due to poor oral hygiene. If oral hygiene is not properly maintained, it can affect the health of the entire body because the teeth and mouth are an integral part of the body's system[2].

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Data from the Indonesian Dentists Association show that the prevalence of gingivitis worldwide is 75%-90%. In Indonesia, gingivitis is the second most frequently occuring oral disease, affecting 95.8% of the population[3]. Gingivitis is an inflammation of the gingiva that does not result in the attachment loss of clinical gingiva, the main cause of which is the accumulation of plaque in the cervical area of teeth and their surroundings. Gingivitis can be prevented by controlling plaque mechanically, such as by brushing the teeth, and chemically, by using toothpaste as well as mouthwash that contains antimicrobial agents[4]. According to Dumitreschu *et al.* (2010)[5], the gingiva-related problem often experienced by students is gingivitis which can be caused by psychological factors, such as stress, which commonly occurs as part of college life. Stress can induce an increased accumulation of plaque, which can, in turn, increase the risk of gingivitis in college students. In addition, gingivitis in students can also be caused by a lack of awareness of the need to maintain good oral hygiene.

Strategies are being developed to improve the behaviors that lead to good oral hygiene, particularly as it relates to the gingiva, including the simulation-based approach known as Dental Health Education (DHE). DHE is a learning process aimed at individuals and community groups to help people achieve the highest possible level of oral hygiene. To succesfully change behaviors, the aim of DHE can best be realized by choosing the right teaching method[6]. The advantage of the simulation method used in this study is that it can provide experience, encourage decision-making, and share the value of good oral hygiene. It can be used to individuals, groups and entired communities. The simulation activities can be easily understood by learners so that their application of the skill taught yields positive[7].

STIKES Muhammadiyah Palembang was chosen as a research location because it currently offers no research on gingival health and the lack of counseling about oral hygiene has resulted in students having insufficient knowledge of how to maintain good oral hygiene, especially as it relates to gingival health. The preliminary survey data of this study showed that 70% of 90 college students in the first level midwifery have a low level of oral hygiene. This study aimed to analyze the influence of Dental Health Education (DHE) on the gingival health of students at STIKES Muhammadiyah Palembang.

Method

This study was quasi-experimental study and used a pre-test and post-test design. Pre-test and post-test were accomplished through an examination of gingival health and an assessment of student's knowledge before and after participating in DHE. The assessment consisted of students filling out the questionnaire that was score according to whether answers were correct (score = 1) or incorrect (score = 0). DHE was performed by counseling using a tooth brushing simulation by modified Stillman method.

This study was conducted at STIKES Muhammadiyah Palembang, and total sampling was used to select subjects who met the inclusion criteria; students in the first level of midwifery studies at STIKES Muhammadiyah Palembang, students who had their own teeth (the element of teeth were 16, 21, 24, 31, 34 and 46), students with gingivitis, and students with willingness to participate in this study. Excluded from this study were students who were smokers, menstruating or pregnant, wearing an orthodontic appliance, or had a systemic disease and had used an antibiotic during the month before this study. After inclusion and exclusion criteria were met, a total of 36 students comprised the sample that participant in this study.

The instruments used in this study took the form of a gingival examination and a knowledge questionnaire. The examination of gingival health used the using gingival index (GI) assessment according to Loe and Sillness ; the first upper right molar (16), the first upper left incisor (21), the first upper left premolar (24), the first lower left molar (46), the first lower right incisor (31), and the first lower right premolar (34). Probing was done at the gingival sulcus of each tooth, with each tooth calculated on four sides (i.e., mesial, distal, facial and lingual) and divided by 24. The examination results were categorized as 0 (healthy), 0.1-1.0 (mild gingivitis), 1.1-2.0 (moderate gingivitis), or 2.1-3.0 (severe gingivitis).

The questionnaire was used to determine the student's level of knowledge with 10 sentences regarding oral hygiene and was scored according to three categories; "high" if the score was between 76% and 100%, "adequate" if the score was 56% and 75%, and "low" if the score was lower than 56%[8]. Other tools and materials used in this study were a periodontal probe, mouth mirror, *nierbekken*, mask, *hand scoen*, alcohol 70%, and a dental model.

Data were collected in several stages; 1) the recording of each respondent's identity, 2) before the intervention (DHE) took place, respondents gave their informed consent, 3) during the pre-test, when the gingival health was examined using the gingival index and when the respondents filled out the questionnaire, 4) when the intervention (DHE) was given to the respondents, including the toothbrush simulation with the modified Stillman method, and 5) one week after DHE, the respondents returned for the post-test which included another gingival health examination and questionnaire. Data were analyzed using the Wilcoxon test to determine the influence of dental health education (DHE) on student's gingival health

Results

Table 1: The oral hygiene knowledge levels of the respondents

Categories	Before DHE		After DHE	
	n	%	n	%
High	16	44.4	34	94.4
Adequate	18	50	2	5.56
Low	2	5.56	0	0
Total	36	100	36	100

Notes: n = number of sample, % = percentage

Based on Table 1, before DHE, only 44.4% of the students had a high level of knowledge about oral hygiene. This indicated that 55.56% students with only an adequate or low level of knowledge did not know about the importance of maintaining oral hygiene, especially their gingival health, which increased their risk of gingivitis[2]. After DHE, 94.4% of students showed a high level of knowledge.

Table 2: Result of the gingival health examination of respondents

Categories	Before DHE		After DHE	
	N	%	N	%
Healthy	0	0	0	0
Mild Gingivitis	26	72.2	36	100
Moderate Gingivitis	10	27.8	0	0
Severe Gingivitis	0	0	0	0
TOTAL	36	100	36	100

Notes: n = number of sample, % = percentage

The results of the gingival health examination using the Loe and Sillness Gingival Index (GI) can be seen in Table 2, which shows that, 27.8% of the students had moderate gingivitis before DHE. As was seen in this study, after DHE, the severity of gingivitis had already decrease. All of the students had only mild gingivitis after the study and not a single student had even moderate gingivitis.

Table 3: The influence of DHE on gingival health

Variable	Result	Probability (p value)
Level of knowledge	Pre-test	0.000
	Post-test	
Gingival Index	Pre-test Post-test	0.002

The Wilcoxon test was used to determine whether DHE with the toothbrush simulation had the effect of improving student's knowledge of oral hygiene and the result obtained was p value = 0.000 (p value < 0.05). This result indicates that there was a significant difference in the levels of knowledge before and after DHE. A similar result was obtained as it relates to the gingival health examination. Based on the Wilcoxon test, the result obtained was p value = 0.002 (p value < 0.05), which means that there was a significant difference in the Gingival Index before and after DHE. Thus, it can be concluded that DHE using the toothbrush simulation significantly influenced gingival health by improving the student's level of knowledge and decreasing their severity of gingivitis (Table 3).

Discussion

Knowledge can be improved with information, which can, in turn effect changes in behavior. Knowledgeable people typically have greater awareness and behave according to what they know[9]. Oral hygiene information can be provided by Dental Health Education (DHE), which aims to achieves high levels of oral hygiene[6].

According to Notoatmodjo[10], this increase in knowledge likely took place because the learning process provided new information that substituted for previous knowledge or represented an improvement over existing knowledge. If someone has a specific sense on object or stimulus after information is given, either through the sense of hearing, sight, smell, taste or touch, the possibility of improving knowledge grows stronger. The knowledge provided about gingival health in this study included the impact of not maintaining good oral hygiene along with a recommendation of an effective method and frequency of toothbrush.

According to Loe and Sillness (1963)[11], the symptoms of moderate gingivitis include gingiva enlargement, erythema, and bleeding when probing. Students are vulnerable to gingivitis because of college-related stress and a lack of awareness of the need to maintain gingival health[5]. Actually, most of the students in this study were already familiar with an appropriate frequency of toothbrush, but their severity of gingivitis was probably because they did not fully understand how to brush their teeth correctly.

In this study, students simply practiced better oral hygiene during this study which can be known after the

activities had been done continuously. Therefore, DHE with simulation can improve awareness and knowledge that can change behaviors and, in turn, improve oral hygiene, especially as it relates to the gingiva. Stillman method was used as a simulation method in this study because it was a highly recommended, simple and efficient toothbrush method that can applied in all parts of the mouth. This method also can give gingival massage and expected to clean debris in interproximal area and gingival sulcus[11].

The decrease in the Gingival Index scores after one week post DHE indicated a decrease in the severity of student's gingivitis and an improvement in their gingival health, perhaps because the students were motivated to follow the toothbrush instructions and maintain good oral hygiene. This result contrasts with the study conducted by Herliana *et al.*, in which there were no changes in Gingival Index scores after study respondents received counseling through video. These different results suggest that if an individual has the necessary knowledge but does not apply it every day to maintain good oral hygiene, it can have poor implications for oral hygiene particularly gingival health[12]. Motivation is the force that can encourage a person to act. Motivation is also important stimulus in the health education process because it is needed to change existing behaviors and maintain new and improved behaviors[13]. Motivation was demonstrated by the students in this study in their maintenance of gingival health and their positive response to the knowledge they gained during DHE.

The use of the simulation method in DHE is one of the strategies that supports the success of the learning process by helping the respondents better understand the learning materials. The simulation method took the form of two-way interaction between the instructor and the students, allowing the students to focus on observing, practicing and discussing the instructor's stimulation of correct toothbrush so that they could better comprehend the problems caused by poor oral hygiene. If the simulation is done correctly, it can positively affect the learning process and impart knowledge that can change attitudes and behaviors[7].

Effectiveness of health education is largely based on the use of a presentation method stimulates the sense, especially sight and hearing. If we can adequately stimulate the senses to receive a message, information can be presented more clearly and the respondents can more easily absorb and remember the information[14]. The students who participated in this study, as a young people aged 17-22 years have already begun to make independent decisions about their health, adapt to the new information about their environment, and form and adopt behaviors that affect their health[1]. As such, this study was in line with a study conducted by Haryani *et al.*, which sought to demonstrate that dental health promotion can improve student's oral hygiene. After the students in that study were given dental health information using an interactive lecture method, the results showed increased oral hygiene index scores[15].

Conclusion

The results of this study showed that Dental Health Education (DHE) significantly influenced improvement in the gingival health. The simulation method used in this study could increased student's knowledge and decreased the severity of their gingivitis, so the students could easily understand and remember how to correctly brush their teeth.

Conflict of Interest: The authors declare that there is no conflict of interests.

Source of Funding: This study is self-funded.

Ethical Clearance: This study was approved by the Ethical Committee of Medical Faculty, University of Muhammadiyah Palembang, Indonesia, the approval number is 049/EC/UBHKI/FK-UMP/X/2018

REFERENCES

1. Gunawati R, Hartati S, Listiara A. Hubungan antara efektivitas komunikasi mahasiswa-dosen pembimbing utama skripsi dengan stres dalam menyusun skripsi pada mahasiswa program studi psikologi fakultas kedokteran universitas diponegoro. Semarang. Jurnal Psikologi Undip. 2006; 9(2).
2. Perry & Potter. Buku ajar fundamental keperawatan. Jakarta. EGC: 2010
3. Depkes. Riset kesehatan dasar (Riskesdas) tahun 2013. Jakarta. Badan Penelitian dan Pengembangan Kesehatan Kementerian RI: 2013. Available at: http://www.depkes.go.id/resources/download/general/Hasil%20Riskesdas%202013.pdf. 2013.

4. American Academy of Pediatric Dentistry. Treatment of plaque-induced gingivitis, chronic periodontitis, and other clinical conditions. Pediatric Dentistry: 2011; 33(6); 307-316.

5. Darmawan R, Sunannti, Rejeki S. Hubungan antara stress akademik dengan gingivitis pada mahasiswa program studi kedokteran gigi Universitas Syiah Kuala. Cakradonya Dent Journal. 2016; 8(2).

6. Herijulianti E, Indriani TS, Artini S. Pendidikan kesehatan gigi. Jakarta. EGC: 2001.

7. Arum S, Effendi F, Dian P. Pengaruh pendidikan kesehatan metode simulasi menggosok gigi teknik modifikasi Bass dengan keterampilan dan kebersihan gigi dan mulut pada anak MI At-Taufiq kelas V. Indonesian Journal of Community Health Nursing. 2012; 1(1)

8. Notoatmodjo. Metode penelitian kesehatan. Jakarta. Rineka Cipta: 2012

9. Notoatmodjo. Promosi kesehatan teori dan aplikasi. Jakarta. Rineka Cipta: 2010

10. Notoatmodjo. Pendidikan dan perilaku kesehatan. Jakarta. Rineka Cipta: 2003

11. Putri MH, Eliza H, Neneng N. Ilmu pencegahan penyakit jaringan keras dan jaringan pendukung gigi. Jakarta. EGC: 2010

12. Herliana N, Miko H, Suwarsono. Pengaruh penyuluhan kesehatan gigi dan mulut melalui media video terhadap *puberty gingivitis* pada siswi kelas XI di SMA Muhammadiyah I Tasikmalaya. Journal ARSA: 2017; 2(2).

13. Djaali. Psikologi pendidikan. Jakarta. PT. Bumi Aksara: 2012

14. Daryanto. Media pembelajaran. Yogyakarta. Gava Media: 2010

15. Haryani W, Masyarani LA, Donsu JDT. Promosi kesehatan gigi meningkatkan status kebersihan gigi mahasiswa. Jurnal Teknologi Kesehatan: 2015; 11(2)

A Smart Nutrition Management System and Nutrition Related Diseases in Humans

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ABSTRACT

The rapid rate of urbanization and world population increase has given rise to new challenges. Increasingly more nutrition- and metabolic-related conditions are appearing as a result of poor nutritional management and lifestyle choices. Clearly, without food management, a person could suffer enormous drawbacks in his or her private and social life. The objective of this project is to help people eat smarter and more mindfully, manage their body conditions, and further improve their relationship with food, in order to facilitate the early diagnosis of certain diseases (e.g., cardiovascular diseases) and to improve the recovery as well as prognosis of these diseases. A system, method, and computer program for integrated, personalized nutrition management is proposed in this study. The nutrition management system features a user data calculation processing unit that calculates the required nutrient quantity for a person based on the person's data. It also calculates the excess or deficiency of nutrients of the person based on the required nutrient amount and nutrient evaluation outcome data of the person, including a meal information search engine user interface that searches for the food data based on input from the user. The system was used by a small group of 20 university students and staffs who, overall, found the experience to be useful and functional with comments to improve the search engine user interface. The results of analysis were fetched fast and accurately. Therefore, the system can be used not only by the general population, but also by dietitians and nutritionists to accurately manage and personalize the nutritional wellness of the society.

Keywords: *Nutrion, Management System, Computer-based, Smart System, Disease Management, Early Diagnoosis*

Introduction

Nutrients supply energy and are the building blocks of numerous materials, which are important for the growth and livelihood of each human being. Macronutrients contribute the entire required energy. However, in the end, the energy that macronutrients yield will be used to ensure muscular tissues and organs of the body function properly. The release of energy for production, motion, and different capabilities is dependent on the micronutrients, which operate as coenzymes, co-catalyst, and buffers within the remarkable, fluid environment of metabolism. States of dietary deficiency or excess could take place when a person's food consumption does not match his or her necessity for optimum wellbeing. Therefore, a balance between nutrient consumption and nutrient necessities must be maintained [1,2,3].

Resolution making involves selecting various courses of motion out of a given number of courses to achieve a purpose or objective[4]. Resolution making is a prestigious scientific, social, and financial endeavor. Hence, a choice-making scenario entails partial, incomplete, or inexact data. A decision support system (DSS) is a responsive computer-based system, which assists resolution makers to make the most of information and models to unravel unstructured issues[5,6,7]. In some resolution conditions, assistance supplied in the form of information and model administration alone is probably not enough[8]. An expert system (ES) presents further

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assistance that could substitute human experience via supplying the required data; nevertheless, a number of different smart services can also be utilized to assist decision-making that requires experience[9,10,11]. ES is an influential technique that helps decision-making and can be applied for a wide range of issues[12,13,14].

Therefore, in this project, we establish a nutrition management system to deal with inexact, and overall unhealthy eating habits.

Method

A system, method, and computer program for integrated, personalized nutrition management is proposed in this study, starting with the crafting of a graphical user interface for the system using Filemaker® Pro 16 Advanced, which is an SQL-based, cross-platform relational database management system that facilitates the implementation of a database engine along with a graphical user interface utilizing the same software. The nutrition management system in this study features a user data calculation processing unit that calculates the required nutrient quantity for a person (the user) based on the user data and calculates whether the person has an excess or deficiency of nutrients based on the required nutrient amount and nutrient evaluation outcome of the user data. The system also provides a meal information search engine user interface that searches for food data based on input from the user, and a meal information calculation processing unit that calculates the nutrient quantity obtained from a meal based on the meal analyzer data. Furthermore, it also provides food information based on the nutrient quantity and shows whether the person has an excess or deficiency of nutrients. The system is designed in such a way that allows the user to input information such as age, gender, weight, height, level of activity, and whether or not the user smokes, into different fields, each with a drop-down menu whenever convenient, to assist in the filling up of data. The user could also choose weight goals such as "lose weight", "maintain weight", or "gain weight", which are implemented in a separate field. After filling out these fields, the "recommended daily energy requirement" and the "energy to achieve goal" is also calculated at the back-end of the system and presented to the user, along with the recommended daily intake for other macro- and micronutrients, each personalized according to the data obtained from the user. It is the quantity of these calculated nutrients that the meal analyzer will output as the end report against the nutrients obtained from daily foods through algorithms to find out whether there is an excess or deficiency in the nutrients. When a user inputs personal data, the data is sent to the back-end of the system and management unit, where it will be processed and then recorded. In the case of calculating daily calorie requirements or macronutrients/micronutrients, the input data is processed using mathematical formulas to output individualized results for each user. This program manipulates the food, menu, and meal and search database. The user can then choose a recommended general and therapeutic menu using this system based on his or her preference and lifestyle (Figs.1 and 2).

In the case of the meal analyzer, the management unit searches for special codes in the database to find a corresponding food nutrition component table. It then sends the corresponding food nutrition component table to the front-end user interface and compares these results to the recommended dietary requirements of calories and essential nutrients in the form of a report (Fig. 5).

The user can also take advantage of the cardiovascular risk assessment portals to determine the potential possibility of developing coronary heart diseases in the next 10 years of his or her life as well as receive customized lifestyle and dietary recommendations based on the results of the analysis. The minimal design of the database's graphical user interface displays the daily ingestion amounts for a variety of nutritions, sends a report that states whether the nutrition of the user is insufficient or in excess, and provides possible diseases and conditions corresponding to the nutrition insufficiency or excess.

Several predictive equations can be used to calculate the basal metabolic rate of the user such as the Harris-Benedict, Mifflin-St Joer and WHO/FAU/UNU equations. In our database, for the estimation of daily calorie requirement, the predictive equation for resting energy expenditure (REE) based on the Mifflin-St Jeor study was utilized because it is the most reliable and accurate according to the literature[14,15,16]. This equation is provided below:

REE (males) = 10 × Weight (kg) + 6.25 × Height (cm) – 5 × Age (y) + 5

REE (females) = 10 × Weight (kg) + 6.25 × Height (cm) - 5× Age (y) – 161

In a study in 2014, to evaluate the efficiency of the BMR formulas, the BMR of overweight and normal-weight people was measured using indirect calorimetry (IC), and then the outcomes observed from the predictive formulas were assessed to evaluate the variations presented between estimated values and those calculated by IC. In both cases, the Mifflin-St. Jeor formulas were the most accurate, with a variation of -9.1% when compared to IC in obese individuals and 0.9% variation compared to normal-weight individuals. The research reported the Mifflin-St. Jeor equations as the most accurate equation for estimating BMR since it is the only equation that allows the valid prediction of BMR in obese individuals. The study did not advise using the equations of FAO/WHO/UNU, Harris and Benedict, Schofield, and Henry and Rees for predicting BMR in these populations, because these formulas tend to exaggerate energy demands. However, these formulas could still produce satisfactory results in predicting the BMR of normal-weight individuals. Nonetheless, they advised that the BMR of overweight patients be measured more carefully and cautiously so as the most convenient course of action pertaining to the foundation of physical activity level and eating pattern of this group is accurately represented[16].

To calculate the recommended daily calorie intake, after taking into account physical activity level (PAL) (Fig. 3), the guidelines below are referred to:

- 1.200 = sedentary (little or no exercise)
- 1.375 = light activity (light exercise/sports, 1–3 days/week)
- 1.550 = moderate activity (moderate exercise/ sports, 3–5 days/week)
- 1.725 = very active (hard exercise/sports, 6–7 days a week)
- 1.900 = extra active (very hard exercise/sports and physical job)

Daily Calorie Requirement = REE×PAL

The user is able to choose from a selection of different eating styles including the Popular style, Vegetarian style, Mediterranean style, and Malaysian style. Each style encompasses a variety of food components such as vegetables, grains and cereals, meat and poultry, fruits, oils, and legumes. The food components of each style are quantified precisely and personalized according to the daily calorie needs and the presence of special conditions of the user (e.g., cardiovascular disease) (Fig. 4).

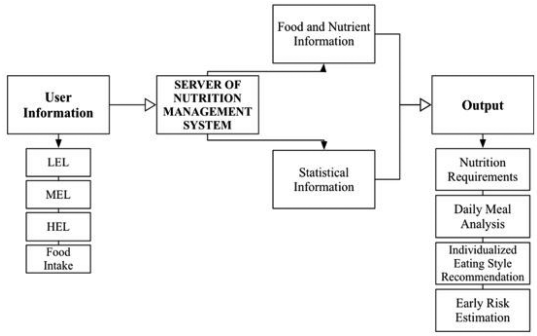


Figure 1: Flowchart of the principal parts of the database (LEL: Low Energy Level, MEL: Medium Energy Level, HEL: High Energy Level)



Figure 2: Welcome screen layout for the graphical user interface database



Figure 3: The screen for calculating user daily calorie requirements



Figure 4: The screen for the recommended eating styles of the user based on the nutrition management system



Figure 5: The meal analyzer search engine user interface

Results

In this study, a nutrition management system was developed, which utilizes a user information calculation processing unit that calculates the required nutrient amount of the user based on user information and calculates the nutrient excess or deficiency information of the user based on the required nutrient amount. It then outputs the nutrient analysis result information for the user. The system was used by a small group of 20 university students and staffs, who overall found the experience to be useful and functional with comments to improve the search engine user interface.

Therefore, the system can be used by not only the general population, but also by dietitians and nutritionists, who have the responsibility of creating menus for clients, as well as specialists in the field of food and nutrition. It can also be a useful tool for nutrition education and nutrition counseling, as it can help establish a really comprehensive connection between food and body.

Discussion

After using the system, the users were asked about their overall experience in using the different parts of the system and to provide feedback about the idea of integrating cardiovascular risk estimation into the developed system. Their reactions were mostly positive. Several were impressed with the implementation of the food composition database and daily meal analyzer. However, they suggested improvements to the search engine graphical user interface so that it would have a more practical feel. One strong point to improve the features of this service was to supply a diet management system and a diet management application that could enable nutrition management and acknowledgement of food-associated conditions. Within the diet management system, in line with the application example described above, the consumer information could embody private data, where the private data could include attribute information relating to at the very least one of gender, weight, age, or physical activity of the individual. Then, the user data calculation processing unit could calculate the required nutrient quantity of the person primarily based on at the very least one of gender, weight, age, or physical activity of the person. Therefore, the system can be used by not only the general population, but also by dietitians and nutritionists who have the responsibility of creating menus for clients, and specialists in the field of food and nutrition. It can also be a useful tool for nutrition education and nutrition counseling, as it can help establish a really comprehensive connection between food and body.

Conclusion

Daily energy needs is the most important nutritional determinant because energy should be provided regularly to meet the requirements of the human body to survive. Every individual has to be aware of his or her energy status so that he or she could strike a balance between energy intake and consumption and make an educated decision regarding his or her eating habits. The purpose of a sufficient and well-organized diet is to prevent calorie and nutrient excess or deficiencies. Nowadays, there is increased understanding of the vital roles that diet has in the initiation or prevention of certain diseases, such as cardiovascular diseases, stroke, cancer, and diabetes mellitus. Insufficient energy intake will restrict the potential of populations in many developing and third-world countries, while excess energy and food intakes are increasingly giving way to very high occurrences of obesity and its accompanying complications across all socio-economic groups in both developing and developed countries. This study is an attempt to provide a practical and easy-to-use tool for comprehensively understanding healthcare and decision-making concepts.

Acknowledgment

The authors would like to acknowledge all individuals who have contributed to this study, including Universiti Teknologi Malaysia and PT Karya Indonesia Cerdas for their support in the preparation of this paper.

Conflict of Interest: The authors declare that there is no conflict of interests.

Source of Funding: This study is funded by PT Karya Indonesia Cerdas, Indonesia, through a research grant (R.J130000.7651.4C223).

Ethical Clearance: This study does not require ethical clearance.

REFERENCES

1. Wiseman MJ, Lean ME. Nutritional surveillance and policy. Public health and food. 2014;43(2):132-4.
2. Howells A, Sauer K, Shanklin C. Evaluating Human Resource and Financial Management Responsibilities of Clinical Nutrition Managers. J Acad Nutr Diet. 2016;116(12):1883-91.
3. Hankey C. Food and catering modifications for public health: chronic disease and obesity prevention. Public health and food. 2014;43(2):135-8.
4. Lean ME. Principles of human nutrition. Principles of human nutrition. 2014;43(2):61-5.
5. Kuo SE, Lai HS, Hsu JM, Yu YC, Zheng DZ, Hou TW. A clinical nutritional information system with personalized nutrition assessment. Comput Methods Programs Biomed. 2018;155:209-16.
6. Cioara T, Anghel I, Salomie L, Barakat L, Miles S, Reidlinger D, et al. Expert system for nutrition care process of older adults. Future Generation Computer Systems-the International Journal of Escience. 2018;80:368-83.
7. Hong SM, Cho JY, Lee JH, Kim G, Kim MC. NutriSonic web expert system for meal management and nutrition counseling with nutrient time-series analysis, e-food exchange and easy data transition. Nutr Res Pract. 2008;2(2):121-9.
8. Kaput J. Nutrigenomics research for personalized nutrition and medicine. Curr Opin Biotechnol. 2008;19(2):110-20.
9. Vergéres G. Nutrigenomics - Linking food to human metabolism. Trends in Food Science and Technology. 2013;31:6-12.
10. Hong S-M, Kim G. Web Expert System for Nutrition Counseling and Menu Management. J Community Nutrition. 2005;7(2).
11. Marti A, Goyenechea E, Martinez JA. Nutrigenetics: a tool to provide personalized nutritional therapy to the obese. J Nutrigenet Nutrigenomics. 2010;3(4-6):157-69.
12. Eaton SB, Eaton SB, 3rd, Konner MJ, Shostak M. An evolutionary perspective enhances understanding of human nutritional requirements. J Nutr. 1996;126(6):1732-40.
13. Sohn S, Helms TM, Pelleter JT, Muller A, Krottinger AI, Schoffski O. Costs and benefits of personalized healthcare for patients with chronic heart failure in the care and education program "Telemedicine for the Heart". Telemed J E Health. 2012;18(3):198-204.
14. Peter S, Saris WH, Mathers JC, Feskens E, Schols A, Navis G, et al. Nutrient Status Assessment in Individuals and Populations for Healthy Aging-Statement from an Expert Workshop. Nutrients. 2015;7(12):10491-500.
15. Frankenfield DC. Bias and accuracy of resting metabolic rate equations in non-obese and obese adults. Clin Nutr. 2013;32(6):976-82.
16. Krüger RL, Lopes AL, Gross JDS, Macedo RCO, Teixeira BC, Reischak-Oliveira Á. Validação de equações de predição da taxa metabólica basal em sujeitos eutróficos e obesos. Revista Brasileira de Cineantropometria e Desempenho Humano. 2014;17(1):73-81.

Dominant Hypertension Factors of Adolescents in West Java, Indonesia

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ABSTRACT

Adolescents are susceptible to degenerative diseases such as hypertension. The hypertension prevalence of the adolescents in West Java, Indonesia is 10.5%, which exceeds the national prevalence of 8.7%. This cross-sectional study was conducted in 2018 in West Java, Indonesia, and involved 152 students selected using a simple random sampling technique. The data was analyzed using chi-squared and logistic regression tests, and the results revealed that 11.8% of the students exhibited hypertension. Moreover, the significantly related factors included the sex, body mass index/age, and sleeping duration, while the sex of the students most dominantly influenced the hypertension rate (p=0.021, odds ratio=8.9). Based on these results, adolescents in Indonesia should undergo regular blood pressure checks, and they should be encouraged to eat more balanced diets, while reducing fatty foods, in order to reduce their risks of high blood pressure and obesity.

Keywords: *age, body mass index, blood pressure, sleeping duration, sex*

Introduction

According to the Centers for Disease Control and Prevention, adolescents are in the development stage of the transition from childhood to adulthood at 10–19 years of age. As described by the United Nations International Children's Emergency Fund's definitions of prehypertension and hypertension, teenagers fall into two categories: early adolescence (10 –14 years old) and late teens (15–19 years old)[1]. In adolescents, hypertension is defined as repeated systolic and diastolic blood pressures above the 95thpercentile[2].

Hypertension is a blood vessel disorder from 1999 to 2010; however, there were no permanent that interferes with the oxygen supply and nutrients carried by the blood to the tissues that require them. This disease often arises without any symptoms, so it is considered to be a "silent killer"[3]. The prevalence of hypertension in adolescents is 4%, and an increase in a single blood pressure measurement indicates a 4% to 17% susceptibility[4]. Based on the National Health and Nutrition Examination Survey (NHANES) data, the 2016–2017 hypertension prevalence among adults was 29% (30.2% of men and 27.7% of women). The prevalence rate increased changes until 2016. Additionally, the 2016 NHANES data showed that there was a blood pressure increase in children and adolescents (8–17 years old) in the US[5]. According to the Basic Health Research data from 2013, the hypertension prevalence in Indonesia (≥ 18 years old) was 25.8%; it was 29.4% in the West Java Province and 27.6% in the Bogor Regency[6]. The Basic Health Research data from 2007 reported hypertension prevalence of Indonesian adolescents 15–24 years old was 8.7%, while the prevalence in West Java was 10.5%. These rates show the hypertension prevalence of individuals ≥18 years old and 15–24 years old in the West Java Province were higher than the national level[7]. Some of the factors contributing to the high hypertension prevalence of adolescents cannot be changed, such as genetics, sex, race, and age. However, some risk factors can be changed, including obesity, lack of exercise or physical activity, stress, smoking, alcohol consumption, potassium, calcium, and a diet high in fat and sodium[8].

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Method

This cross-sectional study was conducted at Health Vocational School located in Bogor, West Java, Indonesia. The research began in April–May 2018, with a total

152 students which chosen by simple random sampling technique as respondents based on the Lemeshow difference in proportions hypothesis test. The data collected included direct interview using a questionnaire, subject characteristics, physical activity level, sleep duration, and stress. The subject characteristics (the sex and family history of hypertension) were obtained directly using a questionnaire. The anthropometric data (height and body weight) were used to measure the nutritional status by dividing the BMI (kg/m^2) by the age (years). The weight was obtained by having the subjects step on to a scale (increments of 0.1 kg), and the height was measured using a Microtoise (increments of 0.1 cm). The nutritional intake data (amounts of sodium, potassium, calcium, fat, fruits, vegetables, and water consumed) was obtained from direct interviews using a 2 x 24-hour dietary recall method (weekday and weekend). The questionnaire and interview formats were based directly on the Physical Activity Questionnaire for Adolescents (PAQ-A) and the Perceived Stress Scale. Each subject's blood pressure was obtained using mercury sphygmomanometer. The physical activity levels were obtained using questionnaires and interviews based on the PAQ-A.

Results

Table 1 shows 11.8% of the students exhibited hypertension 95.4% were females; 28.9% had genetic (family) histories of hypertension, and 19.7% of the students were overweight. The nutrient intakes were as follows: 50% had high sodium intakes, 50% had low potassium and calcium intakes. Another results 50% had high fat intakes,75% had low fruit intakes, 65.1% had low vegetable intakes, and 49.35% had low water intakes. Furthermore, 37.5% of the students exhibited low physical activity levels, 3.9% smoked, 31.6% had low sleep durations, and 88.2% exhibited stress.

The bivariate statistical test results are shown in Table 2. The results of the odds ratio testing (OR=6.50, 95%[CI] 1.32-32.85) showed that the male students had a 6.50 times higher risk of hypertension compared to the female students. This corresponds with the research conducted in Brazil which showed the gender exhibited a significant relationship with hypertension; the percentage of males (22%) with hypertension was greater than the percentage of females (9.7%)[9]. A study also reported the males had higher risk of hypertension than females[10]. It was because women have higher prevalence of healthy living behaviors than men, such as healthy eating habits and avoiding smoking and alcohol consumption. Additionally, male adolescents have higher hypertension risk because they accumulate more visceral and intra-abdominal fat.

Table 1: Univariate Analysis

Variable		Total	Percentage (%)
Hypertension	Yes	18	11.8
	No	134	88.2
Sex	Male	7	4.6
	Female	145	95.4
Genetic	Yes	44	28.9
	No	108	71.1
BMI/A	Overweight	30	19.7
	Normal	122	80.3
Natrium intake	Over	76	50
	Adequate	76	50
Pottasium intake	Defisit	76	50
	Adequate	76	50
Calsium intake	Defisit	76	50
	Adequate	76	50
Fat intake	Over	76	50
	Adequate	76	50
Fruit consumption	Defisit	114	75
	Adequate	38	25
Vegetable consumption	Defisit	99	65.1
	Adequate	53	34.9
Water consumption	Defisit	75	49.3
	Adequate	77	50.7
Physical activity	Sufficient	95	62.5
	Less	57	37.5
Smoking	Yes	6	3.9
	No	146	96.1
Sleep duration	Less	48	31.6
	Sifficient	104	68.4
Stress	Stress	134	88.2
	No Stress	18	11.8

The results also showed a higher BMI/A proportion in the hypertension cases (OR=5.38, 95% [CI] 1.91-15.14). These results correspond to study which described a significant relationship between the BMI/A and hypertension[11]. A study showed the adolescents with

higher BMI/A ratio had 12.3 times chance of developing hypertension[12]. A study in India also showed a significant relationship between the BMI and hypertension[13]. However, a study in Brazil showed there was no significant relationship between BMI/A and hypertension[14].

Obesity is one of factors associated with hypertension in adolescents, and related the activation of sympathetic nervous system, insulin resistance, and vascular dysfunction. Teenagers with overweight experience an increase in sympathetic nervous system activity, which causes increases the heart rate and blood pressure. The insulin resistance occurs due to obesity inhibits glucose absorption and affects the sodium resistance, causes the heart rate and blood pressure. The insulin resistance which occurs due to obesity inhibits glucose absorption and affects the sodium resistance, which causes increase in the blood pressure[15].

Table 2: Bivariate Analysis

Variable		Hypertension				OR 95% CI	p value
		Hypertension (n = 18)		No hypertension (n = 134)			
		n	%	n	%		
Sex	Male	3	42.9	4	57.1	6.5	0.036*
	Female	15	10.3	130	89.7	1.32 – 31.85	
Genetic	Yes	6	13.6	38	86.4	1.26	0.873
	No	12	11.1	98	88.9	0.442 – .3.608	
BMI/A	Overweight	9	30	21	70	5.38	0.002*
	Normal	9	7.4	113	92.6	1.91 – 15.14	
Natrium intake	Over	9	11.8	67	88.2	1	1
	Adequate	9	11.8	67	88.2	0.37 – 2.67	
Pottasium intake	Defisite	11	14.5	65	85.5	1.66	0.451
	Adequate	7	9.20	69	90.9	0.61– 4.56	
Calsium intake	Defisite	12	15.8	64	84.2	2.18	0.209
	Adequate	6	7.9	70	92.1	0.77– 6.17	
Fat intake	Lebih	8	10.5	68	89.5	0.77	0.802
	Cukup	10	13.2	66	86.8	0.28 – 2.08	
Fruit consumption	Defisite	16	14	98	86	2.93	0.244
	Adequate	2	5.3	36	94.7	0.64 – 13.42	
Vegetable consumption	Defisite	8	8.1	91	91.9	0.37	0.089
	Adequate	10	18.9	43	81.1	0.13 – 1.02	
Water consumption	Defisit	9	12	66	88	1.03	1
	Adequate	9	11.7	68	88.3	0.38 – 2.75	
Physical activity	Less	9	15.8	48	84.2	1.79	0.365
	Sufficient	9	9.5	48	90.5	0.66 – 4.81	
Smoking	Yes	3	50	3	50	8.73	0.022*
	No	15	10.3	131	89.7	1.61 – 47.19	
Sleeping duration	Less	11	22.9	37	77.1	4.12	0.009*
	Sufficient	7	6.7	97	93.3	1.48 – 11.43	
Stress	Stress	15	11.2	119	88.8	0.63	0.45
	No Stres	3	16.7	15	83.3	0.16 – 2.43	

This study showed a difference in the proportion of smoking between those individuals with and without hypertension (OR=8.73, 95% [CI] 1.61-47.79). It means the students who smoked exhibited hypertension 8.73 times more often. These results are similar to a study which showed that the adolescents who smoked had a one-time risk of developing high blood pressure, and this was a significant relationship[16]. Contrarily, a study showed no significant relationship between smoking and the hypertension incidence[17]. Smoking is one of the causes of hypertension. This is because the chemicals contained in tobacco can damage the inner walls of

the arteries, making them more susceptible to plaque build-up (atherosclerosis). Additionally, the nicotine in cigarettes can stimulate the sympathetic nervous system, which increases the heart rate and constricts the blood vessels. Moreover, the carbon dioxide released by cigarettes can replace the oxygen in the blood, forcing the heart to work harder to meet the oxygen demands of the body[18]. The results of this study also showed that differences in the sleep duration were related to hypertension (OR=4.12, 95% [CI] 1.48-11.43). This means that those students with a lower sleep duration had 4.12 times the risk of experiencing hypertension than those with a sufficient amount of sleep. This is similar to the research which showed a significant relationship between the sleep duration and blood pressure in adolescents[19]. The biological mechanisms of a poor quality of sleep causing hypertension are not known with certainty, but they may be related to a cortisol secretion disturbance. The stimulation of the renin-angiotensin system and the sympathetic nervous system due to an increase in catecholamine secretion can cause hypertension; therefore, adolescents with a poor sleep quality may exhibit a homeostasis system disruption. This disruption can result in increased brain activity, thus, results in the secretion of various hormones. These hormones (epinephrine and norepinephrine) can affect the peripheral resistance, and factors combined can increase the blood pressure. One study showed there were no significant differences between the genetic factors with regard to hypertension[20]. Additionally, a study reported there was no significant relationship between genetic hypertension and hypertension it self[1]. However, Angesti showed a significant relationship between a family history hypertension and hypertension. The students with family hypertension histories had a 3.19 times greater risk of developing hypertension[21]. Similarly, the results of a study showed a significant relationship between a family hypertension history and the development of hypertension[13]. The statistical test results showed no significant relationship between the sodium intake level and hypertension. This corresponds to a study which showed no significant relationship between the sodium intake and hypertension[21]. However, two studies showed a significant relationship between them[12,22]. Moreover, the results showed no significant relationship between the potassium intake level and hypertension. This also corresponds with research conducted by Angesti, which showed no significant relationship between the potassium intake and hypertension[21]. Contrarily, the results of a study showed low potassium intake had a significant relationship with hypertension[20]. Finally, the present study showed no significant relationship between the calcium intake level and hypertension. This corresponds to the results of study conducted among high school students in Semarang, which also showed significant results between the calcium intake level and hypertension[22]. However, a study conducted among adolescents in Semarang showed the calcium intake level did have a significant relationship with blood pressure[23]. The present study also showed no significant relationship between the fat intake level and hypertension. This corresponds with studies which stated there was no significant relationship between the fat intake level and hypertension[11,22]. Moreover, the present study showed no significant relationships between the fruit and vegetable consumption levels and hypertension. Angesti also showed that there were no significant relationships between the fruit and vegetable consumption levels and hypertension[21]. Contrarily, a study showed the adolescents who consumed less vegetables had a systolic blood pressure 1.0 times and a diastolic blood pressure 0.8 times higher. Additionally, those who consumed less fruit can had a systolic blood pressure 1.3 times higher and a diastolic blood pressure 1.9 times higher[24].

This study showed no significant relationship between water consumption level and hypertension. These results oppose the studies conducted in Bandung which showed drinking more water contributed to prevent hypertension. Drinking more water results in greater water absorption in every cell of the body, which is a catalyst for metabolic processes. Improving the transportation system accelerates the screening process, increases reabsorption in the glomerulus, and accelerates the excretion of metabolic wastes and toxic substances[25]. Thus, water can help maintain the body organ functions and prevent hypertension. There was no significant relationship between the physical activity level and hypertension in the present study. These results correspond the study by Roberta, which showed no significant relationship between the physical activity level and hypertension[14]. Contrarily, a study conducted on high school students in Banjarmasin, and a study conducted in Europe, showed the physical activity level did exhibit a significant relationship with the risk of high blood pressure[26,10]. The results of statistical tests showed no significant association between the stress

level and hypertension. This opposes the results study in Banjarmasin who showed a significant relationship between stress and the high blood pressure risk in adolescents; the stressed adolescents had a 9.3 times higher risk of hypertension[26].These results are similar to a study which showed there was a significant relationship between stress level and the risk of high blood pressure[17]. The results of the logistic regression analysis showed the sex, BMI/A, and sleep duration exhibited p values of<0.05 (Table 3). However, the sex variable had the greatest OR value and chosen as the dominant factor associated with hypertension (OR=8.9, 95% [1.39-57.08]). It means the male adolescents exhibited hypertension at a rate of 8.9 times higher than the females, after controlling for the family hypertension history, BMI/A, fruit consumption level, vegetable consumption level, physical activity level, and sleep duration.

Table 3: Multivariate Analysis

Variable	p value	OR	95% CI	
			Lower	Upper
Sex	0.021*	8.89	1,385	57,083
Genetic	0.275	0.47	0.119	1,831
BMI/A	0.005*	5.62	1,662	19,028
Fruit Consumption	0.141	3.51	0.659	18,721
Vegetable Consumption	0.098	0.37	0.116	1,202
Physical Activity	0.138	2.53	0.742	8,609
Sleeping Duration	0.012*	5.25	1,449	19,021

Note: *statistically significant

Conclusion

Based on the results of this study, it can be concluded that 11.8% of the students who participated in this study exhibited hypertension, with blood pressure values of ≥ the 95thpercentile. Sex was the most dominant factor with regard to the hypertension incidence. Moreover, the male students exhibited a risk of developing hypertension that was 8.9 times higher than that of the female students, after controlling for the genetic factors, BMI/A, fruit consumption level, vegetable consumption level, physical activity level, and sleeping duration. Therefore, adolescents should pay more attention to consuming a balanced diet, especially if they are overweight or obese. Students should be provided with educational counseling programs describing the factors influencing hypertension and how to avoid it. Future research should incorporate a stronger research study design including causal relationships, such as a cohort study.

Acknowledgment

The authors are grateful to all participants who trusted the research team, and the student volunteers who provided support during the data collection process, ensuring that this study was performed smoothly.

Conflict of Interest: The authors declare that there is no conflict of interest.

Source of Funding: This study was self –funded.

Ethical Clearence: Ethical approval was obtained from the Institutional Review Board of the Faculty of Public Health at the Universitas Indonesia (No. 320/UN2.F10/PPM.00.02/2018, April 25 2018). Written consent was obtained from all of the participants.

REFERENCES

1. United Nations International Children's Education and Fund's (UNICEF). Adolescence An Age of Opportunity. New York: UNICEF; 2011.
2. Portman RJ, Sorof JM, Ingelfinger JR, editors. Pediatric Hypertension. New York: Springer Science & Business Media; 2004.
3. Lany, S. *Hypertension*. Jakarta: PT Gramedia Pustaka; 2004.
4. McNience K, Poffenbarger T, Turner J, Franco K, Sorof J, Portman R. Prevalence of hypertension and pre-hypertension among adolescents. J. Pediatr 2007; 150(6): 640-4.
5. Ostchega Y, Carroll M, Prineas RJ, McDowell MA, Louis T, Tilert T. Trends of elevated blood pressure among children and adolescents: data from the National Health and Nutrition Examination Survey 1988-2006. Am J Hypertens 2009; 22(1): 59-67.
6. Ministry of Health. *Basic Health Research*. Jakarta: Ministry of Health; 2007.
7. Ministry of Health. *Basic Health Research.* Jakarta: Ministry of Health; 2013.
8. Casey A., Benson H. and O. B. Lowering Blood Pressure. Jakarta: Popular Bhuana Sciences; 2012.

9. Christofaro DG, Farah B, Vanderlei, L, Delfno, L, Tebar W, Barros L, et al. Analysis of different anthropometric indicators in the detection of high blood pressure in school adolescents: A cross sectional study with 8295 adolescents. Braz J Phys Ther 2018; 22(1): 49-54.
10. de Moraes ACF, et al. Physical activity modifies the associations between genetic varians and blood pressure in European adolescents. J Pediatr 2014; 165(5): 1046-49.
11. Dewi RA. A*nalysis Risk Factors of Hypertension of Adolecent 15-17 Years in Indonesia on 2007: Analysis of Basic Health Research Data 2007*. [Undergraduate Thesis]. Depok: Universitas Indonesia; 2012.
12. Fitriana R, Lipoeto N, Triana V. *Risk factors the incidence of hypertension in adolecents patient of Sidomulyo Health Center, Pekanbaru*. Jurnal Kesehatan 2013; 7(1): 10.
13. Shah, SS, Dave, BR, Sharma, AA, Desai AR. Prevalence of hypertension and association of obesity with hypertension in School Going Children of Surat City, Western India. Online Journal of Health and Allied Sciences 2013; 12(2): 12-14.
14. de Moura IH, Vieira EMS, da Silva GRF, de Carvalho RBN, da Silva ARV. (2015). Prevalence of arterial hypertension and risk factors in adolescents. Acta Paul Enferm 2015; 28(1): 81–87.
15. Sorof JM and Daniels S. Obesity Hypertension in Children: A Problem of Epidemic. Hypertension 2002; 40(4): 441-7.
16. Mahanta TG, Mahanta B, Deuri A, Baruah. S, Rasailey R, Mahanta, B. Determinants of hypertension amongst school going adolescents aged 13-15 years in Assam. Clinical Epidemiology and Global Health 2017: 6(3): 137-42.
17. Nasta AM, Raguwanshi SR, Churiwala JJ. Study of hypertension in youth and its contributory factors - A cross Sectional Study of 600 subject. International Journal of Current Research 2015; 7(11).
18. Setyanda GOY, Sulastri D, Lestri Y. *The relationship between smoking and the incidence of hypertension in man age 35-65 years in Padang City*. Jurnal Kesehatan Andalas 2015; 4(2): 434-40.
19. Paciência I, Araújo J, Ramos E. Sleep duration and blood pressure: a longitudinal analysis from early to late adolescence. J Sleep Res 2016; 25(6): 702–8.
20. Buendia JR, Bradlee ML, Daniels SR, Singer MR, Moore LL. Longitudinal effect of dietary Sodium and Potassium on blood pressure in adolescents girls. *JAMA Pediatr* 2015; 196(6): 560-568.
21. Angesti AN. *Family Hipertension History as Dominant Factors of Hypertension in Adolescent of Class XI Sejahtera High School Depok in 2017* [Undergraduate Thesis]. Depok: Universitas Indonesia; 2017.
22. Kurnianingtyas BF, Suyatno, Kartasurya MI. *Faktor risiko kejadian hipertensi pada siswa SMA di Kota Semarang Tahun 2016* (Risks factors the incidence of hypertension in High School students in Semarang City 2016). Jurnal Kesehatan Masyarakat 2017; 5(2): 70-7.
23. Farid DA. *The relationship between of Sodium, Potassium, Calsium, Magnesium and fiber with blood pressure in adolescent*. Jurnal Universitas Diponegoro 2010; 1-3.
24. Odunaiya NA, Louw QA, Grimmer KA. Are lifestyle cardiovascular disease risk factors associated with pre-hypertension in 15-18 years rural Nigerian youth? A cross sectional study. *BMC Cardiovasc Disord* 2015; 15(1): 1–10.
25. Suheti T, Sunandar K. Habits drinking ordinary water can prevent hypertension. *Open Journal of Nursing* 2016; 6: 404-411.
26. Kania N, Almira GY, Fakhriadi R, Marlinae, L, Rahman F, Wulandari R. Factors affecting the incident of hypertension in adolescent at Christian High School Banjarmasin. *International Journal of Applied Business and Economic Research* 2016; 14(6): 3631–42.

Discogenic Low Back Pain, Diagnostic Criteria

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ABSTRACT

Background: Diagnosis of discogenic low back pain is challenging process as a most common cause of low back pain. It is a matter of debate and concern for all health professionals involved, particularly spine surgeons. the aim of this study to establish a specific criteria for diagnosing discogenic LBP.

Patients and Method: This our study was carried on 88 patients suffering low back pain suspected to be discogenic in nature which were diagnosed clinically and radiological investigations, clinically We asked patients whether they experienced LBP after sitting too long, while standing after sitting too long, squirming in a chair after sitting too long, and in the standing position with flexion. Also, we examined patient if they have midline tenderness (centralization phenomenon) or not. Rather than classic picture of degenerated disc radiologically as back and bulging discs we analyze mri for high intensity zone in lumbosacral spine MRI. We exclude patient with lumbar spinal stenosis, spondylolisthesis and patient with post-operative lumbar surgery back pain.

We analyzed specific criteria clinically and radiologically for diagnosing discogenic LBP.

Results: We can obtain the precise diagnosis of discogenic low back pain standing on our clinical and radiological criteria.

Clinically: Medical history and Physical examination: Mainly four criteria

LBP after sitting too long: All patients experienced LBP after too sitting, it is significant indicator for discogenic LBP.

Squirming in a chair after sitting too long: There is significant relationship between Squirming during sitting and discogenic back pain, P value is highly significant as it is 0.000

LBP in the standing position with flexion: There is significant relationship between LBP in standing with flexion and DLBP, P value is significant as it is 0.014.

Centralization phenomenon (CP): All cases have midline tenderness on examination as specific signs or discogenic back pain. We suggested that the CP is a diagnostic indicator of DLBP.

Radiologicaliy: Magnetic resonance imaging (MRI) is by far the most useful and the most commonly used method for diagnosing DLBP. an MRI of DLBP shows low signal intensity of the disc on T2W, a high-intensity zone (HIZ) at the rear of the disc, and end plate changes. Low signal intensity of the disc on sagittal T2W. However, P-value is not significant, 60% of patients have high intensity zone in MRI L.S.S which considered to be useful in determining symptomatic level.

Conclusion: All three questions, centralization phenomenon and high intensity zone in MRI Lumbosacral spine were useful and specific for diagnosing discogenic LBP.

Keywords: *Dicogenic low back pain – degenerated disc disease – centralization phenomenon.*

Introduction

Low back pain (LBP) became one of the leading problems in public health systems in the western world during the second half of the 20th century [1]. Most people will experience back pain at some point in their lives. It is estimated that an individual has an 80% probability of having low back pain at some period during his lifetime.[2]

It has been difficult to identify the cause of LBP. A specific source of pain can be identified in some cases of LBP; however, the source cannot be identified in other cases of LBP (i.e., non- specific LBPMagnetic resonance imaging (MRI) can identify underlying pathologies of LBP. However, the importance of MRI findings is unclear and controversial. Some reports have shown that disc degeneration was a source of LBP [3]whereas other reports have shown that there was no relationship between disc degeneration and LBP [4]. Reports have also shown that discogenic LBP associated with degenerative disc disease (DDD) is confirmed by the MRI findings and response to the injection of contrast media or local anaesthesia into the disc [5]. Schwarzer et al. reported that 39% of cases of chronic LBP are discogenic, and the diagnosis is made by computed tomography after discography [6]. The technique of injecting local anaesthesia into a disc is analgesic discography (discoblock). However, these procedures do not necessarily indicate high specificity findings of discogenic LBP [7], and they are invasive and harmful to the disc [8].

We hypothesized that discogenic LBP is one of the causes of LBP, and we sought to determine easier and less invasive means of diagnosing discogenic LBP. Few reports have specified that LBP in the sitting position can indicate discogenic LBP [9]. The purpose of the current study was to evaluate the usefulness of our original questions in a medical interview about LBP and radiologically criteria also, which was intended to determine the characteristics of discogenic LBP and establish a support tool for diagnosing discogenic LBP.

Discogenic Low Back Pain (DLBP): Because of the variety of anatomic and pathophysiologic causes of chronic low back pain, it is a difficult diagnosis for clinicians to make. Only a small proportion (approximately 20%) of LBP cases can be attributed with reasonable certainty to a pathologic or anatomical entity. Thus, diagnosing the cause of LBP represents the biggest challenge for doctors in this field. Persistent LBP treatments are often unsatisfactory due to the lack of a precise diagnosis. Good history taking, clinical examination and investigation.

Patient Assessment

The assessment of a patient who has low back pain begins with history taking, followed by a physical examination. There are certain red flags on history and physical examination that warrant immediate evaluation and diagnostic testing. If a red flag has shown, appropriate action must be taken including urgent surgical intervention at the same day.

Red flags on history and physical examination that should lead to immediate investigation and treatment:

- Cauda equina syndrome (the most important).
- Age less than 20 years or greater than 55 years.
- Trauma.
- Malignant disease (multiple myeloma, lymphoma, primary epidural or intra dural tumor) or metastatic disease.
- Treatment with glucocorticoids.
- IV drug abuse, alcohol abuse.
- HIV infection.
- Unexplained weight loss.
- Unexplained fever.
- Constant pain that is worsening over time.
- Progressive neurologic deficit.

Diagnosis of discogenic low back pain: We can obtain the precise diagnosis of discogenic low back pain by the following:

A. Clinically: Medical history and Physical examination: Mainly five criteria

1. LBP after sitting too long
2. squirming in a chair after sitting too long.
3. LBP in the standing position with flexion.
4. Location: Centralization phenomenon (CP):

We examined patient if they have midline tenderness (centralization phenomenon) or not. Mckenzie in 1981 first described the centralization phenomenon, which consists of pain in the

central line of the spine upon lateral movement. The mechanism of the CP showed that Spinal movements may return the displaced or removed nucleus to its normal position along the crack of the disc, resulting in pain along the central line of the spine.

B. Radiological studies: Magnetic resonance imaging (MRI) is by far the most useful and The most commonly used method for diagnosing DLBP. an MRI of DLBP shows low signal intensity of the disc on T2W, a high-intensity zone (HIZ) at the rear of the disc, and end plate changes. Low signal intensity of the disc on sagittal T2W. Age-related disc degeneration is associated with nucleus dehydration and matrix degradation, causing the T2W MRI signal intensity to decrease and resulting in a "black disc", Sagittal T2-weighted images are best for evaluating disk water content (Fig. 1)

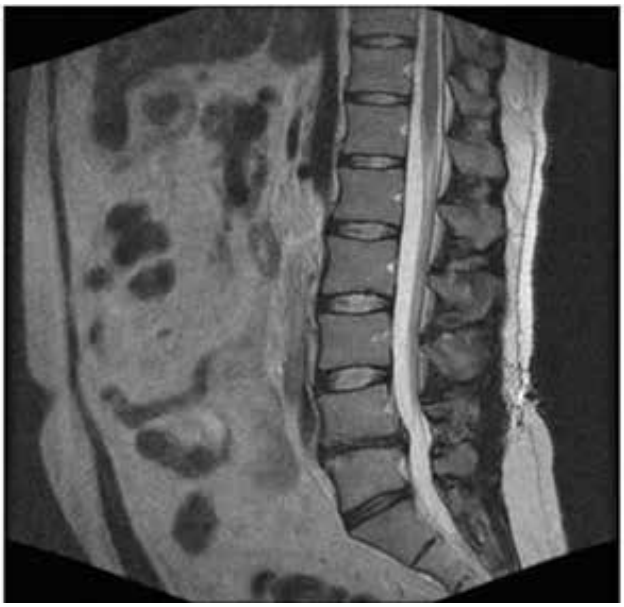


Figure 1: Sagittal T2-weighted magnetic resonance image demonstrating disk height collapse and loss of T2 signal within theL4-5 and L5-S1 disks. Note also the reactive end plate changes and overall loss of lumbar lordosis.

Rather than classic picture of degenerated disc in MRI as black and bulging disc we analyze MRI L.S.S for high intensity zone in the degenerated discs.

High-intensity zone (HIZ): In 1992, Aprill and Bogduk first described what is now known as the High- intensity zone (HIZ) seen on MRI of the lumbar spine. HIZ was a 'high-intensity signal' (bright white) located in the posterior annulus fibrosus. It is clearly dissociated from the signal of the nucleus pulposus in that it is surrounded superiorly, inferiorly, posteriorly and anteriorly by the low-intensity (black) signal of the annulus fibrosus and is appreciably brighter than the signal of the nucleus (Figure 2).

A close association between HIZ and disc pain was observed in some studies. It is suggested that inflammation of the annular fibrosus fissure causes the HIZ to appear, and this inflammation also causes irritation of pain fibers. The presence of the HIZ has a sensitivity of 82%, a specificity of 89%, and a positive predictive value of 90% for DLBP. Peng et al.found that the HIZ had a 100% sensitivity and specificity for discs classified as having a grade 3 tear according to the Dallas discogram description. Overall, most clinicians consider the presence of the HIZ is a good indicator for DLBP.

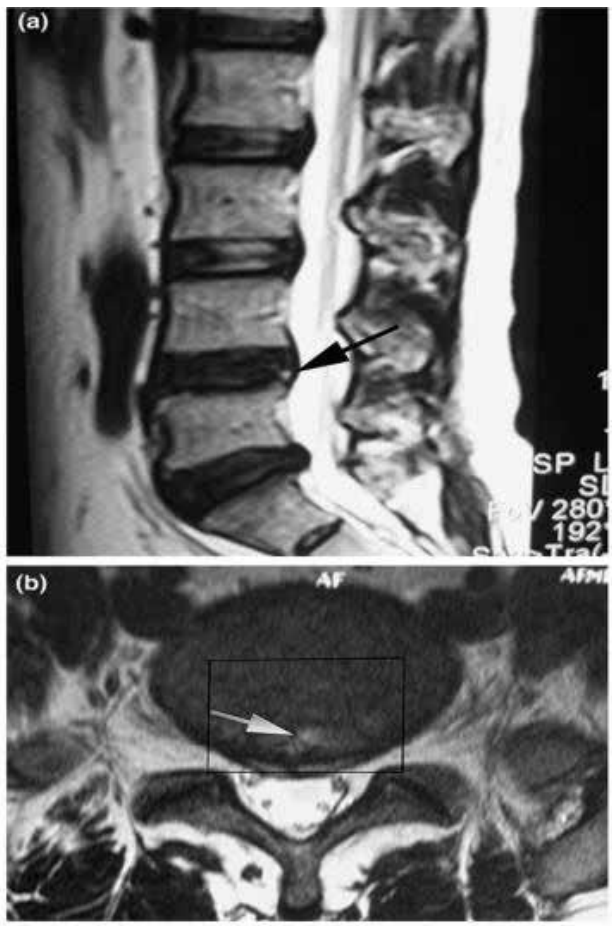


Figure 2: Sagittal T2-weighted magnetic resonance image (MRI) shows a high-intensity zone (arrow) within the posterior annulus at L4-L5 Axial T2-weighted MRI shows a high-intensity zone (arrow) within the posterior annulus at L4-L5

Results

1. **LBP after sitting too long:** All patients experienced LBP after too sitting, it is significant indicator for discogenic LBP.
2. **Squirming in a chair after sitting too long:** There is significant relationship between Squirming during sitting and discogenic back pain, P value is highly significant as it is 0.000
3. **LBP-standing with flexion:** There is significant relationship between LBP in standing with flexion and DLBP, P value is significant as it is 0.014.
4. **Local Midline tenderness:** All cases have midline tenderness on examination as specific signs or discogenic back pain. We suggested that the CP is a diagnostic indicator of DLBP.

Table 1: Relation between discogenic low back pain and LBP after sitting too long- and P-value.

		Negative	Positive	
LBP-sitting	Count	41	47	88
	% within LBP-sitting	46.6%	53.4%	100.0%
Total	Count	41	47	88
% within LBP-sitting-Pre	46.6%	53.4%	100.0%	

	Value	Df	p value
McNemar-Bowker Test	.	.	.(a)
N of Valid Cases	88		

a. Computed only for a PxP table, where P must be greater than 1.

Table 2: Relation between discogenic low back pain and squirming in a chair after sitting too long -and P-value

			Squirming-sitting		Total
			Negative	Positive	
Squirming-sitting	Negative	Count	6	3	9
		% within Squirming-sitting-	66.7%	33.3%	100.0%
		% within Squirming-sitting	13.0%	7.1%	10.2%
	Positive	Count	40	39	79
		% within Squirming-sitting-	50.6%	49.4%	100.0%
		% within Squirming-sitting	87.0%	92.9%	89.8%
Total		Count	46	42	88
		% within Squirming-sitting-	52.3%	47.7%	100.0%
		% within Squirming-sitting	100.0%	100.0%	100.0%

	Value	p value
McNemar Test		.000(a)
N of Valid Cases	88	

a. Binomial distribution used, b. Group = PRF

Table 3: Relation between discogenic low back pain and LBP-standing with flexion - and P-value

			LBP-standing with flexion		Total
			Negative	Positive	
LBP-standing with flexion	Negative	Count	29	9	38
		% within LBP-standing with flexion	76.3%	23.7%	100.0%
		% within LBP-standing with flexion	54.7%	25.7%	43.2%
	Positive	Count	24	26	50
		% within LBP-standing with flexion-	48.0%	52.0%	100.0%
		% within LBP-standing with flexion	45.3%	74.3%	56.8%
Total		Count	53	35	88
		% within LBP-standing with flexion	60.2%	39.8%	100.0%
		% within LBP-standing with flexion	100.0%	100.0%	100.0%

	Value	p value
McNemar Test		.014(a)
N of Valid Cases	88	
a. Binomial distribution used.		

Table 4: Local Midline tenderness

			Group	
Local Midline tenderness	Yes	Count	88	100
		% within Local Midline Tenderness	50.0%	100.0%
		% within Group	100.0%	100.0%
Total		Count	88	100
		% within Local Midline Tenderness	50.0%	100.0%
		% within Group	100.0%	100.0%

5. **High intensity zone in MRI L.S.S:** However, 60% of patients have high intensity zone in MRI L.S.S but P-value is not significant.

Table 5: high intensity zone

High intensity zone	Positive	Negative	Total
Count	53	35	88
Percentage %	60%	40%	100%
p-value 0.55			

Discussion

Because of the variety of anatomic and pathophysiologic causes of chronic low back pain, it is a diffcult diagnosis for clinicians to make, We can obtain the precise diagnosis of discogenic low back pain standing on our clinical and radiological criteria.

A. **Clinically: Medical history and Physical examination:** Mainly four criteria

LBP after sitting too long: All patients experienced LBP after too sitting, it is significant indicator for discogenic LBP.

Squirming in a chair after sitting too long: There is significant relationship between Squirming during sitting and discogenic back pain, P value is highly significant as it is 0.000

LBP in the standing position with flexion: There is significant relationship between LBP in standing with flexion and DLBP, P value is significant as it is 0.014.

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Conclusion

To conclude we hypothesized 5 criteria specific for discogenic low back pain:

- LBP after sitting too long,
- squirming in a chair after sitting too long,
- LBP in the standing position with flexion.
- midline tenderness (centralization phenomenon)
- high intensity zone in lumbosacral spine MRI.

REFERENCES

1. Balagué, F., Mannion, A.F., Pellisé, F. and Cedraschi, C. (2012) Non-specific low back pain. *Lancet*, **379**, 482-491. http://dx.doi.org/10.1016/S0140-6736(11)60610-7

2. Andersson, G.B. (1999) Epidemiological features of chro- nic low back pain. *Lancet*, **354**, 581-585. http://dx.doi.org/10.1016/S0140-6736(99)01312-4

3. Cheung KM, Karppinen J, Chan D, HoD W, Song YQ, Sham P, etal. Prevalence and pattern of lumbar magnetic resonance imaging changes in a population study of one thousand forty-three individuals. Spine. 2009; 34:934 – 940. doi: 10.1097/ BRS. 0b013 e 3181 a 01b3 fPMID: 19532001

4. EndeanA, Palmer KT, Coggon D. Potential of magnetic resonance imaging finding store fine casedefi- nition for mechanical low back pain in epidemiological studies: a systematic review. Spine. 2011; 36: 160–169.doi:10.1097/BRS. 0b013e3181cd9adb PMID: 20739918

5. Ohtori S, Kinoshita T, Yamashita M, Inoue G, Yamauchi K, Koshi T, etal. Results of surgery for disco- genic low backpain : arandomized study using discography versus disco block for diagnosis. Spine. 2009; 34 : 1345–1348. doi: 10.1097/ BRS. 0b013 e 3181 a 401bf PMID: 19440168

6. Carragee EJ, Tanner CM, Khurana S, Hayward C, Welsh J, Date E, et al. The rates of false-positive lumbar discography in select patients without low back symptoms. Spine. 2000; 25: 1373–1380. PMID: 10828919

7. Carragee EJ, Don AS, Hurwitz EL, Cuellar JM, Carrino JA, Herzog R. 2009 ISSLS Prize Winner: Does discography cause accelerated progression of degeneration changes in the lumbar disc: a ten-year matched cohort study. Spine. 2009; 34: 2338–2345. doi: 10.1097/ BRS. 0b013 e 3181 ab 5432 PMID: 19755936

8. Fairbank J C, Couper J, DaviesJB, O'Brien JP. The Oswestry low backpain disability questionnaire. Physiotherapy. 1980; 66 : 271–273. PMID : 6450426

9. Fujiwara A, Kobayashi N, Saiki K, Kitagawa T, Tamai K, Saotome K. Association of the Japanese Orthopaedic Association score with the Oswestry Disability Index, Roland-Morris Disability Question-naire, and short-form 36. Spine. 2003; 28: 1601–1607. PMID: 12865852

Ultrasound Guided Enhanced Recovery Program in Colorectal Surgery: Kasralainy Modified Protocol

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ABSTRACT

Enhanced recovery after surgery (ERAS) protocols were created to improve patient recovery and to reduce the postoperative hospital stay and comorbidities. Temporary postoperative gastrointestinal dysfunction, as nausea, vomiting, or abdominal distension, is a common morbidity after abdominal surgery that largely determines clinical recovery and hospital stay.Currently, the diagnoses of temporary postoperative GI.dysfunction and paralytic ileus are based on subjective reporting of clinical symptoms. In our study an objective assessment tool to identify temporary postoperative GI. dysfunction and paralytic ileus, as well as their resolution was used and the results showed that ERAS combined with abdominal ultrasound used for the care of patients undergoing colorectal surgery is improving standards of care by reducing postoperative hospital stay, attempting to improve the overall quality of recovery, decrease the percentage of postoperative vomiting, cost saving, and patient satisfaction.

Keywords: *Ultrasound, ERAS, Colorectal, Cancer, PONV, Recovery.*

Introduction

Enhanced recovery after surgery (ERAS) protocols were created to improve patient recovery by the early restoration of normal physiological function, and by decreasing the surgical stress response. The result was reducing the postoperative hospital stay and comorbidities. Data regarding the effect of ERAS on complications are conflicting; Some randomized trials have reported no differences in the complication rate[1–6]. however, other studies showed a reduction in minor complications only with ERAS protocols but not in major complications [7-12]. Temporary postoperative gastrointestinal dysfunction, as nausea, vomiting, or abdominal distension, is a common morbidity after abdominal surgery that largely determines clinical recovery and hospital stay[13].

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Dysfunction may be prolonged (≥4 days), resulting in prolonged paralytic ileus [14,] that may reported to affect about 14% of patients after major colorectal surgery[15], Currently, the diagnoses of temporary postoperative GI. dysfunction and paralytic ileus are based on subjective reporting of clinical symptoms. Therefore, a more objective assessment tool to identify temporary postoperative GI.dysfunction and paralytic ileus, as well as their resolution, is desirable to assist with the safe postoperative introduction progression of oral intake. [16]

Patient and Method

This is a randomized control study which was registered with Pan African Clinical Trial Registry (PACTR20180600337298). The study included sixty patients, aged 18 or above who were treated with elective laparoscopic colorectal surgery for malignant or benign disease, with or without stoma, at Cairo university hospitals, (KasrAlainy), Cairo, in the period between March 2017 to February 2018.

After the agreement of the scientific and ethical committee of the general surgery department, the procedure and the study were explained for all individuals

participating in the study and all of them consented for agreement. Patients below 18 years old, patients with previous history of major abdominal surgery, patients with electrolyte imbalance as hypokalemia, haemodynamically unstable, peritonitis, and emergency operations were excluded from the study.

The 60 patients randomized into two groups (A and B) using closed envelop technique. Neither patients nor physicians were blinded to the group assignment because of the nature of the study. Group A included 30 patients who were allowed to have oral fluid intake on the first day postoperative and built up to an oral diet over the next 24 hours postoperatively. Group B included 30 patients who had abdomino-pelvic ultrasound 24 hours after surgery using abdominal probe 3.5 M.H.Z. at least for 10 minutes to assess gastrointestinal motility. Once the intestinal motility recognized the patient allowed to initiate the oral fluid and then allowed to start soft diet as tolerated. If there is no intestinal motility the ultrasound was repeated every 12 hours until the presence of good gastrointestinal motility.

All patients were counseled and trained Pre-operatively for the concept of ERAS, and curtailed fasting. The patients should be fasted for 6 hours to solids but they were allowed to have small amounts of clear free fluids for up to 2 hours before induction of general anesthesia. In addition, a clear carbohydrate rich drink should be administered orally (100 g.) the night before surgery and (50 g.) 3 hours prior to induction of anesthesia. A single dose of prophylactic antibiotics (ceftriaxone 1 gm. and metronidazole 500 mg) was given 15 min. prior to skin incision, and the second dose was administrated if the procedure prolonged more than 4 hours, or major blood loss more than 1500 ml.

Intraoperative infusion of crystalloids was tailored to avoid excess fluid administration and volume overload using goal-directed fluid therapy. intra-abdominal drains were used only when indicated.

Early postoperative mobilization was encouraged with early removal of urinary catheters and NG tubes and administration of a restricted amounts of intravenous fluid. A daily regime of 1.5 to 2.5 L. of balanced intravenous solutions should be prescribed to avoid excessive fluid administration, sodium overload, or hyperchloremic acidosis and delayed return of gut function.. A multimodal, opioid-sparing, pain management plan was adopted in all patients.

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 25. Data was summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using the non-parametric Mann-Whitney test. For comparing categorical data, Chi square ($\chi 2$) test was performed. Exact test was used instead when the expected frequency is less than 5. P-values less than 0.05 were considered as statistically significant.

Results

Both groups were matched regarding the age and gender. The mean age for group A was 51.80 ± 12.95 while group B was 49.57 ± 11.65 ($p > 0.05$).

All patients in group A (100%) started oral fluid in day 1 while only (80%) of group B started oral fluid in the first postoperative day after assessment of good G.I.T motility by U/S. the rest of the patients of group B (20%) started oral fluid after reassessment of G.I.T motility by U/S in day 2. with significant statistical difference between the two groups ($p > 0.05$). Regarding the start of soft diet, 80% of patients in group A started soft diet at day two, 10% of patient at day three, and 10% at day four after toleration of oral fluid. On the other hand, 70% of patients in group B started soft diet at day two, 26.7% at day three, and 3.3% at day four after toleration of oral fluid. ($p > 0.05$)

There is significant statistical difference between the two groups regarding the postoperative vomiting ($p < 0.05$)

The mean post-operative hospital stay of group A was 3.97 ± 0.64 while group B was 3.36 ± 0.65. with significant statistical difference between the two groups ($p < 0.05$).

The readmission rate to the hospital was the same (3.3%) in both groups with no significant statistical difference between the two groups (p value 1).

Both groups were matching regarding the perioperative comorbidities as shown in table (1)

33.3% of patients in group A Pass flatus or stool or functioning stoma while 53.3% in group B at day one, 43.3% of patients in group A while 36.7%in group B at day two, and 10% of patients in group A while 23.3% in group B at day 3 after toleration of oral fluid in both groups with no significant statistical difference between the two groups ($p > 0.05$).

Table 1: Showing the summary of the collected data in both groups

		Group A		Group B		P value
		Count	%	Count	%	
Sex	M	20	66.7%	16	53.3%	0.292
	F	10	33.3%	14	46.7%	
Medical Hx	HTN	2	6.7%	3	10.0%	0.875
	DM	3	10.0%	2	6.7%	
	D.M,AF,Astma	0	.0%	1	3.3%	
	D.M, HTN	5	16.7%	3	10.0%	
	Free	20	66.7%	21	70.0%	
Start oral Fluid	D1	30	100.0%	24	80.0%	0.024
	D2	0	.0%	6	20.0%	
Initiation of soft diet	D2	24	80.0%	21	70.0%	0.218
	D3	3	10.0%	8	26.7%	
	D4	3	10.0%	1	3.3%	
Post Op. vomiting	yes	8	26.7%	1	3.3%	<0.05
	NO	22	73.3%	29	96.7%	
readmission	yes	2	6.7%	2	6.7%	1
	NO	28	93.3%	28	93.3%	
Pass flatus/stool/ functioning stoma	D1	10	33.3%	16	53.3%	0.207
	D2	13	43.3%	11	36.7%	
	D3	7	23.3%	3	10.0%	

Discussion

This was a randomized control study, which included sixty patients who presented to the outpatient clinic of the colorectal unit in KasrAlainy hospital in the period between March 2017 to February 2018 for colorectal surgery.

The purpose of this study was to evaluate the role of abdominal and pelvic ultrasound in ERAS to assess the gastro-intestinal motility after colorectal surgery, and its effect on the postoperative hospital stay, PONV and readmission rate.

In this study, all patients were in group A (100%) started oral fluid in day 1 (under right scenario of ERAS. technique), while only (80%) of group B patients were started oral fluid after assessment of good G.I.T motility by US and the rest of the patients of group B (20%) were started oral fluid after reassessment of good G.I.T. motility by US. in day 2. There was a significant statistical difference between the two groups (p>0.05).

This study matched with what was reported by ***Andersen and his colleagues***[17]that, patients should be allowed oral fluids as tolerated on the day of the surgery and built up to an oral diet over the next 24 hours. Patients who are not meeting their nutritional requirements by 72 hours after surgery should be assessed by a dietician.

The result in this study showed that the oral intake is more tolerated when using an objective method (ultrasound) to assess the gastrointestinal motility, this was suggested by significant statistical difference between the two groups regarding to the postoperative vomiting (p <0.05). The undesirable postoperative GIT dysfunction, manifesting as nausea, vomiting, or abdominal distension, is a common morbidity after ERAS in abdominal surgery that largely determines clinical recovery and hospital stay[13]. However the cause of vomiting is multifactorial and can be classified into three factors: patient, anesthetic and surgical [18,19]

This study showed that 80% of patients in group A were started soft diet while 70% in group B at day two. While 10% of patients in group A while 26.7% in group B at day three, and 10% of patients in group A while 3.3% in group B at day four after toleration of oral fluid

in both groups with no significant statistical difference between the two groups (p >0.05).

These results were matched with what were reported that, early introduction of diet and fluids within 24 hours post-operatively has been shown to be safe [20]. Also compatible with Ljungqvist and his colleaguethat patient progressing normally on an ERAS pathway should be drinking, eating and mobilizing on the day after operation to minimize stress, improve the response to stress and maintaining homeostasis. The early feeding encourage the patient to avoid catabolism with consequent loss of protein, muscle strength, cellular dysfunction and avoiding several traditional care elements.[21,22]

The results in this study showed that 33.3% of patients in group A (patients under ERAS. technique) passed flatus or stool or functioning stoma while 53.3% in group B (patients under ERAS. technique combined with US.) at day one. While 43.3% of patients in group A, and 36.7% in group B at day two, and 10% of patients in group A while 23.3% in group B at day 3 after toleration of oral fluid in both groups with no significant statistical difference between the two groups (p >0.05). Although there were no significant statistical difference between the two groups, but the chance postoperative passage of flatus or stool or functioning stoma in group B where higher than group A. It may need a larger patient sample to be significant.

These results were matched with what were reported that, The tolerance to early feeding provides a more objective evaluation of gut function than assessment on the basis of bowel sounds of passage of flatus [20].

The result of this study showed that the two studied groups had similar readmission rate to the hospital (6.7%), with no significant statistical difference between the two groups of patients under ERAS technique, and patients under ERAS technique combined with US. (P value 1).

The results in this study showedthat, the mean post-operative hospital stay of group A was (3.97 ± 0.64) while group B was (3.36 ± 0.65). There was a significant statistical difference between patients under ERAS. technique, and patients under ERAS. technique combined with US. (p <0.05). These results were matched with what were reported by Carmichael and his colleague [23] and Thanh and his colleagues [24] that have been reported, colorectal surgery under ERAS technique had better outcomes as quicker return of bowel function, shorter hospital lengths of stay, and return of investments of at least 240%.

ERAS combined with abdominal ultrasound used for the care of patients undergoing colorectal surgery provides improved standards of care by reducing postoperative hospital stay, attempting to improve the overall quality of recovery, decrease the percentage of postoperative vomiting, cost saving, and patient satisfaction.

Source of Funding: Self-funding

Ethical Clearance: Cleared by the ethical committee of General surgery department faculty of medicine Cairo University

Conflict of Interest: No

REFERENCES

1. Delaney CP, Zutshi M, Senagore AJ, Remzi FH, Hammel J, Fazio VW. Prospective, randomized, controlled trial between a pathway of controlled rehabilitation with early ambulation and diet and traditional postoperative care after laparotomy and intestinal resection. Dis Colon Rectum. 2003;46:851–859.
2. García-Botello S, Cánovas de Lucas R, Tornero C, et al. [Implementation of a perioperative multimodal rehabilitation protocol in elective colorectal surgery. A prospective randomized controlled study]. Cir Esp. 2011;89:159–166.
3. Ionescu D, Iancu C, Ion D, et al. Implementing fast-track protocol for colorectal surgery: a prospective randomized clinical trial. World J Surg. 2009;33:2433–2438.
4. Khoo CK, Vickery CJ, Forsyth N, Vinall NS, Eyre-Brook IA. A prospective randomized controlled trial of multimodal perioperative management protocol in patients undergoing elective colorectal resection for cancer. Ann Surg. 2007;245:867–872.
5. Ren L, Zhu D, Wei Y, et al. Enhanced Recovery After Surgery (ERAS) program attenuates stress and accelerates recovery in patients after radical resection for colorectal cancer: a prospective randomized controlled trial. World J Surg. 2012;36:407–414.

6. Vlug MS, Wind J, Hollmann MW, et al; LAFA study group. Laparoscopy in combination with fast track multimodal management is the best perioperative strategy in patients undergoing colonic surgery: a randomized clinical trial (LAFA-study). Ann Surg. 2011;254:868–875.
7. Muller S, Zalunardo MP, Hubner M, Clavien PA, Demartines N; Zurich Fast Track Study Group. A fast-track program reduces complications and length of hospital stay after open colonic surgery. Gastroenterology. 2009;136:842–847.
8. Serclová Z, Dytrych P, Marvan J, et al. Fast-track in open intestinal surgery: prospective randomized study (Clinical Trials Gov Identifier no. NCT00123456). ClinNutr. 2009;28:618–624.
9. Wang G, Jiang ZW, Zhao K, et al. Fast track rehabilitation programme enhances functional recovery after laparoscopic colonic resection. Hepatogastroenterology. 2012;59:2158–2163.
10. Wang Q, Suo J, Jiang J, Wang C, Zhao YQ, Cao X. Effectiveness of fast-track rehabilitation vs conventional care in laparoscopic colorectal resection for elderly patients: a randomized trial. Colorectal Dis. 2012;14:1009–1013.
11. Greco M, Capretti G, Beretta L, Gemma M, Pecorelli N, Braga M. Enhanced recovery program in colorectal surgery: a meta-analysis of randomized controlled trials. World J Surg. 2014;38:1531–1541.
12. Spanjersberg WR, Reurings J, Keus F, van Laarhoven CJ. Fast track surgery versus conventional recovery strategies for colorectal surgery. Cochrane Database Syst Rev. 2011;2:CD007635.
13. Augestad K.M, and Delaney C.P.: Postoperative ileus: impact of pharmacological treatment, laparoscopic surgery and enhanced recovery pathways. World J Gastroenterol. 2010:16:20–67.
14. Vather R., Trivedi S., and Bissett I.: Defining postoperative ileus: results of a systematic review and global survey. J. Gastrointest. Surg. 2013; 17:962-972.
15. Chapuis P.H., Bokey L., and Keshava A.: Risk factors for prolonged ileus after resection of colorectal cancer: an observational study of 2400 consecutive patients. Ann Surg. 2013; 257:909–915.
16. Clevers G.J., Smout A.J., van der Schee E.J., and Akkermans L.M.: Myoelectrical and motor activity of the stomach in the first days after abdominal surgery: evaluation by electrogastrography and impedance gastrography. J GastroenterolHepatol.1991; 6:253–259.
17. Andersen H. K., Lewis S. J., Thomas S.Early enteral nutrition within 24h of colorectal surgery versus later commencement of feeding for postoperative complications. Cochrane Database Syst. Rev. 2006 18;(4)
18. De Oliveira G.S., Castro-Alves L.J., Nader A., Kendall M.C., and McCarthy R.J.: Transversusabdominis plane block to ameliorate postoperative pain outcomes after laparoscopic surgery: a meta-analysis of randomized controlled trials. Anesth.Analg.2014; 118:454–463.
19. Gustafsson U.O., Scott M.J., Schwenk W., Demartines N., Roulin D., Francis N., McNaught C.E., Macfie J., Liberman A.S., Soop M., Hill A., Kennedy R.H., Lobo D.N., Fearon K., and Ljungqvist O.: Enhanced Recovery After Surgery (ERAS) Society for Perioperative Care; European Society for Clinical Nutrition and Metabolism (ESPEN); International Association for Surgical Metabolism and Nutrition (IASMEN). Guidelines for perioperative care in elective colonic surgery: Enhanced Recovery After Surgery (ERAS Society recommendations.World J Surg. 2013; 37(2):259-284.
20. Lewis S. J., Andersen H. K., and Thomas S.: Early enteral nutrition within 24 h of intestinal surgery versus later commencement of feeding: a systematic review and meta-analysis. J. Gastrointest. Surg. 2009 Mar;13(3):569-75.
21. Ljungqvist O., and Jonathan E.: insulin resistance and enhanced recovery after surgery. JPEN J. Parenter Enteral Nutr. 2012; 36(4): 389-398.
22. Ljungqvist O., Scott M., and Kenneth C.: Enhanced Recovery After Surgery. JAMA Surg. 2017; 152(3):292-298.
23. Carmichael J., Deborah S., Keller J., and Gabriele B.: Clinical Practice Guidelines for Enhanced Recovery After Colon and Rectal Surgery From the American Society of Colon and Rectal Surgeons and Society of American Gastrointestinal and Endoscopic Surgeons. diseases of the colon & rectum. 2017; volume 60: 8.
24. Thanh N.X., Chuck A.W., Wasylak T., Lawrence J., Faris P., Ljungqvist O., Nelson G., and Gramlich L.M.: An economic evaluation of the Enhanced Recovery After Surgery (ERAS) multisite implementation program for colorectal surgery in Alberta. Can. J. Surg. 2016; 59:6716

The Use of Intra-articular Steroid Injection to improve functional outcomes in Tibial Plateau Fractures

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ABSTRACT

Tibial plateau fractures should be properly managed, otherwise, they may end up in serious complications. These complications include limitation of movements, osteoarthritis and may finally result in joint stiffness. From February 2017 to August 2017, a study was conducted including 30 patients with united tibial plateau fractures to evaluate the role of intra-articular corticosteroid injection in improving the clinical outcomes after open reduction and internal fixation. Ten patients had Schatzker type I tibial plateau fractures, 13 patients had Schatzker type II and seven patients had Schatzker type III fractures. Average follow-up was 13.5 months. The average total clinical Rasmussen score was 28.3. It was excellent in 19 cases, and 11 cases had good results.

Keywords: *Tibial plateau fractures, corticosteroids injection, functional outcomes.*

Introduction

Tibial plateau fractures represent an important entity in orthopedic surgery. Nowadays, most tibial plateau fractures are managed by open reduction and internal fixation. However, in some cases with non-displaced fractures, conservative treatment may be adopted. The most common complications of tibial plateau fractures, regardless the way of management, are knee pain, limitation of movements, osteoarthritis and joint stiffness.[1,2]

The main cause of pain and limitation of movement is the immobilization that follows the fracture, either treated operatively or conservatively. Also, the disruption of the articular cartilage plays an important role, together with the intra-articular inflammatory process following the trauma or the operation.[3]

Corticosteroids were used for intra- articular injection many years ago. Their role in controlling the inflammatory process and improving the range of motion in patients with osteoarthritis is well known and established. [4]

The aim of our study was to evaluate the role of intra-articular corticosteroid injection in improving the outcomes of patients with united tibial plateau fractures treated by open reduction and internal fixation.

Materials and Method

From February 2017 to August 2017, 30 patients with tibial plateau fractures were enrolled in this study. Regarding the mechanism of the injury, 12 patients (40%) fell to the ground, 11 patients (36.7%) had road traffic accidents injury, and 7 patients (23.3%) fell from height. The study included 12 male patients (40%) and 18 female patients (60%). The mean age was 48.5 years, ranging from 41-58 years. Ten patients had Schatzker type I tibial plateau fractures (33.3%), 13 patients (43.3%) had Schatzker type II and seven patients (23.3%) had Schatzker type III fractures. The patients were fully assessed by proper history taking and full physical examination. The patients were admitted in the hospital after completing the primary, secondary and tertiary surveys.[5]

The following table shows the patients demographics. (Table 1)

Table 1: Patient Demographics

Variable	No.
Total no. of Patients	30
Average age, (range) years	48.5 years, (41-58) years
Gender :Male Female	12(40%) 18(60%)

Conted…

Side: -Right -Left	16(53.3%) 14(46.6%)
Mode of trauma: Fall to the ground Road traffic accidents injury Fall from height	12 patients (40%) 11 patients (36.7%) 7 patients (23.3%)

Above knee slabs were used until the time of the operation which was performed after an average of 4 days. The patients were treated by open reduction and internal fixation using either plates and screws or screws only. The patients were put in above knee slabs for another 2 weeks. Then, the slabs were removed and the patients were instructed to start range of motion. The patients were followed up until clinical and radiological union, which occurred at an average of 8.9 weeks. Clinically, there was minimal to no tenderness at the fracture site. Radiologically, union was determined by the disappearance of the fracture gap and continuity of the fracture lines. (Fig. 1) After that, intra-articular injection of corticosteroids was done.

The procedure was done under complete aseptic conditions. It was done in the room specialized for minor procedures in the operating theater. Sterilization and surgical draping was done using betadine solution. Standard anterolateral (soft spot) entry point was used for injection. (Fig. 2)



A **B**

Fig. 1: (a) Pre-operative x-ray anteroposterior view showing Schatzker type III tibial plateau fracture, (b) X-ray after union.

Then, using a spinal cannula, 4mg of dexamethasone was injected intra-articularly. Gentle physiotherapy was done for one week, followed by active and passive physiotherapy with anti-inflammatory modalities. The patients were followed up every 3 months, until the final assessment was done one year post-operatively.

The patients were assessed according to modified Rasmussen scoring system.[6] (Table 2)

Results

The patients were followed up for an average of 13.5 months postoperatively (range from 12 months to 15 months). Regarding the pain, twenty patients were pain free, two patients had occasional pain, and eight patients had stabbing pain in certain positions. (Fig. 3)

Twenty five patients had normal walking capacity for age. Three patients could walk outdoors for more than one hour, and two patients could walk outdoors from (fifteen minutes to one hour).

Twenty five patients had normal knee extension. Four patients had lack of extension less than ten degrees, and another one had lack of extension more than ten degrees.

Regarding the total range of motion, twenty three patients had full range of motion, five patients had at least 120 degrees, and two patients had at least ninety degrees. (Fig. 4)



Fig. 2: The marker sign shows the site of intra-articular injection (soft spot).

Table 2: Modified Rasmussen scoring system.[6]

Parameter	Score
Maximum score	30
Excellent	28-30
Good	24-27
Fair	20-23
Poor	<20

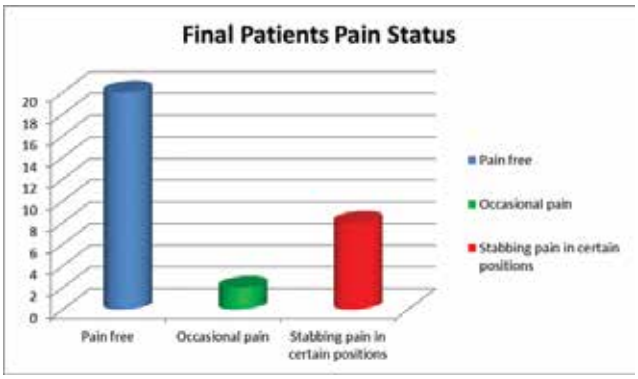


Fig. 3: Final Patients Pain Status

Twenty-eight patients had normal stability in extension and in 20º flexion, and two patients had abnormal stability in 20 ºflexion. The power of quadriceps in twenty five patients had grade V power. Five patients had grade III-IV quadriceps power.

The average total clinical Rasmussen score was 28.3. It was excellent in 19 cases, and 11 cases had good results. (Fig. 5)

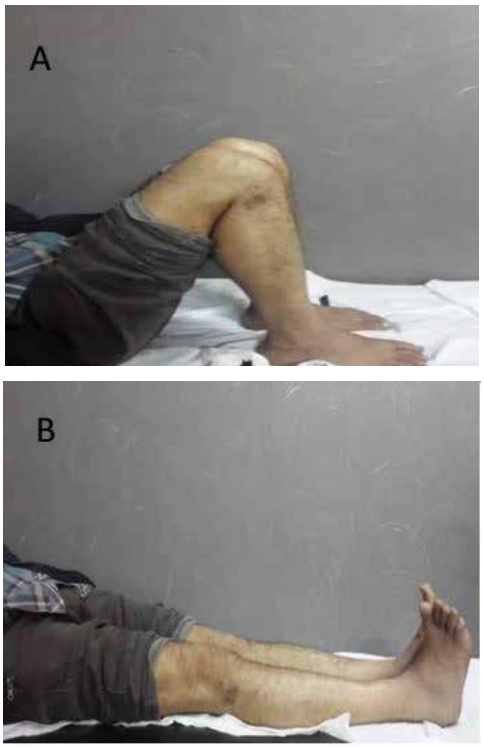


Fig. 4: Final Range of motion showing (a) full flexion and (b) full extension

DISCUSSION

Historically, a patient with comminuted tibial plateau fractures was thought to permanently lose some functions of the injured knee. With the development of new techniques of reduction and fixation, this concept started to diminish. However, nowadays, patients with tibial plateau fractures even if properly managed may suffer from some complications.[7]

These complications include persistent pain, limited range of motion, either flexion or extension. This may even end up in stiffness. This is attributed mainly to the inflammatory process and the cartilaginous disruption that occurs with the traumatic episode.[7]

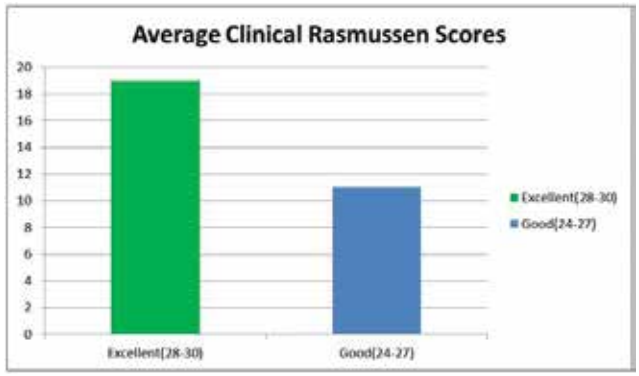


Fig. 5: Average Clinical Rasmussen Scores

Corticosteroids have been long used in the treatment of osteoarthritis. Dexamethasone is one of the most potent members of the steroids family. It is about 25 times more potent than hydro-cortisone. They are used systemically to treat a wide range of auto-immune diseases. However, their use was limited with their adverse effects, such as impairing blood glucose level, and impairing the vascularity of certain bones such as the head of the femur or the distal end of the femur. Also, the adverse effects include increasing the body weight, cardiovascular diseases, and increasing the susceptibility of infection. The use of intra-articular injection avoids these risk factors, especially, if not repeated frequently. Dexamethasone performs its anti-inflammatory effects through inhibition of metalloproteases, prostaglandins, and oxygen free radicals. [4, 8]

Lu et al., described the role of dexamethasone in protection of injured cartilage. It acts by normalization of the glycosaminoglycans release from the injured cartilage as a response to tumor necrosis factor alpha. [9]

Sofi et al., assessed the efficacy of Injection of steroids intra-articularly in patients with osteoarthritis. They concluded that corticosteroids provide good pain

relief and improved the functional outcomes in patients with osteoarthritis. They didn't find any osteopenia in radiographs as an adverse effect. [10]

Our study included 30 patients with tibial plateau fractures, 12 males and 18 females with mean age of 48.5 years. The aim of our study was to evaluate the role of intra-articular corticosteroid injection in improving the outcomes of patients with united tibial plateau fractures treated by open reduction and internal fixation.

The patients were followed up for an average of 13.5 months postoperatively (range from 12 months to 15 months). The average total clinical Rasmussen score was 28.3. It was excellent in 19 cases (63%), and 11 cases (37%) had good results.

When comparing our results to other studies on tibial plateau fractures that didn't utilize intra-articular injection, we found that our study yielded relatively better scores. Chiu CH et al. operated on 25 patients with tibial plateau fractures. The average clinical Rasmussen score was 25.9. Eleven patients (44%) had excellent results, 12 patients (48%) had good results, and two patients (8%) had fair results.[11] Siegler et al., operated on 27 patients, the average clinical Rasmussen score was 25.5. [12]

Conclusion

Intra-articular corticosteroids injection is thought to improve the pain, function, and final outcomes in patients with tibial plateau fractures.

They also act to prevent the inflammatory process that occurs in post-traumatic knee injury. It is recommended that they should be used more often, but other comparative studies with longer follow up periods are recommended.

Conflict of Interest: All authors contributed to formatting and designing the study as well as revising the data. All authors actively participated in critically editing the paper. All Authors approved the final manuscript before submitting.

Source of Funding: This manuscript presents original honest work done by the Authors. There are similar studies done which are presented & referenced in this study.

Ethical Clearance: The paper was accepted and approved by the ethical committee.

REFERENCES

1. Hohl M. Part I: Fractures of the proximal tibia and fibula. In: Rockwood C, Green D, Bucholz R, eds. *Rockwood and Green's Fractures in Adults.* Vol 2. 3rd ed. Philadelphia, PA: JB Lippincott; 1992:1725-1757.
2. Caspari RB, Hutton PM, Whipple TL, Meyers JF. The role of arthroscopy in the management of tibial plateau fractures. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 1985 Jan 1;1(2):76-82.
3. Kalman DS, Heimer M, Valdeon A, Schwartz H, Sheldon E. Effect of a natural extract of chicken combs with a high content of hyaluronic acid (Hyal-Joint®) on pain relief and quality of life in subjects with knee osteoarthritis: a pilot randomized double-blind placebo-controlled trial. Nutrition journal. 2008 Dec;7(1):3.
4. Rhen T, Cidlowski JA. Antiinflammatory action of glucocorticoids—new mechanisms for old drugs. New England Journal of Medicine. 2005 Oct 20;353(16):1711-23.
5. Burdin G. Arthroscopic management of tibial plateau fractures: surgical technique. Orthopaedics & Traumatology: Surgery & Research. 2013 Feb 1;99(1):S208-18.
6. Rasmussen PS. Tibial condylar fractures: impairment of knee joint stability as an indication for surgical treatment. JBJS. 1973 Oct 1;55(7):1331-50.
7. Boldin C, Fankhauser F, Hofer HP, Szyszkowitz R. Three-year results of proximal tibia fractures treated with the LISS. Clinical orthopaedics and related research. 2006 Apr 1;445:222-9.
8. American Association of Orthopaedic Surgeons (AAOS) (2013) Treatment of osteoarthritis of the knee: based guideline – 2nd edtn. Illinois, USA.
9. Lu YC, Evans CH, Grodzinsky AJ. Effects of short-term glucocorticoid treatment on changes in cartilage matrix degradation and chondrocyte gene expression induced by mechanical injury and inflammatory cytokines. Arthritis research & therapy. 2011 Oct;13(5):R142.
10. Sofi F, Ahmad M, Bilal A. Arif (2018) Efficacy of Intra-Articular Steroid Injection in Osteoarthritis Patients. J Arthritis.;7(269):2.

11. Chiu CH, Cheng CY, Tsai MC, Chang SS, Chen AC, Chen YJ, Chan YS. Arthroscopy-assisted reduction of posteromedial tibial plateau fractures with buttress plate and cannulated screw construct. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2013 Aug 1;29(8):1346-54.

12. Siegler J, Galissier B, Marcheix PS, Charissoux JL, Mabit C, Arnaud JP. Percutaneous fixation of tibial plateau fractures under arthroscopy: a medium term perspective. Orthopaedics & Traumatology: Surgery & Research. 2011 Feb 1;97(1):44-50.

Relationship between Hygiene and Sanitation with Coliform Bacteria Contamination in Refill Drinking Water

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ABSTRACT

Drinking water is the main source of consumption for the family so it needs to be maintained its quality in order to avoid Coliform bacteria. Coliform bacteria are suspected to originate from feces, therefore their presence in various places ranging from drinking water, food ingredients or other materials for human needs, is not expected. This study aims to get a description of bacterial contamination, depot environmental sanitation, equipment sanitation, worker hygiene, quality of raw water and refill drinking water in drinking water depots in BarrangLompo Island, Sangkarang District, Makassar City, 2017. This type of research is observational with a descriptive approach. The sampling technique uses Grab samples by taking directly from the tap of the drinking water depot. Water samples were examined using the Most Probable Number (MPN) method. Data analysis in this study was carried out descriptively and shows that 3 out of 6 depots have quality refill drinking water that meets the requirements. Raw water samples from all depots show no one meets the requirements. The samples examined contained gram negative bacteria. The types of bacteria that grow in the sample are Klebsiella pneumonia and Pseudomonas aerogenosa. On depot environmental sanitation and worker hygiene no one fulfils the requirements. Equipment sanitation all meets the requirements and there are depots that use the reserve osmosis method and use a combined method of reserve osmosis and ultraviolet light. The conclusion of this study is that bacteria are found in almost all drinking water samples. The bacteria found were Klebsiella pneumonia and Pseudomonas aerogenosa. Owners and depot workers are advised to improve and implement better hygiene and sanitation.

Keywords: *Hygiene; Sanitation; Coliform Bacteria; Contamination; Refill Drinking Water*

Introduction

Water is an important material in life and all living things need water. For humans, about 70% of the substances that make up the human body consist of water. Water needs for daily needs are different for each place and every level of life. Usually the higher the standard of living, the higher the number of water needs.[1] More than 100 million Indonesians lack access to clean water and 150 million contaminated water sources.[2] One effort to meet water needs in Indonesia, the government issued a policy to establish a Regional Water Supply Company (PDAM) which is engaged in the distribution and provision of clean water facilities for the general public.[3] Determination of water quality in microbiology is done by the Most Probable Number Test (MPN). If in 100 ml of water samples, Coliform bacterial cells are found to cause diarrhea and other digestive disorders.[4]

Higherlevel of Coliform bacterial contamination means presence the risk of other pathogenic bacteria. One example of a pathogenic bacterium that is likely to be contained in water contaminated with human excrement or warm-blooded animals is the Escherichia coli bacteria, namely microbes that cause symptoms of diarrhea, fever, abdominal cramps, and vomiting.[5] In addition, the rate of diarrhea is higher by 66% in children from families who defecate in rivers or sewers than those in households with private toilet facilities and septic tanks.[6]

Research conducted by Indirawati (2009) shows that there is a significant relationship between sanitation hygiene and microbiological quality of refill drinking water.[7] The Novita (2004) study in Palembang City also showed the same results for sanitation hygiene showed that depot sanitation hygiene had a significant relationship with the quality of drinking water.[8] This is due to the poor environmental conditions that make people worry about consuming ground water.

Based on data at the BarrangLompo Island Health Center, Sangkarang Sub-District, Makassar City (2015), diarrheal disease is one of the main public health problems and is classified as the highest ten diseases. The number of diarrhea patients in 2013 was 192 people, in 2014 there were 187 people and in 2015 there were 199 people. BarrangLompo Island is one of the islands within the administrative area of BarrangLompo Sub-District. So far, the needs of clean water and drinking water for residents of BarrangLompo Island have been met through dug wells, drilled wells and clean water supply businesses.[9]

The number of refill drinking water depots in BarrangLompo Island in 2016 was 6 depots of drinking water by using raw water sources from bore wells, which are likely to be contaminated with coliform bacteria. Unlike the raw water source in refill drinking water depots located in Makassar City which uses raw water sources from the PDAM. The large number of DAMIUs that are scattered on BarrangLompo Island does not guarantee the quality of drinking water produced because the method of management and filling of depots cannot always be monitored. As a result, many health problems can be caused. Research on hygiene of refill drinking water depot workers conducted by Nurmawati et al (2009) showed that there was a relationship between hygiene of drinking water depot workers and the number of coliform bacteria.[10] Hygiene and sanitation are related to bacterial contamination. Therefore, this study aims to identify the sanitation hygiene and bacterial coliform contamination in refill drinking water in BarrangLompo Island, Sangkarang Sub-District, Makassar City, 2017.

Methodology

This study uses observational methods with a descriptive approach.

Location and Time of Research: The location of the study was carried out at the drinking water refill depot in BarrangLompo Island, SangkarangSubdistrict, Makassar City, and a Microbiology Laboratory, Faculty of Medicine, Hasanuddin University. This study was conducted on February - March, 2017.

Population and Samples: The sample in this study was a refill drinking water depot of 6 depots. The type of sampling is done by Non Probability Sampling, because the population is relatively small.

Data Collection: Primary data on sanitation is obtained directly from the results of interviews using questionnaires and observations by researchers to employers or employees who work in Refill Drinking Water Depots. Data regarding the quality of refill drinking water was obtained through laboratory examination of bacteriological parameters. The secondary data was obtained from BarrangLompo Island Health Center regarding the number of AMIU depots operating and registered since 2011 - 2017.

Measurement Method: Hygiene equipment, personal hygiene of workers, environmental sanitation is measured using an observation sheet. Each of the raw water and water produced by the depot will be examined based on bacteriological parameters and the number of samples as many as 12 samples taken 150 ml per sample at each depot.

Data Analysis: Analysis of the data used is descriptive analysis, namely by making a description of the data obtained from the laboratory and then compared with the standard RI PERMENKES No. 492/Menkes/Per/VI/2010 concerning Quality Requirements for Drinking Water to find out whether refill drinking water meets the requirements so that it is suitable for consumption or not. And the data obtained from observations and interviews are compared with the Decree of the Minister of Industry and Trade of Republic of Indonesia Number 651/MPP/Kep/10/2004 concerning the Technical Requirements of Drinking Water and Trade Depots to find out whether sanitation depots are eligible or not.

Processing and Presentation of Data: Data obtained from the results of examinations in the laboratory and the results of observations are then processed manually and presented in the form of tables accompanied by explanations.

Result and Discussion

Coliform Bacteria Contamination in Refill Drinking Water and Raw Water: The number of coliform bacteria in refill drinking water was obtained from the results of laboratory tests with the MPN test with the standard of the Indonesian Ministry of Health No. 492/MENKES/PER/IV/2010. Microbiological parameters the maximum level allowed in drinking water are 0 per 100 ml of drinking water. Table 1 shows 3 refill drinking water depots that did not meet the requirements of both

raw water and refill drinking water and 3 depots that did not meet the requirements of raw water but had fulfilled the requirements for refill drinking water.

Table 1also shows no Escherichia Coli bacteria were found but 2 other bacteria were found, namely the bacteria Klebsiella pneumonia and Pseudomonas aerogenosa. These germs can cause infections in the lower respiratory tract, urinary tract, eyes and others.[11] Therefore monitoring of the quality of refill drinking water, especially monitoring of bacterial contamination must be carried out continuously by owners of refill drinking water depot facilities themselves and by the local Health Service to provide guarantees for the community in obtaining drinking water that meets the stipulated requirements.[12]

Table 1: Coliform Bacterial Contamination in Refill Drinking Water and Raw Water

Sample Code	Index (MPN/100 ml)	Qualified	Number of Colonies	Identification of Bacteria
D1 Raw water	4	Not	12	*Pseudomonas aerogenosa*
D1 Drinking water	0	Yes	0	Not cultured and identified
D2 Raw water	15	Not	52	*Klebsiella pneumonia*
D2 Drinking water	0	Yes	0	Not cultured and identified
D3 Raw water	460	Not	88	*Pseudomonas aerogenosa*
D3 Drinking water	28	Not	80	*Pseudomonas aerogenosa*
D4 Raw water	93	Not	130	*Klebsiella pneumonia*
D4 Drinking water	4	Not	6	*Klebsiella pneumonia*
D5 Raw water	8	Not	59	*Klebsiella pneumonia*
D5 Drinking water	7	Not	32	*Klebsiella pneumonia*
D6 Raw water	4	Not	15	*Klebsiella pneumonia*
D6 Drinking water	0	Yes	0	Not cultured and identified

DAMIU Sanitation Environmental: Table 2 shows the environmental sanitation in the aspect of location at 6 drinking water depots shows that there are 2 depots that meet the requirements and 4 depots do not meet the requirements namely D2, D3, D4, and D5. Also in the aspect of the building in 6 drinking water depots, all of them did not meet the 100% requirement according to the Decree of the Minister of Industry and Trade of Republic of Indonesia Number 651/MPP/Kep/10/2004.

Table 2: Environmental Sanitation of Refill Drinking Water Depots

Environment sanitation	Qualified	Frequency (n)	Percentage (%)
Location	Yes	2	33
	Not	4	67
Building	Yes	0	0
	Not	6	100

Sanitation Equipment of DAMIU: Table 3 shows the sanitation equipment at 6 water depots have all fulfilled the requirements according to the Decree of the Minister of Industry and Trade of Republic of Indonesia Number 651/MPP/Kep/10/2004.The treatment of drinking water in refill drinking water depots is not entirely done automatically so that it can affect the quality of the water produced, thus the quality still needs to be studied in order to safeguard its water quality.[13]

Table 3: Sanitation Equipment in Refill Drinking Water Depots

Equipment for Sanitation	Qualified	Frequency (n)	Percentage (%)
Made from food ingredients, corrosion resistant, does not react with chemicals	Yes	6	100
	Not	0	0
The tool used is still in use	Yes	6	100
	Not	0	0
Material is not made of heavy metal that is soluble in water	Yes	6	100
	Not	0	0

DAMIU Worker Hygiene Overview: Based on Table 4, the criteria that are not met by all depots is using masks, no workers use masks.

Table 4: Hygiene of Workers in Refill Water Depots

Worker Hygiene	Qualified	Frequency (n)	Percentage (%)
Must be free from infectious diseases	Yes	6	100
	Not	0	0
Free from wounds, ulcers, skin diseases, and other injuries	Yes	6	100
	Not	0	0
Wash hands before and after serving consumers	Yes	5	83.3
	Not	1	16.7
At the time serving consumers do not eat, long nails, scratching and scratching ears/nose/teeth	Yes	6	100
	Not	0	0
Wear clean clothes	Yes	6	100
	Not	0	0
Using a medical mask	Yes	0	0
	Not	6	100

The use of masks during the production process will minimize contamination of processed water from workers. Hygienic and sanitary behaviour needs to be done every time to serve consumers, including always washing hands with soap and running water, each serving consumers to prevent pollution.[14] Hands that are not clean can be a source of contamination of pathogenic bacteria that can increase the risk of pollution. The use of personal protective equipment such as gloves in work is also needed as a prevention of contamination.[15] Workers who do not have hygiene and healthy lifestyle such as not washing their hands and smoking while serving consumers can cause contamination of drinking water.[16] Therefore, it is better for refill drinking water depots to maintain sanitary hygiene to avoid bacterial contamination. Places that are guaranteed sanitary hygiene clean and healthy workers, recommended equipment is safe and raw water from clean water sources will ensure the quality of healthy and safe water.[17]

Description of the DAMIU Processing Method: Table 5 shows there are 4 depots that use one method of drinking water treatment that is using Reserve Osmosis (RO) and 2 depots using a combined processing method that is using Ultraviolet (UV) and Reserve Osmosis (RO).

Table 5: Processing methods in Refill Drinking Water Depots

DAMIU Processing Method	Frequency (n)	Percentage (%)
Using Reserve Osmosis (RO)	4	66.7
Using UV + RO	2	33.3

The process of purifying water with Reserve Osmosis (RO) will produce water that is truly pure free from the content of minerals and other toxic substances. In this process Reserve Osmosis (RO) there are stages that must be considered, among others, the water source of raw materials, the water treatment process, and the type of Reserve Osmosis (RO).[18] The processing of refill drinking water using ultraviolet light is known to be able to kill microorganisms because it has a lethal effect on microorganisms.[19]

Conclusion

The obtained results show that all raw water in the depot did not meet the requirements and in refill drinking water there were 3 depots that met the requirements. The types of bacteria in raw water and refill drinking water in drinking water depots are Klebsiellapneumoniae and Pseudomonas aerogenosa bacteria. Environmental sanitation for drinking water depots based on location aspects has fulfilled the requirements, but in the building

aspects all depots do not meet the requirements. Sanitation of drinking water depot equipment indicates that all drinking water depots have fulfilled the requirements. Hygiene of drinking water depot workers shows that there are 5 depots with fulfilment of criteria 84% and 1 depot with fulfilment of criteria 67%. There are 2 drinking water depots use a combined method with UV and RO and 4 drinking water depots that use RO method only.

Acknowledgement

The authors would like to thank to the participants, BarrangLompo Island Health Center, Faculty of Medicine, and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Apriliana E, Ramadhian MR, Gapila M. Bacteriological Quality of Refill Drinking Water at Refill Drinking Water Depots in Bandar Lampung [Internet]. 2014 [cited 2016 Nov 28]. Available from http://juke.kedokteran.unila.ac.id/index.php/juke/article/download/401/402
2. Parera MJ. Analysis of the Differences in the Test of Water Well Quality in the Madidir Ure Village of Bitung City Based on Physical Parameters. Thesis. Medical Faculty of the University of Sam Ratulangi [Internet]. 2014 [cited 2016 Nov 28]. Available from http://ejournal.unsrat.ac.id/index.php/ebiomedik/article/download/4584/4112
3. Tirsa TS, Henry MF, Rahayu HA. Description of the Bacteriological and Chemical Quality of the Water in the Langowan Unit of the Minahasa Regency year, Sam Ratulangi University Public Health Faculty. 2014.
4. Wandrivel R, Suharti N, Lestari Y. Quality of Produced Drinking Water Depots of Refill Drinking Water in Padang Bungus District Based on Microbiology Requirements. Andalas Health Journal [Internet]. 2012. [cited 2016 Dec 1]. Available from http://jurnal.fk.unand.ac.id/articles/vol_1no_3/129-133.pdf
5. Bambang AG, Fatimawali, Kojong NS. Analysis of Coliform Bacteria Contamination and Identification of Escherichia Coli in Water Refill from Depots in Manado City. Pharmacy Scientific Journal. UNSRAT [Internet]. 2014. [cited 2016 Dec 1]. Available from http://ejournal.unsrat.ac.id/index.php/pharmacon/article/download/5450/4957
6. Unicef Indonesia. Clean Water, Sanitation and Hygiene [Internet]. 2012. [cited 2016 Dec 5]. Available from http://www.unicef.org/indonesia/id/A8_-_B_Ringkasan_Kajian_Air_Bersih.pdf
7. Indirawati SM. Hygiene Analysis of Sanitation and Quality of Refill Drinking Water Based on Raw Water Source in Drinking Water Depots in Medan City. Thesis. USU.2009.
8. NovitaE. Factors Affecting the Quality of Drinking Water Refill in Palembang City in 2004. Thesis. University of Indonesia. 2004.
9. Selintung M, Zubair A, Rakhman D. Study of Clean Water Supply Systems in Barrang Lompo Island, Ujung Tanah District, Makassar City. 2013. Journal of Civil Engineering. Hasanuddin University. [Internet]. 2013. [cited 2016 Dec 5]. Available from http://repository.unhas.ac.id/handle/123456789/9728
10. Nurmawati F, Mifbakhuddin, WardaniSR. Relationship Between Individual Hygiene and Sanitation Officers Depo Refill Drinking Water with Amount of Coliform Bacteria in Sendang Mulyo Village, Semarang City. Essay. Faculty of Public Health. Muhammadiyah University Semarang. Semarang. 2009.
11. Syahrurachman A. Textbook on Medical Microbiology, Ciputat, Tangerang, Binarupa Aksara. 2010.
12. Radji. Bacteriological Examination of Drinking Water Refills in Several Refill Drinking Water Depots in Lenteng Agung and Srengseng Sawah Areas, South Jakarta. [Internet]. 2008. Journal of Pharmaceutical Sciences. [cited 2017 May 15]. Available from http://psr.ui.ac.id/index.php/journal/article/download/3424/502

13. Athena, Sukar, Haryono. Content of Total Bacteria of Coli and Escherichia Coli/Fecal Coli Drinking Water from Refill Drinking Water Depots in Jakarta, Tangerang and Bekasi. Health Ecology Research Center, Research and Development Agency. [Internet]. 2004. [cited 2016 Nov 28]. Available from http://ejournal.litbang.depkes.go.id/index.php/BPK/article/viewFile/1216/144

14. Permenkes. Nomor 43 Tahun 2014. About Sanitation Depot for Drinking Water. Jakarta. [Internet]. 2014. [cited 2017 May 15]. Available from http://pelayanan.jakarta.go.id/download/regulasi/permen-kesehatan-nomor-43-tahun-2014-tentang-higiene-sanitasi-depot-airinum.pdf

15. Cahyaningsih CT, Kushadiwijaya H, Tholib A. Relationship between Sanitation and Food Handler Hygiene with Bacteriological Quality of Tableware at Food Stalls. Journal of Public Medical News. [Internet]. 2009. [cited 2016 Nov 28]. Available from http://beritakedokteranmasyarakat.org/index.php/BKM/article/view/178/102

16. Khoeriyah. Aspects of Bacteriological Quality and Physical Sanitation Hygiene Refill Drinking Water Depot (DAMIU) in 73 Cimareme District, West Bandung Regency. Proceedings of the 2013 National Seminar on Natural Resource Management and Environment. [Internet]. 2013. [cited 2017May 15]. Available from http://eprints.undip.ac.id/40580/1/010-Ari_Khoeriyah.pdf

17. Kemenkes RI. Guidelines for Implementing Sanitation Depot Drinking Water Hygiene in Jakarta. [Internet]. 2010. [cited 2016Nov 28]. Available from http://kin.perpusnas.go.id/DisplayData.aspx?pId = 9730 & pRegionCode = PKSJOG & pClientId = 145

18. Imbo N. Study of the Quality and Quality of Refill Drinking Water (DAMIU) in Terms of the Parameters of Fluorine (F) and Iron (Fe) in Drinking Water Deposits in the District of Borkanaya, Makassar City. Essay. Hasanuddin University. 2011.

19. Arie IS, Imam S. The Use of Drinking Water Sterilization Tools By Using Ultra Violet (UV) Lights In Household Stairs. Ruwa Jurai Environmental Health Journal. 2008;2(2).

Relationship between Work Posture and Musculoskeletal Disorders (Msds) at Processing Workers in PtToarco Jaya, Rantepao City year 2017

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ABSTRACT

Musculoskeletal Disorders (MSDs) are one of the problems that are often experienced by workers in both the informal sector and the formal sector. PT Toarco Jaya Processing worker is an industry that engaged in Arabica coffee production where there are activities that are quite high, monotonous and repetitive. This can cause workers to experience skeletal muscle disorders that can reduce work productivity. This study aims to determine the relationship of work posture with Musculoskeletal Disorders (MSDs) disorders in PT Toarco Jaya processing workers in the city of Rantepao in 2017. This type of research was observational analytic with a cross sectional study approach. Data collection is conducted against 57 workers by exhaustive sampling in March 2017. Primary data collection was obtained from interviews using questionnaires, Nordic Body Map Questionnaire, Rapid Entire Body Assessment, microtoise, scales and cameras. Data analysis was performed using univariate analysis, namely frequency distribution and percentage of each variable and bivariate analysis was performed on two variables to identify relationships using the chi-square test. The results of this study indicate that there is a relationship between work posture and MSDs complaints with a p value (0.002), there is a relationship between age, nutritional status, and work period with complaints of MSDs with a value of p (0.005), p (0.030), p (0.031) < α (0.05). It is best for the company management to provide training on work posture at work. Others factors such as workload and environmental factors are recommended in future study.

Keywords: *Work Posture; Musculoskeletal Disorders; Processing Workers*

Introduction

As a developing country, Indonesia needs healthy, efficient and productive human resources to support national development. Besides that labor is an element that is directly confronted with various consequences of technological advances in industry, so it is only natural for them to be given health care protection and development towards welfare or national guarantees.[1] Based on data from the International Labor Organization (ILO) in 2013, every 15 seconds one worker dies from a work accident and 160 workers experience work-related illness.[2]

The factors that cause musculoskeletal complaints are excessive muscle stretching, languishing activity, unnatural work attitude, secondary causes and combination causes.[3] Studies of musculoskeletal in various types of industries have been carried out and studies have shown that muscle parts that are often complained about are skeletal muscle which includes the muscles of the neck, shoulders, arms, hands, fingers, back, waist, and lower muscles.[3] From various types of research, it can be seen that the complaints of diseases that are often suffered by workers are work related musculoskeletal disorders, one of which is influenced by the existence of a work position. The work method will directly or indirectly affect the muscles involved and can cause muscoleskeletas disorders with complaints of pain in the neck, back, lower back and other complaints.[4]

In a study conducted on paving workers in CV SumberGalian, Makassar, showed that of 85 respondents there were 52 respondents who experienced severe disorder Muscoleskeletas disorder and 32 other respondents had mild disorder muscoleskeletas disorder, this indicates that there are still many workers who suffer from muscoleskeletas disorder specifically in the city of Makassar.[5] Based on research conducted on Fumiture workers in Benda Kota Tangerang District, showed that there were 27 workers (81.8%) aged ≥ 30

years who had musculoskeletal disorder and as many as 22 workers (45.8%) aged <30 years also experienced musculoskeletal disorder. The results of bivariate statistical tests showed that there was a significant relationship between age and musculoskeletal disorder. According to Suma'mur (2009) in a week people can only work well for 40-50 hours. More than that negative tendencies arise.[6]

Body mass index (BMI) can also be used as an indicator of the condition of worker nutrition according to Zulfiqor (2010) who conducted research on fabrication workers at PT.[7] Caterpillar Indonesia, someone who is overweight will try to support the weight from the front by contracting the lower back muscles. And if this continues, it will cause pressure on the spinal cord pads which results in fatigue and muscle pain. Based on the results, it was obtained workers who had an index of body obesity period of 13 workers (17.3%) and workers with a normal body mass index of 32 workers (42.7%). The test results showed that most workers had a normal BMI and experienced complaints of mild MSDs, namely 26 workers. This is not in line with the research of Karuniasih (2009) which examined 52 bus travel drivers, which amounted to 90.4% of MSDs complaints experienced by bus drivers who had excessive body mass index (overweight) or obesity.[8]

Work posture and work position that are not ergonomic have an impact on decreasing work productivity and work performance which can lead to work accidents, besides that it can also affect workers' health levels, one of which is muscle and joint complaints or musculoskeletal complaints. Based on the description of the background above, the authors are interested in conducting research on the relationship of work posture with disorders of Musculoskeletal Disorders (MSDs) in PT workers,Toarco Jaya, Rantepao City.

Methodology

This study used observational analytic method. A cross sectional approach was used to identify the relationship of work posture variables with musculoskeletal disorder (MSDs). The location of the research was carried out at PT. Toarco Jaya, the city of Rantepao.The population used as samples in the study were 57 processing workers at PT Toarco Jaya, Rantepao City.

Method of Collecting Data: The data on complaints of Musculoskeletal Disorders (MSDs) were obtained using the Nordic Body Map questionnaire. The data on work posture is obtained by calculating the risk of skeletal muscle pain in certain body parts (neck, spine, upper & lower arms, wrists) using the REPR (Rapid Entire Body Assessment) sheet. The data on the Body Mass Index obtained through direct measurement of body weight and height of workers using a weight scale and microtoice role and then calculated using the BMI formula.

Data Processing: Processing and data analysis techniques were carried out by Chi Square statistical tests and using the SPSS program.

Data Analysis: Univariate analysis was performed on each variable from the results of this study to see the frequency and percentage distribution, which included work attitudes, age, length of work, length of service, nutritional status, musculoskeletal disorder (MSDs).
Bivariate analysis is done to prove the hypothesis with the chi-square test where the variable work attitudes, age, work status of nutritional status (BMI) and years of service with MSDs complaints in this study.

Result and Discussion

Retrieval of respondents' research data was conducted in March 2017 with 57 Processing workers. This study gains the permission of the Manager of PT Toarco Jaya and the head of Processing. Interviews were conducted using questionnaires and the Nordic Body Map Questionnaire. Then, measurements of workers' height were carried out using microtoise and for measuring body weight using weight scales. The data obtained is then processed using the SPSS computer program.

The characteristics of the respondents show majority of the respondents are from age group of 35-44 and 45-54 contribute by 35% and 33% respondents respectively. Next, most of the respondents about 63.2% have working period between 3 to 10 years. For nutrition status, majority about 40.4% of the respondents are under fat categories where thin and normal categories contribute by equal percentage which is 28.1% each.

Distribution of Respondents based on Musculoskeletal Disorders Complaints (MSDs): In this study, complaints of Musculoskeletal Disorders (MSDs) in processing part workers were grouped into two, namely workers who experienced MSDs complaints (80.7%)

and workers who did not experience MSDs complaints (19.3%). The highest reported body parts for MSDs are neck, waist, left ankle, right ankle, right shoulder, left shoulder and back contribute by 45.6%, 42.1%, 38.5%, 38.5%, 36.8%, 33.3% and 26.3% respectively.

Distribution of Respondents based on Work Posture, Age, Nutritional status and Working period: High-risk workers are who have 8-15 Rapid Entire Body Assessment (REBA) scores or action levels 3 and 4. For low-risk work postures, they have a REBA score of 1-7 or level 0, 1, and 2. Table 1 shows that the work posture on processing workers who have a high risk are 73.7%. The number of workers with a low risk work posture is 26.3%. The age of respondents into two categories, namely high risk (aged ≥ 30 years) and low risk (aged <30 years). High risk category has 77.2% of the respondents and a low risk category has 22.8% of the respondents.

The nutritional status has two categories where the abnormal nutritional status is BMI> 25 or <18.5 and for the category of normal nutritional status is BMI ranged from 18.5-25. Table 1 shows that 71.9% of the respondents are under abnormal nutritional status and the respondents under normal nutritional status are 28.1%. Working period is grouped into two categories where the respondents who have worked for ≥ 5 years and working period of <5 years. The working period of respondents with the category ≥ 5 years is 47.4% and category which is <5 years is 52.6%.

Table 1: Distribution of Respondents based on Work Posture, Age, Nutritional status and Working period

Items	Categories	Frequency (n)	Percentage (%)
Work posture	High Risk (8-15 REBA)	42	73.7
	Low Risk (1-7 REBA)	15	26.3
Age	High Risk (More than 30 years old)	44	77.2
	Low Risk (Less than 30 years old)	13	22.8
Nutritional status	Normal	16	28.1
	Not Normal	41	71.9
Working period	Old (More than 5 years)	27	47.4
	New (Less than 5 years)	30	52.6

Relationship between Complaints on Musculoskeletal Disorders (MSDs) with Work Posture, Working Period, Age and Nutritional Status: Table 2 shows there are 90.5% of the respondent experienced musculoskeletal disorders with high risk work posture and 53.3% of the respondent experienced musculoskeletal disorders with low risk work posture. Besides that, there are 46.7% and 9.5% of the respondent did not experienced low risk and high risk respectively. The chi-square test obtained p = 0.002 (p = <0.05), so that H0 is accepted and Ha is rejected so that it can be interpreted that there is a relationship between work posture and complaints of musculoskeletal disorders (MSDs) in processing workers PT Toarco Jaya In 2017.

Table 2 shows there are 92.6% of the respondents are from long service life which is more than 5 years and about 7.0.0% are from new work a period which is less than 5 years. Furthermore, respondents who did not experience MSDs complaints with a long working period about 7.4% and 30.0% with new years of service that did not experience MSDs complaints. The chi-square test obtained the value of p = 0.031 (p <0.05) means that H0 is rejected and Ha is accepted, so that it can be interpreted that there is a relationship between work period and MSDs complaint on processing workers PT Toarco Jaya Kota RantepaoTahun 2017.

Table 2 shows the high risk age that experienced MSDs complaints are about 88.9% and high risk age that experienced MSDs complaints are about 53.8%. Then, respondents who did not experience MSDs with a high risk age category is about 11.4% and a low risk age category is about 46.2%. The chi-square test obtained the value of p = 0.005 (p <0.05) means that H0 is rejected and Ha is accepted, so that it can be interpreted that there is a relationship between age and MSDs complaints in 2017 PT Toraco Jaya processing workers.

Table 2 shows the respondents who experienced complaints of MSDs with abnormal nutritional status were 36 respondents are 87.8% and respondents who experienced complaints of MSDs with normal nutritional status are 62.5%. Respondents who did not experience

complaints of MSDs with abnormal nutritional status are 12.2%, while respondents with normal nutritional status are 37.5%. The chi-square test obtained the value of p = 0.030 (p <0.05) means that H0 is rejected and Ha is accepted, so it can be interpreted that there is a relationship between nutritional status and MSDs complaints to processing workers PT Toarco Jaya, Rantepao, Tahun 2017.

Table 2: Relationship between Complaints on Musculoskeletal Disorders (MSDs) with Work Posture, Working Period, Age and Nutritional Status

Relationship between Complaints on Musculoskeletal Disorders (MSDs)		Complaints of MSDs		Statistical test results (P value)
		No (%)	Yes (%)	
Work Posture	Low Risk (1-7 REBA)	46.7	53.3	0.002
	High Risk (8-15 REBA)	9.5	90.5	
Working Period	New (More than 5 years)	30.0	70.0	0.031
	Old (Less than 5 years)	7.4	92.6	
Age	Low Risk (Less than 30 years old)	46.2	53.8	0.005
	High Risk (More than 30 years old)	11.4	88.9	
Nutritional Status	Normal	37.5	62.5	0.030
	Not Normal	12.2	87.8	

The results of this study are consistent with the research conducted by Suwanto, J (2016) that the results of statistical tests using the Spearman Rho test with a significant level (α≤0.05) obtained a significance value (p = 0.001) with a moderate relationship (r = 0.551) hence there is a significant relationship between the risk of work posture and the risk of musculoskeletal complaints.[9] Meanwhile, according to Nurhayati (2013), the results of statistical tests on the relationship between work posture and musculoskeletal complaints with a significance value of 0,000 p-value <0.05, a correlation strength value of 0.657 (strong) and a positive correlation means that there is a strong and very significant relationship between postures work with musculoskeletal complaints.[10]

Boshuizen et al in Margarini (2014), states that someone who works more than 5 years increases the risk of back pain compared to less than 5 years of exposure.[11] This can occur because the loading of the spine for a long time can cause the disc cavity to constrict permanently and also result in spinal degeneration which can cause chronic lower back pain. The same is true of Aisyah (2014), in lifting workers about the relationship between individual characteristics and work position with musculoskeletal complaints in lift-up workers at PT.[12] AJG Gresik is one of them concerning working period which shows that there is a relationship between years of service and musculoskeletal complaints.

Age is identical to the level of work ability by changes in body tools, cardiovascular and hormonal systems.[1] This study is in line with Tarwaka (2010) which states that workers who than 35 years old have a small risk of experiencing musculoskeletal complaints.[3] These complaints occur because in general, skeletal muscle complaints begin to be felt in working age, which is 25-65 years. Nusa, et al (2013) showed that there was a significant relationship between age with musculoskeletal complaints with a value of p = 0.003 (p <0.05) and the closeness value of the relationship was positive, namely the higher the age the higher the risk of musculoskeletal complaints.[13]

This is consistent with Puput's 2015 study which showed that body mass index (BMI) had a significant relationship with musculoskeletal complaints.[14] According to Supariasa (2002), the Body Mass Index (BMI) or Body Mass Index (BMI) is a simple tool or way to monitor the nutritional status of adults, especially those associated with underweight and overweight.[15] The association of BMI with MSDs is the more fat a person is, the greater the risk of experiencing MSDs.

Conclusion

Based on the results of research on the relationship of work posture with complaints of musculoskeletal disorders in PT Toarco Jaya Processing workers in the city of Rantepao in 2017, the musculoskeletal Disorders (MSDs) complaints on processing workers are more than workers who do not experience MSDs complaints. Work posture, Working period, Age and Nutritional status

are related to complaints of Musculoskeletal Disorders (MSDs) in PT Toarco Jaya processing workers in the city of Rantepao in 2017.

Acknowledgement

The authors would like to thank to the participants at PT Toarco Jaya, Rantepao City.and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Suma'mur PK. Company Hygiene and Work Safety. Printing 13. Haji Masagung: Jakarta. 1996.
2. ILO. The Prevention of Occupational Diseases. [Internet]. 2013. [cited 2015 Oct 25]. Available from www.ilo.org/wcmsp5/groups/public/wcms_204755.pdf
3. Tarwaka. Industrial Ergonomics, Knowledge Fundamentals and Applications at Work. Publisher: Harapan Press Solo. 2010.
4. Fatimah T. Pain in the Back of the Stitching Workers Section at PT Intigarmindo Persada Jakarta. Thesis. Jakarta: Veterans National Development University. 2011.
5. Cindyastira D. Relationship between Circulation with Complaints on Musculoskeletas Disorder in Block Paving Workers at CV Sumber Galian, Makassar City. Makassar Journal: Faculty of Health Community of Hasanuddin University. 2014.
6. Suma'mur PK. Corporate Hygiene and Occupational Health (Hiperkes). Sagung Seto: Jakarta. 2009.
7. Zulfiqor MT. Related Factors with Complaints of Mollusculoskeletal Disorders in Welder in Parts Fabrication of PT. Caterpillar Indonesia in 2010. Scientific Thesis. State Islamic University Syarif Hidayatullah Jakarta. 2010.
8. Karuniasih. Review of physiology and complaints about the impact of musculoskeletal disorders on the driver of the Trans-Jakarta Travel X-Bandung travel destination. Journal. Jakarkat: Indonesian University Community Health Faculty. 2009.
9. Suwanto J. Relationships between Risks of Posture Work with Risk of Complaints on Mollusculoskeletal Workers in the Cutting Section of Iron in the Industrial Center in the Padas Industry in Klaten. Thesis. Health Sciences Faculty. Muhammadiyah University Surakarta. 2016.
10. Nurhayati H. Relationship between Posture Work with Complaints Muskuloskleetal on Work Press Dryer UD. Abioso, Boyolali. Scientific Thesis. Surakarta: UNS. 2013.
11. Margarini AF. Relation of Factors to Characteristics of Individuals, Economical Factors with Complaints on Subjective Musculoskeletal Disorders (MSDs) in Construction Workers of PT. X. Thesis.Surabaya: Faculty of Health, University of North Carolina. 2014.
12. Aisyah F. Relationship Characteristics of Individuals and Position of Work with Complaints of Musculoskeletal Disorders in Cluster Workers in Warehousing of PT AJG Gresik 2014. Thesis. Surabaya: Faculty of Health Community of the University of North Carolina. 2014.
13. Nusa Y, Joseph WB, Lampus BS. Relationships between Tribes, Duration of Work, and Shaking with Complaints on the Musculoskeletal System at Manado-Langowan Route Bus Driver at Karombasan Terminal. Journal. Community Health Faculty, Samrat University repeated. 2013.
14. Puput NF, Catur Y. Secondary Factors Associated With Complaints of Mollusculoskeletal Laundry Workers in Muktiharjo Kidul Village Semarang. Journal of Dian Nuswantoro University Health Faculty. 2015.
15. Supariasa, I.D.N. Nutritional Status Assessment. Jakarta: ECG Medical Book. 2002.

A study on Frequency of 12-23 Months of Children Visits to Integrated Service Post (Posyandu) 3 Months in a Row against Developments in the Work Areas, Makassar City

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ABSTRACT

Based on data from the National Central Statistics Agency currently there are an estimated 351,000 children with special needs under the age of five. This study aims to describe the frequency of visits between 12-23 months to Posyandu (Integrated Service Post) for 3 consecutive months on the development of baduta (children under two) in the Working Area of the Puskesmas, Makassar City. The type of study method used is descriptive survey research. The sampling method in this study was purposive sampling with predetermined criteria. The sample in this study is the age of 12-23 months with 35 badutas taken from 9 posyandu. Data was taken using the family characteristic questionnaire and the Pre Development Screening Questionnaire (KPSP) to measure the development of baduta. The collected data is processed using the SPSS program and presented in table form along with narration. The results showed that out of a total of 35 people who visited the posyandu 3 months in a row there were 34 baduta (97.1%) with normal development and the rest with deviant development (2.9%). When tested for development using a 15-month KPSP, the person could not carry out 5 tests out of a total of 10 tests in the 15-month KPSP. These 5 tests are rough movements. Based on the results of the study, it is suggested that the puskesmas conduct development checks at all posyandu so that children's development can be monitored.

Keywords: *Posyandu (Integrated Service Post); Developments; Work Areas*

Introduction

The national development goals listed in the concept of the 2015-2019 National Long Term Development Plan (RPJMN) are one of which is to improve the quality of human resources (HR). Efforts to improve the quality of human resources begin with the process of developing children from conception to young adulthood. Posyandu is a form of community participation in the health sector that is managed by cadres targeting the entire community. Posyandu is one of the health services in the village to make it easier for people to know or check health, especially for pregnant women and toddler.[1] One of the posyandu's objectives is to monitor improvement in nutritional status toddlers and pregnant women. However, public awareness of health care, especially toddlers, is still lacking, so there are still toddlers with impaired growth development.[2]

The active visit of mothers to bring their children to the posyandu is influenced by several factors such as age, education, employment, access to health services, and social economy.[3] The results of the 2007 Basic Health Research (Riskesdas) showed that Posyandu was the most visited place for underfive weighing, which was 78.3%; toddlers weighed regularly (4 times or more), weighed 1-3 times and which were never weighed consecutively were 45.4%, 29.1% and 25.5%.[4]

The results of Riskesdas in 2010 showed that the higher the age of the child, the lower the scope of the weighing was carried out at the posyandu (≥ 4 times over the past six months). The percentage of weighing children under the age of sex is not different, but according to the place of residence in urban areas the tendency is to weigh their children in the posyandu rather than in rural areas.[5]

Riskesdas 2013 shows that monitoring the growth of toddlers carried out every month shows that the percentage of infants aged 6–59 months who have never been weighed in the past six months tends to increase from 25.5% (2007), 23.8 percent (2010), to 34, 3% (2013).[6] What are the impacts on toddlers, if mothers of

children under five are not active in Posyandu activities, among others, do not get health counselling about the growth of normal toddlers, do not get vitamin A for eye health, mothers of children under five do not know the growth of body weight for months.[4]

In Indonesia, data on deviations in pre-school child development have not been recorded accurately and specifically, but UNESCO can estimate children who have a deviant tendency to reach at least 10% and this can be a strong reference. Meanwhile, based on data from the National Central Statistics Agency currently there are an estimated 351,000 children with special needs under the age of five.[7] Several studies on the relationship between language development and family socio-economic status show that children from poor families experience delays in the development of their language compared to children from better families.[8]

In Indonesia, it is famous for the term children under three years old. Even though physical development (especially feet) at this age is not the main thing, children in toddlers at stage 1 like to walk, climb or climb something. At this stage, it is very important for parents to be the main safeguards.[9] Therefore, this study is identifying the Frequency of Visits from 12-23 Months to 3-Month Consecutive Posyandu on Developments in the Work Areas of Puskesmas, Makassar City.

Methodology

The type of study method used is descriptive survey method which is to find out the description of the frequency of posyandu visits in 3 consecutive months to the growth of toddlers aged 12-23 months in the working area of the Puskesmas, Makassar City. This study was conducted in the Community Health Center Working Area between March-April 2017.

Population and Sample: The population in this study were all children aged 12-23 months. The sampling technique in this study was purposive sampling. The samples in the study were mothers of the children aged 12-23 months who were enrolled at the posyandu who visited the Posyandu for 3 consecutive months. Samples will be included in the study if they meet the criteria such as mother, who have KMS toddlers, have babies aged 12-23 months, children visited Posyandu in the last 3 months, children no hospitalized for the past 3 months and never sick for more than 7 days.

Data Collection: The data obtained directly from respondents through a questionnaire, which is the Pre Development Screening Questionnaire (KPSP) to see the development according to the age of the baby which included subtle motion, rough motion, speech and language, socialization and independence. The latest secondary data is obtained by referring at the results of the toddler weighing record and the posyandu register book.

Data Processing and Analysis: The collected data are processed using the SPSS program through Univariate Analysis.

Result and Discussion

The environmental condition of the Antara Health Center is an urban development area, a dense residential environment, some areas are still slums, mainly on the outskirts and some areas are lowlands, allowing floods to occur. Community behaviour still does not have clean culture; the personal hygiene of children is still low, consumption of fast food, and smoking. The work program of the Antara Health Center for improving community nutrition includes the provision of vitamin A capsules, Fe tablets for pregnant women, supplementary feeding to infants and toddlers. Health promotion includes alert villages, PHBS coaching/counselling, development of health posts (Poskestren and Posyandu), public health counselling, occupational health efforts (UKK).

Table 1 shows there are a total of 133 physical targets in 9 PosyandupuskesmasAntara. The population is 58 baduta who had visited in April. While baduta who visited 3 months in a row about 36 baduta and the sample considered in this study were 35 baduta, which meet the sample criteria.

Table 1: Target Data and Posyandu Visits 3 consecutive months in the working area of the health center between 2017

Posyandu	Baduta	Visited				Sample
		Feb	Mar	Apr	3 Con. months	
Kantisang	17	14	13	2	1	1
Antara	12	11	8	8	6	5
Hamzy RW 3	12	11	9	7	4	4

Conted…

Hamzy RW 2	19	16	10	7	4	4
AsalMula	12	11	10	8	5	5
Bontosugi	33	25	22	9	4	4
KeraRamsis	8	7	7	5	3	3
Hartaco Jaya	12	7	7	6	4	4
Immim	8	8	8	6	5	5
Total	133	110	94	58	36	35

Table 2 shows there are 34 baduta with normal development and 1 baduta with development deviate. Baduta with this deviant development is 16 months old and female. When tested for development using a 15-month KPSP, the person could not carry out 5 tests out of a total of 10 tests in the 15-month KPSP. These 5 tests are rough movements. The cause of the baduta was not able to do any rough motion tests because the growth of baduta legs was hampered, making it difficult to stand. Based on the KIA 2016 book, the stimulation parents can do to overcome this is by slowly training children to stand up and walk by holding on, and teach children to walk on the steps/stairs.[10] In addition, to monitor the progress of the health center the health center should do examination of developments in the posyandu so that the possibility of developmental irregularities can be prevented.

Table 2: Distribution of Baduta KPSP Score Categories

KPSP Score Category	Baduta Age Category				Total
	12-14 months	15-17 months	18-20 months	21-23 months	
Normal (%)	22.9	34.3	14.3	25.7	97.1
Deviate (%)	0.0	2.9	0.0	0.0	2.9

Table 3 shows there is 1 baduta with a percentage of fine motion KPSP score of 67% which is in the age of 12-14 months. Baduta is 14 months old. Of the 3 subtle motion test questions at the 12-month KPSP, there was 1 test question that could not be implemented by the person. The baduta fail to grab the pencil tightly and can be easily taken away. This can be caused by a lack of developmental stimulation by parents. Based on the 2016 KIA book, the stimulation that parents can give is to teach children to scribble pencils on paper, hold their own cups, and hold small objects.[10]

Table 3: Distribution of Percentage of Subtle Motion KPSP Score

Percentage of Subtle Motion KPSP Score	Baduta Age Category				Total
	12-14 months	15-17 months	18-20 months	21-23 months	
67 %	1	0	0	0	1
100 %	7	13	5	9	34

Table 4 shows Bbaduta with the percentage of KPSP score of 80% of rough motion could not carry out 1 KPSP test of gross motion from a total of 5 gross motion test questions in the 15-month KPSP. Baduta is 17 months, 15 months and 16 months old. The 17-month-old and 16 months old baduta fail to bend to pick up the toys without holding or touching the floor. When he wants to take the toy he immediately sits down and does not want to stand up again. The 15-month-old baduta cannot walk along the room without falling or staggering. The stimulation that can be given by parents based on the 2016 KIA book to optimize the development of the rough movements is such as teaching children to walk along a room or staircase and teaching children to move freely in supervision.[10]

Table 4: Distribution of Percentage of Gross Motion KPSP Scores

Percentage of Gross Motion KPSP Score	Baduta Age Category (Months)				Total
	12-14	15-17	18-20	21-23	
0 %	0	1	0	0	1
80 %	0	3	0	0	3
100 %	8	9	5	9	31

Table 5 shows there is 1 baduta with the percentage of KPSP scores speaking and language 0% that is at the age of 15-17 months. Baduta is 15 months old. The Baduta is 15 months old and cannot carry out a speech and language test from a total of 1 question. At the time of the test the baduta was not able to say the words. In other words the baduta has a delay in speaking. Possible causes are lack of speech and language stimulation by parents. The stimulation that can be given by parents based on the 2016 KIA book, among others, invites simple words such as "ma-ma" and teaches to mention parts of his body.[10]

Table 5: Distribution of Percentage of Talk and Language KPSP Scores

Percentage of Talk and Language KPSP Scores	Baduta Age Category (Months)				Total
	12-14	15-17	18-20	21-23	
0 %	0	1	0	0	1
100 %	8	12	5	9	34

Table 6 shows the distribution of Percentage of KPSP Scores on Socialization and Independence. Based on the percentage of KPSP scores on socialization and independence there are 5 baduta with the percentage of KPSP score on socialization and independence of 50%, which is in the age of 12-14 months. The Baduta was unable to carry out 1 test out of a total of 2 tests of socialization and independence in the 12-month KPSP. Baduta is aged 13 months (4 baduta) and 14 months. When tested 3 children baduta did not look for and expect researchers to reappear, but felt afraid and some were shy and some were crying out of fear. The other 2 baduta did not show a shy attitude at all, even feeling afraid. Baduta at that age should meet fear and shame when meeting new people. The stimulation that parents can provide to overcome these problems is based on the 2016 KIA book, namely by introducing to family members, invite to play with friends.[10]

Table 6: Distribution of Percentage of KPSP Scores on Socialization and Independence

Percentage of KPSP Scores on Socialization and Independence	Baduta Age Category (Months)				Total
	12-14	15-17	18-20	21-23	
50 %	5	0	0	0	5
100 %	3	13	5	9	30

Bebgei (2000) states that stimulation is less likely to experience delays in development and where children are fostered with good stimulation by providing various aspects of stimulation needed by children, namely rough motion, subtle movements, language and speech, socialization and independence. [11, 12] According to Hurlock (1994) argues that a stimulating environment is one of the factors driving children's development.[13] A stimulating environment encourages good physical and mental development, while a non-stimulating environment causes the development of children below their abilities.[7] Stimulation activities include various activities to stimulate child development such as exercise, speech, thinking, independence and getting along.[7] Also, parents are the main cause of problems arising from poor child stimulation.[12]

Jafri and IsnaOvari's study (2015) showed that the development of socialization before and after giving stimulation of socialization to the age group with poor categories increases from 52.2% to 87.0% for 36–47 months of age, 48.1% to 55.6% for 48–59 months of age and 46.7% to 86.7% age 60–71 months of age.

Social personal development is strongly influenced by the environment and interactions between children and parents/other adults.[12] Child development will be optimal if social interactions are sought according to the needs of children at various stages of development. According to Bebgei (2000) states that of 49 children 4.08% of children experience delays in development of poor stimulation, namely children who received less attention from his parents while 32.65%, children with developmental interpretations doubted, among others, with sufficient stimulation.[11, 12]

Conclusion

Based on the results of this study, the conclusion is most of the baduta are born with normal body weight. Most of the baduta who were sampled were given exclusive breastfeeding by their mothers. The type of MP-ASI given to all baduta is MP-ASI mixed (factory and local). All nurses give birth at health services and are assisted by health workers. There are 1 baduta that has a deviant development. There is 1 baduta with a percentage of subtle motion KPSP score 67% There is 1 baduta with the percentage of KPSP score of roughly 0% and 3 baduta movements with the percentage of KPSP score moving roughly 80%. There is 1 baduta with the percentage of KPSP score speaking and language 0%. There are 5 baduta with a percentage of KPSP score of 50% socialization and independence.It is recommended that the Puskesmas conduct development checks at all posyandu each month so that child development can be monitored and the possibility of developmental irregularities can be prevented. Parents must be diligent in providing stimulation to the clown so that developmental irregularities can be prevented.

Acknowledgement

The authors would like to thank to the participants and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Sumirat, Widhi, Isti W. Relationship between the Activities of Culture and the Activities of Social Services with Growth and Development of Bullies. AKP Journal No. 6. 2012 December 1 July-31.
2. Sugiyarti. Compliance with Visit Posyand and Gizi Status Balita at Posyandu Karangbendoanguntapan, Bantul, Yogyakarta. JNKI. 2014;2(3):141-146.
3. Maulana, A. Relationship between the Activity of Culture in Politics and the Decrease in the Number of Balita Bawah Garis Merah (BGM) in the Village of Suko, West Java, West Java Regency. Thesis. Jember University Nursing Study Program. 2013.
4. Republic of Indonesia Ministry of Health. Health System Research Bulletin. Surabaya: Bakti Husada. 2007.
5. Republic of Indonesia Ministry of Health. Indonesian Basic Health Research (Riskesdas) 2010. The Indonesian Ministry of Health's Research and Health Development Agency. 2010.
6. RI Ministry of Health. Basic Health Research. Republic of Indonesia Ministry of Health Research and Health Development. 2013.
7. Erviyanti, E. Relationship between Gizid Status and Development of Pre-School Children in TK/ PAUD Kelubuk Buaya Sub-District, Koto Tangah District, Padang City in 2015. Thesis. Andalas University. 2015.
8. Soetjiningsih, Ranuh. Growing Flower Children and Teenagers. Editions - 1. Jakarta: CV. SagungSeto. 2014.
9. Soetjningsih. Child Growth. Jakarta: EGC.2005.
10. RI Ministry of Health. Mother and Child Health Book. Jakarta: Ministry of Health and JICA (Japan International Cooperation Agency). 2016.
11. Bebgei. Growing Flower Babies. Less Moon on 2-6 Months. Semarang: FK. UNDIP. 2000.
12. Diana, Fivi M. Toddler Child Development Monitoring. Journal of Public Health. 2010;4(2).
13. Elizabeth H. Child development. Jakarta: Erlangga. 1998.
14. JafriY, Isna O. Relationship between Providing Stimulation of Socialization with Socialization Development in Children of 3-6 Years of Age at the Posyandu of the District of North Jakarta City of 2015. In the Study Program of Nursing School, University of Singapore. 2015.

Analysis of Ability to Pay National Health Insurance Contributions to Communities on Lakkang Island, Makassar City in 2017

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ABSTRACT

This study aimed to analyse the ability to pay National Health Insurance (NHI) contributions by the community in the Lakkang Island of Makassar City. The type of research used is quantitative research with a descriptive survey approach. The population in the study was 121 families who had not participated in the NHI program on Lakkang Island. Saturated sampling method is used to obtain a sample of 95 families. Data collection was carried out by direct interviews with the people of Lakkang Island based on the questionnaire and the data analyzed using univariate analysis. The results showed that the ability to pay ATP 1 of the respondents was in the capable category, which was 61.1% with an average of IDR 90,440 per month, for non-food ATP 2 category, it was 62.1% with an average amounting to IDR23,544 per month. Non-essential is in the capable category, which is 51.6% with an average of IDR26,536 per month.

Keywords: *Lakkang Island, NHI, ability to pay and ATP.*

Introduction

The development of health insurance in Indonesia runs very slowly compared to the development of health insurance in several neighboring countries in ASEAN. Careful research on factors that influence the development of health insurance in Indonesia is not sufficiently available. Theoretically, several important factors can be stated as the cause of the slow growth of health insurance in Indonesia, including low population demand and income, lack of government will, insurance culture that has not been good and bad quality of health services, and lack of legal certainty in Indonesia[1].

The ability to pay and willingness to pay are two factors that play a role in the utilization of medical services which in turn will also affect equity. The ability to pay can be measured by the approach of calculating family income, family assets, or household expenses. The willingness to pay can be measured by asking the respondent through two methods, namely what is the real expenditure of individuals/families for health during a certain period of time and by directly asking how many individuals are willing to issue health services[2].

Community participation in the NHI program can be seen from the ability and willingness to pay contributions. Research in KabupatenJember showed that the value of ATP is greater than that of WTP. Lack of ownership of *BadanPenyelenggaraJaminanSosial* (BPJS) Health cards among handicraft workers in Jember showed low efficacy on the NHI program even though the income of handicraft workers is relatively high[3]. Whereas in the research in the City of Bengkulu, the people who do not have a BPJS Health card are those who are not able to, but the expenditure on cigarettes (essential) is greater than for paying NHI contributions each month[4]. The amount of ATP and WTP of a person or community in paying contributions is certainly inseparable from the factors that influence it. Research in the Hulu Sungai Selatan District showed that greater income and the existence of savings for health care costs are factors that influence ATP and community WTP[5]. In addition, research in Konawe Selatan District revealed that there is a relationship between income and utilization of health services by coastal communities[6].

The number of BPJS Health participants for Lakkang Island is 571 people or 60% of 952 residents and those who do not have a BPJS Health card are 381

people or 40% with 121 family heads. It can be seen that Lakkang Island has not achieved the National Health Insurance for its population[7]. Based on the background, the authors are interested in examining the ability to pay the National Health Insurance contributions by the community on Lakkang Island, Makassar City.

Methodology

This type of research is a quantitative study with a descriptive survey approach that is used to produce an overview of the ability to pay national health insurance contributions to the community on the Lakkang Island. The duration of this research was from January 19 to February 18, 2017.

The population in this study was the people of Lakkang Island who had not been covered by NHI. The number of residents who have not participated in the NHI program is 381 people, consisting of 121 family heads. Samples are measures taken from the overall population. The sample in this study was the head of the family in Lakkang Island who have not been covered by NHI. Of the 121 family heads who were sampled, 95 families were not covered by NHI during the study due to the presence of people who had enrolled the BPJS Health during the study and those who had obtained an Indonesia Health Card. Thus, the number of samples in this study was 95 people. The sampling procedure used a saturated sampling method, which is the method of sampling that often being regarded as a total sample, where all members of the population are included as samples[8].

The primary data of this study were obtained from 95 respondents through direct interviews using a prepared questionnaire on matters relating to the research, namely data on respondent characteristics, ability to pay data and willingness to pay data. Secondary data of this study was obtained from the LakkangPustu report, Lakkang Urban Village report and other sources related to this research.

Univariate analysis is used to analyze the data in this research. This analysis produced a frequency distribution and a percentage of each variable and to describe the description of each variable in the distribution table.

ATP 1 = Total income – total expenditure/total dependents

ATP 2 = 5% of total non-food and non-essential expenditure.

Result and Discussion

Based on the Makassar City minimum wage in 2016, the number of respondents with low-income levels is 69 people. The number of respondents with sufficient income was 26 people. This is caused by several factors such as the area of rice fields or ponds and the presence of family members who had helped the head of the household to fulfil daily life. The increase in commodity prices (goods and services) and the guidance of daily living needs make families have to keep thinking of other ways to get additional income. The low-income respondents did not participate in the NHI program because the people of Lakkang Island who mostly worked as fishermen, entrepreneurs, and informal workers does not have fixed monthly income and only earned enough to meet their daily food needs. The results of this study are in line with the research conducted by Mudayana[9] which stated that family income affects the ability of patients to pay for health services. If the patient's income is still lacking, they assume that they cannot afford health services. This research is also in line with the research conducted by Sihaloho[10] whereby high income affected respondents to become NHI participants and determine their willingness to pay contributions.

Based on Table 1, it is known that the majority of respondents with food expenditure of IDR500, 000-IDR999, 999 are 76 people (80%) since the interview results revealed that the average monthly food expenditure of respondents in Lakkang Sub-district is IDR 775,105. Consumption expenditures are generally spent on basic needs to meet physical needs. Food consumption is the most important factor because food is the main type of goods to maintain survival. Some respondents also planted crops by planting rice so that people's food needs were met without buying rice.

It is also known that the majority of respondents with non-food expenditure amounted to <IDR500, 000, as many as 59 people (62.1%). This is because based on the results of calculations from interviews with all respondents, the average monthly non-food expenditure of respondents in Lakkang Sub-District is IDR 4,70,876. The type of non-food expenditure is the lowest type of expenditure compared to other expenses. This is because the lifestyle of the people on Lakkang Island is very simple. Based on the results of the study, the biggest non-food expenditure was expenditure on electricity, gas, and water payments. While the lowest non-food expenditure

is on durable goods such as kitchen utensils, cutlery and cellular phones. The results of this study are not in line with the research conducted by Karimah[3] which said that the largest household expenditure on handicrafts was non-food expenditure, because many craft workers' families bought durable goods such as cooking utensils, both cash and credit.

Non-essential expenditures are household expenditures for one month which include expenses for party, ceremonies, cigarettes, alcohol, snacks and entertainment expenses that are calculated in units of rupiah. Most of respondents with non-essential expenditures amounted to <IDR500,000 - and IDR500,000-IDR999,999, respectively as many as 46 people (48.4%). This is because based on calculations from the results of interviews with all respondents, the average monthly non-essential expenditure of respondents in Lakkang is IDR530,715.

Table 1: Distribution of respondents based on expenditure per month by Lakkang Island community in 2017

Expenditure Category	Amount	Respondent	
		Total (n)	Percentage (%)
Food expenditure (IDR)	<500.000	5	5.3
	500.000-999999	76	80
	1.000.000-1499.999	6	6.3
	≥1.500.000	8	8.4
	Total	95	100
	Mean	IDR 775.105	
Non-food expenditure	<500.000	59	62.1
	500.000-1.000.000	35	36.8
	≥1.500.000	1	1.1
	Total	95	100
	Mean	IDR 470.876	
Non-essential expenditure	<500.000	46	48.4
	500.000-999999	46	48.4
	1.000.000-1499.999	2	2.1
	≥1.500.000	1	1.1
	Total	95	100
	Mean	IDR 530.715	

The biggest amount of expenditure is spending on cigarettes and snacks. This is because the heads of households in this case are husbands, most of whom are smokers who can spend a pack of cigarettes in a day or two. Based on the results of interviews with respondents it is known that the majority of families have school-age children. Thus, the expenditure for snacks in one month is quite large even those who have not yet school, have also been snacking every day.

The amount of ATP 1, indicated that most of respondents were able to pay NHI contributions each month which was as many as 58 people (61.1%). While 37 people (38.9%) were unable to pay the contributions or the ability to pay was not included in the category of care rooms for NHI service classes. Based on Table 2, it is known that of the 58 respondents who were able to pay NHI contributions, as many as 30 people (31.6%) belonged to the class 1 category. This was because the people in these categories were people who had sufficient income. Furthermore, the results of research show that respondents with low income but are able to pay the contributions each month. This is due to the simple living behaviour of the people of Lakkang Island.

Table 2: Distribution of respondents based on ATP 1 family in the community of Lakkang Island, Makassar City in 2017

Category	Contribution (IDR)	Ability to pay	
		Total (n)	Percentage (%)
No class	<25.500	37	38.9
Class 3	25.500	19	20.0
Class 2	51.000	9	9.5
Class 1	80.000	30	31.6
Total		95	100

Based on Table 1, the average food expenditure of respondents is IDR470,876. If calculated using the 5% formula multiplied by the non-food expenditure of each respondent, the average ability to pay the community was IDR23,554. This means that the respondents with more non-food expenditures were included in the incapable category, namely 59 people (62.1%). While 36 people (37.9%) belong to the category of capable. Table 3 shows that of the 36 respondents who were able, as many as 35 people (36.8%) belonged to the class 3 category services. This is because the non-food expenditure of the Lakkang Village community is not too high. As for non-food expenditure for clothes, people buy these items when necessary, or even during festive seasons, as well as for spending on beauty and durable goods.

The results showed that the average ATP 1 calculation, respondents were able to pay NHI contributions every month. These results are in line with the theory of Adisasmito[11] which stated that if a person is able to spend on non-essential goods, then surely that person is also able to pay for essential health services. If the smoking and snacking behaviour is reduced or stopped, the ability to pay for contributions or health services will increase. Yandrizal[4]'s research indicated that the majority of people who do not have a BPJS Health card are those who are not able to, but expenditures for shopping for cigarettes are greater than for paying NHI contributions each month. This research is also in line with the research conducted by Noormalasari[12] who conducted the research in Jember, saying that on average respondents had consumptive behaviour towards non-essential expenditures such as cigarettes.

Table 3: Distribution of respondents based on ATP 1 in the community of Lakkang Island, Makassar City in 2017

Category	Contribution (IDR)	Non-food		Non-essential	
		n	%	n	%
No class	<25.500	59	62.1	46	48.4
Class 3	25.500	35	36.8	46	48.4
Class 2	51.000	1	1.1	2	2.1
Class 1	80.000	0	0	1	1.1
Total		95	100	95	100

The ability to pay using the ATP formula 2 for non-essential expenses, based on Table 4, is more in the capable categories, which are 49 people (51.6%). The use of the 5% formula multiplied by non-essential expenditure, the obtained average ability to pay the community is IDR26,536. From 49 respondents (51.6%) who were able, as many as 46 people (48.4%) were included in the category of NHI class 3 services. This was due to the non-essential expenditure of Lakkang Island communities such as cigarettes and snacks. The respondents maximum expenditure for non-essential items is IDR1,667,000, average non-essential expenditure of respondents is IDR530,715. The results of this study are consistent with the research conducted by Putra [7] that the ability to pay if seen from the average non-essential expenditure of respondents of independent paying BPJS participants in Makassar City is IDR 405,484. Such non-essential expenditures should make the head of the family able to finance his family for essential needs such as paying JKN contributions each month, at least in class 3 service which is only IDR 25,500.

Table 4: Distribution of respondents based on ATP 2 families in the community of Lakkang Island, Makassar City in 2017

Ability to pay	Non-food		Non-essential	
	Total (n)	Percentage (%)	Total (n)	Percentage (%)
Not able	59	62.1	46	48.4
Able	36	37.9	49	51.6
Total	95	100	95	100

Conclusion

Based on the results of the research and discussion that has been described, the following conclusions can be drawn:

1. The level of income of respondents is mostly in the category <IDR1,500,000, which is 38 respondents (40%). If, based on the 2016 Makassar City minimum wage, the majority of income is in the low category with 69 respondents (72.6%). The level of respondents' expenditure for food averaged Rp.775,105, for non-food Rp.470,876 and non-essential Rp.530,715. The biggest type of expenditure is spending on food.
2. The ATP value of the respondents using the ATP 1 formula was mostly in the capable category of 58 respondents (61.1%) with an average ATP per person of IDR 90,440 per month. While for the ATP 2 formula, the majority are in the category of non-food for non-food namely 59 respondents (62.1) with an average ATP of IDR 23,544 and for the most non-essential are in the category of capable of 49 respondents (51.6%) with ATP average IDR 26,536.

Acknowledgement

First and foremost, the authors would like to thank Faculty of Community Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank all the respondents from the community on the Lakkang Island who were willing to participate in this study.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Agustina R, Dartanto T, Sitompul R, Susiloretni KA, Achadi EL, Taher A, Wirawan F, Sungkar S, Sudarmono P, Shankar AH, Thabrany H. Universal health coverage in Indonesia: concept, progress, and challenges. The Lancet. 2018 Dec 19.
2. Nosratnejad S, Rashidian A, Dror DM. Systematic review of willingness to pay for health insurance in low and middle income countries. PLoS One. 2016 Jun 30;11(6):e0157470.
3. Karimah. Karimah. Employees' ability and willingness to pay challenges to national health insurance coverage in the North Sulawesi sub-district of Balung, Jember Regency. Essay. Jember: FKM University of Jember. 2015.
4. Yandrizal Y, Utami SP. Ability analysis and willingness to pay for the benefits of achieving UHC JKN in Bengkulu City. Journal of Health. 2017 Aug 30;10(1):3-10.
5. Handayani E, Gondodiputro S, Saefullah A. Factors that Influence the Willingness of the Congregation Paying for the Guarantee of Health in the District of South Sungai Selatan. Bandung: Library of Padjajaran University. 2013.
6. Karman K, Saptaputra S. Related Factors With Utilization of Health Services Share the Community of the Coastal Areas of the Village in the Province of the District of South Sulawesi in 2016. Journal of Scientific Community Health Scholarships. 2017 Apr 13;1(3).
7. Putra. Analysis of ability to pay and catastrophic payment for independent BPJS Makassar health payment participants. Thesis. Makassar: Post-Graduate FKM Unhas. 2014.
8. Buraerah. Descriptive analysis of health research data. Makassar: Masagena press. 2013.
9. Mudayana AA. Analysis of Ability and Willingness to Pay for Nursing Patients in PKU Muhammadiyah Hospital, Bantul. Kes Mas: Ahmad Daulan University Public Health Faculty Journal. 2015;9(1).
10. Sihaloho EN. Determinants of Willingness to Pay Contribution to National Health Insurance Entrepreneurs Independent in Semarang City Health Service Area (Doctoral dissertation, Semarang State University).
11. Adisasmito W. Second Edition Health System. PT Raja Grafindo Persada, Jakarta. 2014.
12. Noormalasari W, Nuryadi N, Sandra C. Ability To Pay The Premium of National Health Insurance for Fishermen in Jember. Health Library. 2015 Jan 17;3(1):147-54.

Factors Associated with Musculoskeletal Disorders (MSDs) Complaint on the Workers of Cargo Unit at PT. Angkasa Pura Logistics, Makassar in 2017

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ABSTRACT

Musculoskeletal complaints are complains on the part of skeletal musclefelt by someone starting from mild to very severe. When the muscle receives heavy load repeatedly and for a long time, it will lead to complain on damage of joints, ligaments, and tendons. The observational analytic with cross sectional study done, aimed to determined factor associated with MSDs complaints on cargo unit workers at PT. Angkasa Pura Logistics Makassar in 2017. The number of samples as many as 31 people was taken by purposive sampling technique. Data are taken from respondents using questionnaires, Nordic Body Map, Rapid Entire Body Assessment (REBA), microtoise and scales. The results showed that there was a relationship between length of work p= 0.017, work attitude p= 0.036, and Body Mass Index (BMI) p=0.041 with MSDs complaints oncargo unit workers at PT. Angkasa Pura Logistik Makassar in 2017.

Keywords: *MSDs, Musculoskeletal, BMI and PT. Angkasa Pura Logistics.*

Introduction

Musculoskeletal hazards are a disorder or decrease in the condition of the musculoskeletal system commonly referred to as Musculoskeletal Disorders (MSDs). MSDs are a major cause of industrial injury in both developed and developing countries[1]. MSDs can be one of the factors causing a decline in production, loss of working hours, high costs treatment and material, increased absenteeism, low quality of work, injury and muscle tension, increased likelihood of workplace accidents and errors, increased labor turnover costs and reduced reserves associated with emergencies[2].

Complaints of the musculoskeletal system are complaints to parts of the skeletal muscles that are felt by a person ranging from mild complaints to very sick. If the muscle receives a static load repeatedly and for a long time, it can cause complaints in the form of damage to joints, ligaments and tendons. Work attitude that causes the position of parts the body moves away from its natural position, for example hand movements are raised, the back is too bent and the head is raised. The farther the body part of the body's gravity, the higher the risk of occurrence complaints of the musculoskeletal system[3].

MSDs are one of the increasing occupational diseases in the world. The results of research conducted by Cindyastira et al.[4] on production workers in CV. SumberGalian Makassar found the prevalence of MSDs complaints felt by 26 workers (60%). The statistical results show that the age variable, work period variables, exercise habits, and work attitude variables have a significant relationship with complaints of MSDs, whereas the vibration intensity variable and the longer working duration variable have no significant relationship with MSDs complaints. Research conducted on tofu factory workers in East Bara-Baraya Village, Makassar City showed that MSDs complaints were felt by 42 workers (66.7%). The results of statistical tests show that the variables of age, smoking habits, and years of service and work posture are related to complaints of MSDs[5].

PT. Angkasa Pura Logistik is a subsidiary of PT.Angkasa Pura I (Persero) which is engaged in logistics in Indonesia. Based on the preliminary survey that has been carried out, the work process in the cargo unit includes the receipt of goods, weighing, making/ checking transport documents, storing goods in the warehouse until the process of goods is loaded into cargo compartment, withdrawing goods from the warehouse

to the aircraft and vice versa, loading goods loading) to the aircraft and unloading of aircraft, storage and shipping. From the types of work, some processes are still done manually, for example the process of lifting and moving items. This work process is usually called manual handling. Manual handling operations are all activities of transporting or sustaining loads (including lifting, placing, pushing, pulling, carrying, or moving) by hand or body strength[6].

Manually lifting activities can cause complaints about skeletal muscles often referred to as musculoskeletal complaints. Moreover, if the activity of lifting weights manually is done with repetitive positions or working attitudes repeatedly every day the possibility of a musculoskeletal complaint is greater. The results of Jaya[7] research show that there is a relationship between the weight of goods and MSDs complaints on CV Cahaya Malang Raya Makassa employees. Masliah et al. [8] research results on manual handling workers in Makassar Port showed that there was a relationship between work posture and MSDs complaints experienced by workers. In addition to being able to carry out their duties well, workers also need good physical condition. This is necessary because every day workers are required to lift heavy items, it needs a large work capacity so as not to cause harm. Based on preliminary data obtained from the administrative division of PT. Angkasa Pura Logistics, the number of workers in the cargo unit is 111 people with working experience of generally less than 3 years. Workers work every day from Monday to Sunday. Based on the description of the background above, the authors are interested in conducting research on factors related to complaints of Musculoskeletal Disorders (MSDs) in cargo unit workers at PT. Angkasa Pura Logistik Makassar.

Methodology

The type of research used is observational analytic research with cross sectional study approach, with the intentions of perceiving the relationship between the independent variables and the dependent variable which is the relationship between weight burden, work attitude, and BMI with MSDs complaints among workers in cargo unit at PT. Angkasa Pura Logistics Makassar.The research was conducted at PT. Angkasa Pura Logistics Makassar from January 2017 to April 2017.

The population in this study was all porter workers in the unit cargo PT. Angkasa Pura Logistik Makassar, which is 111 people. From this population, the sample study was workers in the cargo unit of PT. Angkasa Pura Logistics, who works in the afternoon shift (35 people). Sampling is done using purposive sampling techniques, namely sampling based on certain characteristics considered to have a close relationship with the characteristics of the population that were previously known. The inclusion criteria used in this study are as follows:

a. Minimum 1-year work period. This is done because of MSDs complaints is a complain that can arise due to a monotonous work process and continuous load over a relatively long period of time.

b. Work in the afternoon shift during the study period.

Data on complaints of Musculoskeletal Disorders (MSDs) were obtained by using the Nordic Body Map questionnaire. Primary data regarding name and age were obtained through direct interviews with respondents using questionnaire. Data on load weight is obtained from the weight of the object shown on packed weights. Data regarding work posture is obtained through the calculation of MSDs risk on certain body parts (neck, spine, upper arms & bottom, wrist) using the Rapid Entire Body Assessment scoring sheet. Data on Body Mass Index is obtained through weight and height measurement of the worker using weight scales and microtoise, then calculated using the IMT formula. Secondary data was obtained from the company in the form of data regarding company profiles and the number of workers in the cargo unit of PT. Angkasa Pura Logistics Makassar. All the gathered data were analyzed using SPSS program which consist of univariate analysis and bivariate analysis.

Result and Discussion

Univariate Analysis: Respondents' distribution based on Musculoskeletal Disorders (MSDs) complaints is shown in Table 1 which was obtained from interviews using the Nordic Body Map questionnaire. It shows that out of 35 respondents, 21 people (60%) experienced MSDs while the number of respondents who did not experience MSDs was 14 people (40%).This study categorizes the weight variable into two categories namely heavy and light. Based on Table 1, it can be seen that, 21 people (60%) who lifts heavy loads while working whereas remaining people involves in light loads. As for work attitude category,itt can be concluded that a total of 20 people (57.1%) exhibit risky work attitude in contrast

to the remaining 15 people (42.9%).In this study, BMI was categorized into two; which are ideal category if the BMI is between 18.5 – 25.0 kg/m^2 and the non-ideal category if BMI <18.5 kg/m^2 or BMI> 25 kg/m^2. Non-ideal consists of those who are underweight, overweight, and obese. Data shows that out of 35 respondents, there were 17 people (48.6%) who had ideal BMI and 18 people (51.4%) with non-ideal BMI.

Table 1: Distribution of respondents based on MSDs complaints, weight load, work attitude and body mass index at PT. Angkasa Pura Logistics Makassar workers in 2017

Category		Frequency (n)	Percentage (%)
Complaints of MSDs	Have complains	21	60
	No complains	14	40
Weight load	Heavy	21	60
	Light	14	40
Work attitude	Risky	20	57.1
	Non-risky	15	42.9
Body mass index	Ideal	17	48.6
	Non-ideal	18	51.4

Bivariate Analysis: The bivariate analysis results of the relationships between weight burden and MSDs complaints at PT Angkasa Pura Logistics is presented in Table 2. It shows that of all respondents who involved in lifting heavy loads, there were 16 people (76.2%) who experienced MSDs while 5 people (35.7%) did not complain of MSDs. While respondents who were involved in lifting light loads, 5 respondents do have MSDs while 9 people (64.3%) did not experience any MSDs. Based on the results of data analysis using Chi-square test, the value of p = 0.017 which indicated that there is a relationship between weights and complaints of MSDs in cargo unit workers at PT Angkasa Pura Logistics Makassar. The results of this study are in line with the research conducted by Masliah et al.[8] regarding MSDs complaints of workers in manual handling at Makassar port, which showed to have a significant relationship between complaints of musculoskeletal disorders and the weight of the burden. If the weight of the load exceeds the work capacity of workers, it can cause interference to workers. The heavier the burden received by a worker, the greater the likelihood of disruption to the physical of the worker, especially at parts of the muscles and bones. This is because the heavier the objects, the greater the energy that presses on the muscles to stabilize the spine and produces greater pressure on the spine. Due to transporting loads that are too heavy or too weak, physical abilities can cause a worker to suffer a disorder or disease[9].

Table 2: Relationship between load weight and MSDs complains among workers at PT. Angkasa Pura Logistics Makassar in 2017

Weight load	MSDs complains				Total		p
	Have complain		No complain		n	%	
	n	%	n	%			
Heavy	16	76.2	5	23.8	21	60.0	0.017
Light	5	35.7	9	64.3	14	40.0	
Total	21	60	14	40	35	100	

An overview of the bivariate analysis results of the relationships between work attitudes and MSDs complains at PT Angkasa Pura Logistics is shown in Table 3. Respondents with risky work attitudes who experienced MSDs were as many as 15 people (75%) while workers who demonstrate non-risk work attitude and had MSDs disorders, namely 6 people (40%). In contrast, respondents who has complains of MSDs comprises of 5 people (25%) with risky work attitudes and 9 people (60%) with non-risky work attitudes. Based on the results of data analysis using Chi-square test, the value of p = 0.036 which indicated that there is a relationship between work attitudes and complaints of Musculoskeletal Disorders (MSDs) in cargo unit

workers at PT Angkasa Pura Logistics Makassar. This research is in line with the research conducted by Riyanto[10] regarding the effect of manual lifting work on complaints of the musculoskeletal system in workers at PT. SidoMuncul Semarang as the p value is 0.001. An unnatural work attitude causes the body part to move away from its natural position. The farther the position of the body part from the center of gravity, the higher the complaints of skeletal muscles also occur. Work attitudes are not generally due to workers 'incompatibility with workers' abilities[11]. The attitude and work position that are not ergonomic have the potential to cause some health problems, including muscle fatigue, pain, and vascularity disorders[12].

Table 3: Relationship between work attitude and MSDs complaints among workers at PT. Angkasa Pura Logistics Makassar in 2017

Work attitude	MSDs complains				Total		p
	Have complain		No complain		n	%	
	n	%	n	%			
Risky	15	75	5	25	20	57.1	0.036
Non-risky	6	40	9	60	15	42.9	
Total	21	60	14	40	35	100	

Table 4 presented the bivariate analysis results of the relationships between BMI and MSDs complains at PT Angkasa Pura Logistics. It can be observed that out of 35 respondents, the number of respondents with ideal BMI who had MSDs complains was as many as 14 people (77.8%) while 7 people (41.2%) in non-ideal BMI category raised MSDs complains. Respondents who has ideal BMI and did not have any MSDs were 4 people (22.2%) while remaining 10 people (58.8%) are in the non-ideal BMI category and did not have any MSDs. Based on the results of statistical analysis using the Fisher Exact, the value of p = 0.027 which tells there do exist relationship between Body Mass Index (BMI) with complaints of MSDs. The results of this study are in line with the research conducted by As'Adi et al.[13] workers who measured the relationship of individual characteristics and manual material handling (MMH) to workers in the TanjungJember Market. He obtained p = 0.041 which concluded that there is a relationship between BMI and MSDs complaints. BMI associated with musculoskeletal complaints are the results in the body not being able to sustain body weight that makes the body feel pain. Overweight and obesity leads to serious health consequences. Risks are increasing along with increasing BMI. Body mass index is a major risk factor for chronic diseases osteoarthritis[14]. Meanwhile, underweight workers also have the potential to experience complaints of MSDs due to the inability of their bodies to support heavy loads. The possibility of injury or sprains when lifting weights is greater than workers who have a proportional body.

Table 4: Relationship between work attitude and MSDs complaints among workers at PT. Angkasa Pura Logistics Makassar in 2017

BMI	MSDs complains				Total		p
	Have complain		No complain		n	%	
	n	%	n	%			
Ideal	14	77.8	4	22.2	18	51.4	0.041
Non-ideal	7	41.2	10	58.8	17	48.6	
Total	21	40	14	60	35	100	

Conclusion

Based on the results of research on factors related to complaints of Musculoskeletal Disorders (MSDs) in cargo service workers at PT Angkasa Pura Logistics Makassar in 2017, some conclusions were obtained as follows:

a. The heavier the burden received by workers, the more likely it is to experience MSDs complains.
b. Workers need to practice ergonomic work attitude in order to reduce MSDs occurrences.
c. Maintaining BMI in ideal category helps the workers from MSDs risks.

Acknowledgement

The authors would like to thank Faculty of Community Health, Hasanuddin University for their support and facilities in conducting this study. In addition, the authors would also like to thank all the respondents from Cargo Unit at PT. Angkasa Pura Logistics who was willing to participate in this study.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Gallagher S, Schall Jr MC. Musculoskeletal disorders as a fatigue failure process: evidence, implications and research needs. Ergonomics. 2017 Feb 1;60(2):255-69.
2. Macdonald W, Oakman J. Requirements for more effective prevention of work-related musculoskeletal disorders.BMC musculoskeletal disorders. 2015 Dec;16(1):293.
3. Choi HW, Kim YK, Kang DM, Kim JE, Jang BY. Characteristics of occupational musculoskeletal disorders of five sectors in service industry between 2004 and 2013.Annals of Occupational and Environmental Medicine. 2017 Dec;29(1):41.
4. Cindyastira D, Russeng SS, Wahyuni A. Vibration Intensity with Complaints on Musculoskeletal Disorders (Msds). Public Health Media Indonesia. 2016 Jun 22;10(4):234-40.
5. Oei VTW, Wahyu A, Rahim MR. Factors Associated with Complaints on Musculoskeletal Disorders (MSDs) in Workers of Tofu Factory in Bara Barayya District East Kalimantan Makassar City District in 2016. (thesis, Hasanuddin University)
6. Ridley J. Occupational health and safety. Jakarta: Erlangga. 2006.
7. Jaya I. Factors related to complaints of musculoskeletal disorders (msds) in manual handling activities by employees of CV. CahayaMajang Raya (CAMAR) Makassar in 2015. (thesis, Hasanuddin University)
8. Masliah SS, Rahim MR. Factors related to complaints of musculoskeletal disorders (MSDs) in manual handling workers at Makassar Port (thesis, Hasanuddin University)
9. McGill SM. Low back disorders: evidence-based prevention and rehabilitation. Human Kinetics; 2015 Nov 17.
10. Riyanto, A. Influence of Attitude Working on the Manual Focus on Complaints on the Mollusculoskeletal System in the Workers of the Push in Pt. SidoMuncul Semarang (Doctoral dissertation, Muhammadiyah University Surakarta).
11. Fuady AR. Factors Associated with Complaints on Musculoskeletal Disorders (MSDs) at Shoe Craftsmen in Small Industrial Village (PIK) Grinding District of North Jakarta in 2013.
12. Widana IK, Sumetri NW, Sutapa IK. Effect of improvement on work attitudes and work environment on decreasing occupational pain. International journal of life sciences. 2018 Oct 29;2(3):86-97.
13. As' Adi AM, Sujoso AD, Prasetyowati I. The Relationship Between Individual Characteristics and Manual Material Handling With Musculosceletal Complaints Due To Work. Health Library. 2014 May 5;2(2):271-6.
14. Zulfiqor MT. Factors related to complaints ofculosletal disorders in welder in the fabrication section of PT. Caterpillar Indonesia.

Relationship between Heat Pressure and Age with Work Fatigue among Workers at Department Factory I of Pt. Maruki International, Makassar in 2017

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ABSTRACT

PT. Maruki International Indonesia is the only company in Indonesia that exports Butsudan. Production activities are divided into 6 factories. The initial process that has high activity and has high heat pressure sourced from the engine takes place in Factory 1. Hence, this can cause workers to experience fatigue easily. This study aimed to determine the relationship of heat pressure and age with work fatigue experienced by Factory 1 workers at PT. Maruki International Indonesia Makassar City. The type of research is observational analytic with a cross sectional study approach. Data collection from 48 workers took place from April 10 to April 15, 2017. The work fatigue measurement technique used the Reaction timer tool, heat pressure using Heat Stress Monitor equipment, and age through direct interview. Data analyses were done using Chi-square test. The results showed that there was a relationship between heat pressure $p = 0.014$ ($p < 0.05$) and age $p = 0.026$ ($p < 0.05$ with work fatigue at factory I workers of PT. Maruki International Indonesia.

Keywords: *PT. Maruki International, Fatigue, temperature and factory I workers.*

Introduction

Fatigue is a mechanism for protecting the body so that the body can avoid further damage resulting in recovery after rest[1].The term fatigue leads to the condition of weakening of energy to carry out an activity. Symptoms of subjective and objective fatigue include feelings of lethargy, sleepiness, dizziness, lack of concentration, lack of alertness, poor and slow perception, reduced arousal for work and decreased spiritual and physical performance. Fatigue can affect work productivity, so that if the level of productivity of a workforce is disrupted caused by physical or psychological factors, then the result will be felt by the company in the form of decreased in productivity[2].

Workers will be able to carry out activities well and work optimally under conducive working environment. The comfort of a workplace is influenced by several factors, one of which is the work climate. Work climate is a combination of air temperature, air humidity, air movement speed and radiation temperature in a work environment[3]. If these four components interact with heat, it will potentially cause heat stress. Excessive heat pressure can lead to various health problems, work accidents to death. Human ability to adapt to environmental temperature is generally seen from changes in body temperature. Humans are considered able to adapt to changes in environmental temperature if temperature changes do not occur or changes in body temperature whereby still in a safe range[4]. The local temperature and existence of life are very closely related, as are the effects of work weather on labour power. Work efficiency is greatly influenced by working weather in areas where work is not cold and not hot. The recommended temperature in the workplace is around 24-26 ° C (cold temperature) and humidity of 65% - 95%[3].

Workers in hot environments, such as around furnaces, smelters, boilers, ovens, heat sinks or working under the hot sun can experience heat stress[5]. These thermal conditions can affect the performance of workers both working outside and inside buildings. The effectiveness of the performance of workers in the two work locations is strongly influenced by the comfort of the work environment where they are located, especially for workers who are in building[6]. The United States Emergency Department reports that the number of work

accident patients due to heat stress in the workplace has increased significantly from 3,192 cases in 1997 to 7,452 in 2006[7]. Based on research conducted by Indriawati[8] about the effect of heat pressure on the fatigue level of work at the concert slab steel plant I PT. Krakatau Steel Cilegon, Banteng shows that there is a relationship between heat pressure and work pressure in the concrete section, namely the higher the heat pressure in the work environment, the higher the level of fatigue of workers. Conversely the lower the heat pressure in the workplace the lower the work fatigue of the workers.

Individual factors such as age, nutritional status and haemoglobin levels also greatly influence the occurrence of work fatigue. Research by Damopoli et al.[9] concluded that there is a relationship between age and work fatigue at the Manado-Amurang bus driver at Malayan terminal. The age of bus driver is directly proportional to the level of fatigue. The results of research conducted by Febriani et al.[10] on the relationship of heat pressure to fatigue in tofu maker workers of Tofu Factory in East Bara-Barayya Sub-District, in 2016 showed that as many as 43 respondents obtained more work fatigue in the status category. 29 respondents (82.9%) experienced abnormal nutritional compared to the normal nutritional status category as many as 14 respondents (50.0%).

PT Maruki International Indonesia is the only company in Indonesia that exports Butsudan (furniture that serves as a place to respect and communicate with deceased ancestors). Types of activities carried out at PT. Maruki International Indonesia, namely wood drying, woodcutting, refinement, gluing, colouring, assembly and packaging. Examples of complaints by workers during the research work include quickly feeling tired, fast thirst, dizziness, and excessive sweating. This is the background of researchers wanting to conduct research with the title "Relationship between Heat Pressure and Age with Fatigue among Workers in Factory I Section at PT. Maruki International Indonesia Makassar City 2017.

Methodology

The type of research used is observational analytic research with a cross sectional study approach as the independent and dependent variables will be observed at the same time. This research was conducted at the factory 1 of PT. Maruki International Indonesia Makassar City. Data collection began on 10 April until 15 April 2017 against 48 workers in the factory as samples taken with exhaustive sampling techniques. The data were collected using direct interviews (questionnaires) as to find out the age and heat pressure measurements using a Heat Stress Monitor measuring device. Furthermore, work fatigue measurements were carried out using a reaction timer on a sample of 48 workers. The data obtained is then analyzed using the SPSS computer program and the data is presented in the form of a frequency table and cross tabulation (crosstab) in accordance with the research objectives and accompanied by a narrative as a table explanation.

Result and Discussion

Univariate Analysis: Distribution of respondents according to work fatigue group can be seen in Table 1. Based on Table 1, it is shown that the highest number of respondents is in the reaction time group 198-239 milliseconds as many as 18 respondents or 37.5% while the least number of respondents is in the reaction time group 502-543 milliseconds as many as 2 respondents or 4.3%.

Table 1: Distribution of respondents by fatigue group

Fatigue group	Respondents	
	n	Percentage (%)
198 – 239	18	37.5
240 – 381	5	10.4
282– 323	3	6.2
324– 365	4	8.4
366– 407	3	6.2
408 – 459	3	6.2
460 – 501	4	8.4
502 – 543	2	4.3
544 – 585	3	6.2
586 – 627	3	6.2
Total	48	100

After grouping the fatigue level based on the reaction time of workers, work fatigue in this study is then divided into 2 categories, namely fatigue if the reaction time is ≥ 240 milliseconds and not fatigued if the reaction time is <240 milliseconds. Data in Table 2 presented that from 48 respondents, it was known that respondents who experienced fatigue were 30 people or 62.5% whereas those who did not experience fatigue is as many as 18 people or 37.5%.

Table 2: Distribution of respondents by fatigue category

Fatigue category	Respondents	
	n	Percentage (%)
Experienced fatigue	30	62.5
No fatigue experience	18	37.5
Total	48	100

Data presentation based on distribution of respondent according to heat pressure can be seen in Table 3. Heat pressure is categorized into 2 categories, namely meeting the requirements for Wet Bulb Globe Temperature Index (WBGT) of not exceeding threshold value 28℃ and not meeting the requirements if the WBGT does not pass the threshold value (> 28℃). The data in Table 3 showed that from 48 respondents, it was obtained as many as 32 people or 66.7% who worked under heat pressure did not meet the requirements and 16 people or equal to 33.3% worked on heat pressure that met the requirements.

Table 3: Distribution of respondents by heat pressure category

Heat pressure category	Respondents	
	n	Percentage (%)
Did not meet the requirement	32	66.7
Met the requirement	16	33.3
Total	48	100

Distribution of respondents based on age group is tabulated in Table 4.The age of respondents working at Factory I ranged from 20-59 years. Based on table 4, the highest number of respondents is in the age group 45-49 as many as 11 respondents or 22.9% while the least number of respondents is in the age group 55-59 years as many as 4 respondents or 8.4%.

Table 4: Distribution of respondents by age group

Age group	Respondents	
	n	Percentage (%)
20-24	6	12.5
25-29	6	12.5
30-34	5	10.4
35-39	5	10.4
40-44	6	12.5
45-49	11	22.9
50-54	5	10.4
55-59	4	8.4
Total	48	100

Bivariate Analysis: The results of cross tabulation between heat stress and fatigue can be seen in Table 5 which revealed that from 48 respondents, most of workers that experienced work fatigue working under heat pressure (did not meet the requirements), as many as 24 respondents or 75.0% compared to those working under heat pressure (met the requirements) of 6 respondents or 37.5%. The number of respondents who did not experience fatigue but worked under heat pressure (within the requirements), were as many as 10 respondents or 62.5% whereas those who worked under heat pressure (did not meet the requirements), namely as many as 8 respondents or 25.0%. Based on data analysis using the Chi square test, the value of p = 0.014. The interpretation is that there is a connection between heat stress and work fatigue.

Table 5: Relationship between heat stress and work fatigue

Heat stress	Work fatigue				Total		p-value
	Experienced fatigue		No fatigue experience		n	%	
	n	%	n	%			
Did not meet requirement (>28℃)	24	75.0	8	25.0	2	66.7	0.014
Met requirement (≤28℃)	6	37.5	10	62.5	6	33.3	
Total	30	62.5	18	37.5	8	100	

The following are the results of cross tabulation between age and work fatigue which can be seen in Table 6. Table 6 showed that of the 48 respondents those who experienced work fatigue were in the old age (35 years and above) category as many as 23 respondents or 74.2% compared to the young age category that is as many as 7 respondents or 41.2%, while the percentage who did not experience work fatigue in the young age category were as many as 10 respondents or 58.8% and in the old category 8 respondents or 25.8%. Based on data analysis using the Chi square test, the obtained p value = 0.026. Thus, there is a relationship between age and work fatigue.

Table 6: Relationship between age and work fatigue

Age	Work fatigue				Total		p-value
	Experienced fatigue		No fatigue experience		n	%	
	n	%	n	%			
Old (≥35 years)	23	74.2	8	25.8	31	64.6	0.026
Young (<35 years)	7	41.2	10	58.8	17	35.4	
Total	30	62.5	18	37.5	48	100	

Discussion

The results of the heat pressure received by workers vary depending on which production process the worker works. In addition to work processes that are exposed to heat, the condition of buildings and roofs made of zinc and not equipped with air vents (exhaust fans) increase the factor of heat stress in the workplace is higher. If workers are exposed to heat, the organs will work harder to remove excess heat from the body, causing the hypothalamus to stimulate the sweat glands so that the body will sweat. In sweat contains various sodium chloride salts, the release of sodium chloride salt with sweat will reduce levels in the body, thus inhibiting the transportation of glucose as an energy source. This will cause a decrease in muscle contraction so that the body experiences fatigue[11]. This was reinforced by complaints from workers when researchers conducted interviews, where most workers experienced dehydration, headaches, excessive sweating and complained of the existence of a hot environment. Based on the results of data analysis and observations, it can be concluded that the higher the heat pressure, the respondents will be at risk of experiencing work fatigue. This research is in line with the research conducted by Indriawati[8] which stated that there is a significant relationship between heat pressure and work fatigue among workers at the Concrete Slab Steel Plan 1 PT. Krakatau Steel Cilegon, Bantensince obtained p value = 0.002.

In this study, there is a relationship between age and work fatigue whereby the older a person is, the lower the body's strength which result in faster work fatigue. A person's age will affect the condition and capacity of the body in carrying out its activities. Workers over the age of 35 have fatigue when doing work under hot temperatures compared to younger workers[12]. The results of this study are not in line with the research conducted by Winwood et al.[13] where young workers are easily tired than old age employees.

Although most respondents who experience work fatigue are included in the old age category, but there are 8 respondents who are in the old age category whom did not experience fatigue. This can be caused by workers utilizing their rest periods well. In addition, in the young age category, 7 respondents experienced work fatigue. Based on the results of interviews, these workers had poor sleep patterns. This is due to other activities after working like additional work, experiencing sleep disorders (insomnia) and the habit of spending time late at night after returning to work.

Conclusion

Based on the results of research and analysis of the variables studied about the relationship of heat pressure and the characteristics of individuals with work fatigue on workers at the factory 1 of PT. Maruki International Indonesia Makassar City In 2017 it can be concluded that:

1. The higher the temperature of the environment in the workplace, the faster the workers experience work fatigue.
2. The older the age of a worker, the faster they experience work fatigue.

Acknowledgement

The authors would like to thank Faculty of Community Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank all the respondents from Department Factory I of Pt. Maruki International who was willing to participate in this study.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Krueger GP. 14 A Fatigue.Human Error in Medicine. 2018 Feb 6:187.
2. Gander P, Hartley L, Powell D, Cabon P, Hitchcock E, Mills A, Popkin S. Fatigue risk management: Organizational factors at the regulatory and industry/company level. Accident Analysis & Prevention. 2011 Mar 1;43(2):573-90.
3. De Been I, Van Der Voordt T, Haynes B. Productivity. Facilities Management and Corporate Real Estate Management as Value Drivers: How to Manage and Measure Added Value, Routledge, Abingdon. 2016 Oct 4:140-55.
4. Irzal MK. Basics of Health and Safety: Edition 1. Kencana. 2016 Nov 1.
5. Listrianti AW, Naiem MF, Muis M. Relationship between Heat Pressure and Fatigue of Nutritional Installation Workers at Makassar City Hospital. Journal of Public Health. 2014: 1-10.
6. Mukti IF, Huda LN, Matondang AR. Design of Environmental Improvement Work for Use Reduced Exposure Heat Work Operator at PT. Xy. USU Industrial Engineering Journal. 2013 Feb 24;1(1).
7. Fuhrmann CM, Sugg MM, Konrad CE, Waller A. Impact of extreme heat events on emergency department visits in North Carolina (2007–2011). Journal of community health. 2016 Feb 1;41(1):146-56.
8. Indriawati A. Effect of Heat Pressure on Work Fatigue at Concast Slab Steel Plant 1 at PT Krakatau Steel. (doctorate dissertation, Sebelas Maret University).
9. Damopoli FC, Paul AT, Raini AT. Factors Associated with Work Fatigue at Route-Driver Manado-Amurang at Malalayang Terminal Manado. Skirpsi. Field of Health Care Workers. Faculty of Public Health. 2013.
10. Febriani E, RahimMR,Wahyuni, A. Relationship between Heat Pressure and Fatigue in Tofu Factory Workers in Bara-Baraya Subdistrict, East Sumatra District Makassar City Makassar, 2016. (thesis, Hasanuddin University)
11. Hall JE. Guyton and Hall Textbook of Medical Physiology E-Book: with STUDENT CONSULT Online Access. Elsevier Health Sciences; 2010 Jul 19.
12. Salasa N, Kolibu FK, Punuh MI. Relationship Between Age, Work Period and Nutritional Status With Exhaustion of Work on Workers in the Loining Section of PT. Sinar Pure Foods International Bitung. Health Media. 2017;9(3).
13. Winwood PC, Winefield AH, Lushington K. Work-related fatigue and recovery: the contribution of age, domestic responsibilities and shift work. Journal of Advanced Nursing. 2006 Nov;56(4):438-49.

Relationship of Health Service Quality with Inpatients' Loyalty at RSUD M akassar City

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ABSTRACT

The purpose of this research is to get an illustration about the relationship of quality of health service with the loyalty of inpatients in RSUD Makassar City. This research type is quantitative research with cross sectional design. A total sample of 95 respondents is determined by the accidental sampling technique. The data collection is done using questionnaire. The result of Chi-square test ($p < 0.05$) on service quality variables was correlated between responsiveness ($p = 0.007$), assurance ($p = 0.000$), and reliability ($p = 0.013$) toward loyalty of inpatients in RSUD Makassar City. Meanwhile, service quality variables have no relation between tangibility ($p = 0.901$) toward loyalty of inpatient patient in RSUD Kota Makassar. In conclusion, there is relation between quality of health service variable with patient loyalty including, dimension of responsiveness, and assurance. However, there is no correlation between the variable of health service quality and patient loyalty in tangibility dimension. Thus, it is recommended that the hospital speed up the process of renovation of the rooms, hospitalization and complement each room according to the needs of patients in RSUD City.

Keywords: *Health Service, Quality, Inpatients, Loyalty and RSUD.*

Introduction

Healthcare providers such as hospitals, health centers, medical centers and medical practices are form of provision of health resources which need to have quality services that are in line with the expectations of the community[1]. Health personnel (doctors, nurses, medical and non-medical support staff in the hospital) must understand how to serve consumers well, especially patients, since they are the primary consumers[2]. There are many things to consider in improving the health status of the community, one of which is to provide health services for instance any individual or collective effort in an organization to nurture and improve the health of individuals, families, groups or communities, and the establishment of health care facilities such as health centers and hospitals[3]. Quality as a concept is applied and practiced in the same manner and style in every circumstance. Health care must understand the health status and needs of the public health services it serves in determining the most effective way to provide a quality healthcare.

Based on Gunawan et al.[4]'s research results on the quality of patient service and loyalty, the results showed that the service quality consisted of tangibility, empathy, reliability, responsiveness and assurance had partial effect on patient's loyalty. Research conducted by Mahamad et al.[5] showed that empathy, reliability, responsiveness, assurance, and tangibility had positive and significant influence on customer's satisfaction and loyalty. The results of the study conducted by Asmita[6] revealed that patient's perception about doctor's medical skill was not good at 50.9%, perception of doctor attitude was not good at 49.1%, perception of information delivery was not good equal to 53.6 %, timekeepingservice perceptions were poor with 59.1%, perception of doctor's time consultation was not good with 52.7% and less loyal patients 56.4%. Research by Berlianty et al.[7], showed that there is a significant relationship between all variables with patients' loyalty, the related variables are responsiveness p (0.00), assurance p (0.03), tangibility p (0.03), empathy p (0.03), and reliability p (0.01). While the results of research conducted by Hidayah[8], proved that the variables associated with the loyalty of inpatient

patients were reliability (p = 0.006), empathy (p = 0.000), and brand personality (p = 0.007). Variables that were not related to loyalty of inpatients is affordability variable (p = 0.314).

Based on reports from RSUD Makassar from 2014 to 2016, there has been a decreased in the number of patients especially from year 2015 to 2016 with a reduction of number of patient visits as many as 3358 patients.This is likely to be due to the quality of health services in inpatient admission was in poor condition. Consequently, patients are not loyal to re-utilizing the service in the hospital. Therefore, this study is interested to know the quality of health service quality with patient inpatient loyalty at RSUD Makassar City for the year 2017 based on tangibility, responsiveness and assurance factors.

Methodology

This quantitative research applied an observational analytic with cross sectional approach which is meant to identify the relationship between health service quality with patient loyalty in RSUD Makassar City. The study conducted in RSUD Kota Makassar (located at Jl. Pioneer of Independence Km 14 Daya, Makassar (Provincial Poros Road), was from 10th to 30th April 2017.

The population in this study was all patients in the care unit staying in Makassar Municipal Hospital in 2016 as many as 9228 people.Sampling technique used in this research was 'accidental sampling technique' that is the simplest sampling technique, because the sample coincidently exists at the time of the research and meets the criteria for research sample. The criteria for the samples are as follow:

a. Willing to be a respondent in this study.

b. Respondents are patients who have more than two visits.

c. Respondents are able to understand the questions/ statements contained in questionnaire and answer the question itself. For respondents who have difficulty completing the questionnaire, they can be assisted by his/her family.Based on this given criteria, the total number of samples accepted from the population was 95 respondents.

In this study, the primary data is obtained through questionnaires that have been prepared and distributed to the respondents to be filled up whereas the secondary data is obtained from document collection such as annual report and profile of Makassar City Hospital, and other sources related to research. The collected data were analyzed using SPSS program for univariate analysis and bivariate analysis with responsiveness, assurance, and tangibility as independent variables while loyalty as the dependent variable.

Result and Discussion

Univariate Analysis: The distribution of respondents scoring based on responsiveness dimension statements is tabulated in Table 1. Based on the description of the statement the dimension of responsiveness in the first statement, no respondents who rated strongly agree and strongly disagree, while 87 respondents rated disagree. In statement number two, 89.5% did not agree, and similar to the first statement, 0 respondents strongly disagree and strongly disagree. In statement number three, there are 4 respondents who rated strongly agree, 36 respondents judged agree, 55 respondents who did not agree and 0 respondents who rated strongly disagree. For the fourth statement, there are 12 respondents (12.6%) who ranked strongly agree, 44 respondents (46.3%) judged agree, 39 respondents (41.1%) who rated disagree, 0 respondents (0.0%) strongly disagreed. In statement number five, there are 20 respondents (21.1%) who rated strongly agree, 37 respondents (38.9%), rated agree, 38 respondents (40.0%) who did not agree, and 0 respondents (0.0%) who strongly disagreed. For the last statement, there are 0 respondents (0.0%) who rate strongly agreed and disagreed, 40 respondents (42.1%) agreed, and 55 respondents (57.9%) who did not agree. This is due to doctors are quick and responsive in providing services, and nurses inform quickly if there is a delay in providing health services. However, on the other hand from the results of data collection in the field, there are some respondents who judge poorly on the responsiveness dimension because most respondents rated not all nurses in Makassar City Hospital are quick and responsive in providing health services to patients. Therefore, health workers should be faster and clearer in providing services to patients so that they feel comfortable with the attitudes held by health workers in Makassar City Hospital.

Table 1: Distribution of respondents scoring based on responsiveness dimension statements

Statements	Responses							
	Strongly agree		Agree		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%
Doctors are fast and responsive in providing health services to patients.	0	0	8	8.4	87	91.6	0	0
Doctors are willing to listen to the patient's complaints.	0	0	10	10.5	85	89.5	0	0
Nurses inform quickly if there is a delay in providing health services to patients.	4	4.2	36	37.9	55	57.9	0	0
Health workers always provide information on every action/ treatment that will be taken to the patient/family.	12	12.6	44	46.3	39	41.1	0	0
Nurses are fast and responsive in providing health services to patients.	20	21.1	37	38.9	38	40.0	0	0
Health workers serve andaccept patients well.	0	0	40	42.1	55	57.9	0	0

Table 2 presented the distribution of respondents scoring based on assurance dimension statements. With reference to the scoring on the description of the statement, the assurance on statement number one, there are 0% strongly agree and disagree, 21.1% agree and 78.9% assessed disagree. For statement number two, there is 1 respondent who chose strongly agreed, 25 respondentsagreed, 69 respondents assessed disagreed and none rated strongly disagreed. The third statement had 0 respondents who rated strongly agree, 20 respondents agree, 74 respondents disagree, and 1 respondent who strongly disagree. As for the fourth statement, 0% rate strongly agree and disagree, 9.5% considered agree, and 90.5% assessed disagree. Likewise with the fourth statement, there were no respondents who strongly agree or strongly disagree with the fifth statement. 30 respondents judged to agree and 65 respondents assessed disagree. For the sixth statement, 23 respondents rated strongly agree, 16 respondents agreed, 56 respondents disagreed, and none strongly disagreed.

Table 2: Distribution of respondents scoring based on assurance dimension statements

Statements	Responses							
	Strongly agree		Agree		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%
Doctor can always answer every question I asked.	0	0	20	21.1	75	78.9	0	0
Nurse is always polite and friendly towards patients.	1	1.1	25	26.3	69	72.6	0	0
Doctors did their duty well till patients feel satisfied and comfortable in receiving care.	0	0	20	21.1	74	77.9	1	1.1
Nurse maintains confidentiality/privacy ofpatient's condition during treatment.	0	0	9	9.5	86	90.5	0	0
Doctors give attention to the complaints that patients feel.	0	0	30	31.6	65	68.4	0	0
Nurse is always available 24 hours if needed by the patient.	23	24.2	16	16.8	56	58.9	0	0

The distribution of respondents scoring based on tangibility dimension statements is shown in Table 3. Based on the description of the statements, the dimensions of physical evidence (tangible) on statement number 1, there are 2 respondents who rated strongly agree, 44 respondents judged to agree, 49 respondents assessed disagree, and 0 respondents who rated strongly disagree. In statement number 2, 1.1% strongly agree, 34.7% agree, 64.2% disagree and 0% strongly disagree. For the third statement, 28.4% agreed, 71.6% disagreed, and 0% strongly disagreed and

strongly agreed. As for the fourth statement, there are 4 respondents who rated strongly agree, 40 respondents agree, 51 respondents disagree, and 0 respondents who rated strongly disagree. Respondents neither voted for strongly agree nor strongly disagree for the fifth statement. 21.1% considered agreeing while the remaining 78.9% assessed disagreeing. For statement number 6, there are 2 respondents who rated strongly agree, 41 respondents agreed, 52 respondents (54.7%) assessed disagree, and nobody rated strongly disagree.

Table 3: Distribution of respondents scoring based on tangibility dimension statements

Statements	Responses							
	Strongly agree		Agree		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%
Clean and attractive appearance of inpatient room.	2	2.1	4	46.3	9	51.6	0	0
Complete medical equipment is available (blood pressure measurement device, stethoscope, infusion pole, etc.).	1	1.1	3	34.7	61	64.2	0	0
All health workers always neat and clean uniforms, as well use identification/nametag.	0	0	7	28.4	68	71.6	0	0
Available facilities are reasonable at the price paid	4	4.2	0	42.1	1	53.7	0	0
Complete medicines are available at the pharmacy.	0	0	0	21.1	5	78.9	0	0
Complete health facilities are supported by sophisticated technology.	2	2.1	1	43.2	2	54.7	0	0

Table 4 presented the relationship between the dimensions and patients' loyalty. Based on the dimension of responsiveness, there were 33 respondents who considered good and loyalty or, and 33 respondents who are considered good but not loyal. While respondents who assessed the dimensions of responsiveness were not good but loyal as many as 23 respondents and 6 respondents assessed the responsiveness dimension not good and not loyal. Furthermore, the value of p =0.007 means that there is a relationship between the dimensions of responsiveness and the loyalty of inpatients.Research conducted by Ulfa[9], and Sahara[10] stated that the responsiveness dimension has a positive relationship with patients' loyalty. This is supported by the opinion of Ulfa[9] where poor systems and processes greatly influence patients' ratings even though hospitals have skilled employees since such as long waiting time can cause hospitals to lose customers.

As for the dimensions of assurance, there are 65.9% respondents who are good and loyal, while the good but not loyal ones are 34.1%. 10 respondents valued the assurance dimension as not good and are not loyal. There are health workers, especially doctors and nurses who are able to answer every question posed by the patient, the doctor is on duty so that the patient feels satisfied in receiving treatments. However, the results of data collection in the field showed there are some respondents who judge poorly about the assurance dimension because patients assume that nurses are sometimes difficult to find if patients need services. Therefore, health workers especially nurses need to pay more attention at any time if the patient needs service. The obtained p value of 0.000 proved there is a relationship between assurance and loyalty of inpatients. This is in line with the research conducted by Wandebori[11], which stated that assurance influences patients' loyalty.

With reference to the tangibility dimension that, those who assessed this dimensions as good and loyal are as many as 41 people, while the good and non-loyal are 29 people. Respondents who assessed the tangibility dimension as not good but loyal as many as 15 people, whilethose judged poor and disloyal as many as 10 respondents. This is due to the availability of complete medicines at the pharmacy, health workers are always in neat uniforms, facilities are comparable to the payment especially in general patients. Nevertheless, most of the respondents rated badly related to less clean and unattractive inpatient rooms, incomplete facilities such as air conditioner not functioning, fan was not available, and the patient complained and felt hot in the room, the X-ray instrument was not available so the patient used X-rays outside of Makassar City General Hospital. Therefore,

the hospital is supposed to be remodeling properly and completing each room accordingly with patients' needs. Moreover, since the p value= 0.901, there is no significant relationship between the dimensions of tangible with the loyalty of inpatients. The results of this study are in accordance with the research conducted by Diniaty[12] at the RSUD TengkuRafi'anKabupatenSiakwhich stated that tangibility affect patients' loyalty.

Table 4: Relationship between responsiveness dimensions and patients' loyalty

Dimension		Patients' loyalty				Total		p
		Loyal		Not loyal		n	%	
		n	%	n	%			
Responsiveness	Good	33	50.0	33	50.0	66	69.5	0.007
	Poor	23	79.3	6	20.7	29	30.5	
	Total	56	58.9	39	41.1	95	100	
Assurance	Good	56	65.9	29	34.1	85	89.5	0.000
	Poor	0	0	10	100.0	10	10.5	
	Total	56	58.9	39	41.1	95	100	
Tangibility	Good	41	58.6	29	41.4	70	73.7	0.901
	Poor	15	60.0	10	40.0	25	26.3	
	Total	56	58.9	39	41.1	95	100	

Conclusion

From the results of research conducted at Makassar City Public Hospital about the relationship between the quality of health services and the loyalty of inpatients, it can be summarized as follows:

1. There is a relationship between the dimensions of responsiveness, and assurance with the loyalty of inpatients at Makassar City Hospital.
2. There is no relationship between the dimensions of tangibility with the loyalty of inpatients at Makassar City Hospital.

Acknowledgement

The authors are thankful to Faculty of Community Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to express their gratitude towards all the respondents (patients) from RSUD Makassar City who was willing to participate in this study.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Damayanti NA, Jati SP, Fatmasari EY. Differential level analysis of satisfaction with the coverage of Nursing Services for Public Health Insurance Status and Plenary in Semarang City. Journal of Community Health (e-Journal). 2018 Oct 1;6(5):124-34.
2. MaulanaIS, Amalia N. The Relationship of 5 Dimensions of Service Quality with Loyalty to Patients in the Inpatient Installation of Samarinda Medika Citra Hospital in Year 2018.
3. Supriyanto S, Ernawati M. Industrial Marketing Health Services. Edited by O. HS. Yogyakarta: Andi. 2010.
4. Gunawan K, Djati SP. Service Quality and Patient Loyalty (Study at the Hospital of Private Public in Singaraja City, Bali). Journal of Management and Entrepreneurship. 2011 Sep 30;13(1):32-9.
5. Mahamad O, Ramayah T. Service quality, customer satisfaction and loyalty: A test of mediation. International business research. 2010 Oct 1;3(4):72.
6. Asmita W. Analysis of the Influence of Patient Perception About Mutu ServicesDoctor Against Patient Loyalty at the Polyclinic General

Installation Care for Hospital Hospital Semarang Hospital in 2008. (Doctoral dissertation, Post-Ceremony Program Diponegoro University).

7. Berlianty A. Nurhayani. Analysis of Patient Loyalty based on Quality of Service at Inpatient Installation in Bhayangkara Hospital, Makassar, Makassar City in 2013. Journal of Public Health. 2014.
8. Hidayah TN. Satisfaction of Non PBI BPJS Patients Against Service Quality for First-Level Providers of Family Doctors in Laweyan Subdistrict, Surakarta Municipality (Muhammadiyah University of Surakarta).
9. Ulfa R. Relationship Characteristics of Patients, Quality of Service and Inhibition of Moving with Patient Loyalty in Nursing Installation Road Hospital Hospital Depok in 2011. University of Indonesia. Jakarta. 2012.
10. Sahara N. Analysis of the Influence of Satisfaction on Service Services for Doctors against Interests Visit (Study in Patients General in Hospital Installation in RSUD A Dadi Tjokrodipo Bandar Lampung). Journal of Medical Sciences and Health. 2016;3(2).
11. Wandebori H. Revisit Intention to Hospital: Factors Unveiled From a Case Study of Balimed Hospital. Journal of Theory and Applied Management. 2017 Dec 21;10(3):205-16.
12. Diniaty D. Analysis of Quality at the Service of Community Satisfaction or Patients in Tengku Rafi Hospital, Regency of Siak Using Method Importance Performance Analysis and Potential Gain in Customer Value. JTI: Journal of Industrial Engineering. 2016 Jun 1;2(1):25-30.

Relationship of Marketing Mix with Loyalty of Patients of Dental Poly in BatuaPuskesmas, Makassar City in Year 2016

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ABSTRACT

This study aimed to determine the relationship between marketing mix and the patients' loyalty of Poly Dental in BatuaPuskesmas Makassar City using quantitative study with a cross sectional design. The total population of this study was 190 respondents which were taken using the accidental sampling method. The results showed that the variables related to the marketing mix with the loyalty of the dental polyclinic patients at BatuaPuskesmas were products (p = 0.00), place (p = 0.039), health workers (p = 0.00), process (p = 0.00), physical facilities (p = 0.00), promotions (p = 0.006). Whereas the unrelated variable was price (p = 0.076). The dental polyclinic at BatuaPuskesmas is expected to further improve the marketing mix process, although it is good enough but must continue to pay attention to the service process in terms of the time that the patient sometimes have to wait long.

Keywords: *Marketing Mix, BatuaPuskesmas, Loyalty, dental polyclinic and patients.*

Introduction

Oral and dental health is one of the supporting aspects of a healthy paradigm and is a national development strategy to realize healthy Indonesia 2010. 56.7% health centres in Indonesia have carried out community dental health business, while 86% of health centre in Indonesia have implemented the School Dental Health Business[1].

The description of the service utilization of the health centre dental polyclinic can be seen based on the number of visits by the people who get dental treatment per day. Situmorang[2]'s study showed that out of 360 respondents, it was found that only 10% had ever undergone dental treatment for health services at health centres. This indicated that high dental and oral diseases have not been matched by the utilization of health service units[3].

Marketing mix can be used as a marketing tool that makes it easier for health centres to achieve their marketing goals. Along with the times, marketing mix has also developed. This is seen from the magnitude of the influence of the direct relationship between the components in marketing mix (products, tariffs, places, promotions, people, processes, and physical facilities). Marketing mixprogram has a very important role as part of the strategy and company policy to realize customers' satisfaction which will ultimately increase consumers' loyalty[4].

In this globalization era, the social condition of society is increasing where the public is increasingly aware of the quality, it is necessary to improve the quality of satisfaction-oriented health services so that patients will feel loyal to the provision of health services. Hawkins et al.[5] researched on dental and oral hygiene measured using the Oral Hygiene Index Simplified (OHIS) showed that the average dental and oral hygiene of elementary school students in grade IV - VI in the specific district of Jakarta area was in the moderate category of 53.8% of the students who have been examined. Maharani[6]'s research results showed that 88.3% of respondents had dental and oral hygiene status in the unclean category, only 11.7% of respondents had dental hygiene status in the clean category. This problem needs to be addressed since dental and oral hygiene is a very decisive factor in the process of maintaining oral health.

The results of the research conducted by Hayati et al.[7] revealed that there is a there is no significant relation between place mix and physical proof mix with patients' loyalty, but there is significant relation between product mix, price mix, promotion mix, and process mix with patients' loyalty. Based on research done by Semboret at.[8] about marketing mixrelationship with patients' loyalty, it was concluded that there was no relationship

between the product service marketing mix and patient loyalty, whereas there was a relationship between the marketing mix of price, place, promotion, staff (people), process, physical evidence and facility services with patients' loyalty. A similar study was conducted by Riana[9] which also proved that there was a relationship between products, promotions, processes, and physical facilities with the utilization of services in the Sanrobone Health Centre dental clinic.

From the data collection at BatuaPuskesmas, an overview of patient visits per day to the dental in average was 15/day and seen from patient's visits from 2013-2015, it was known that each year the dental poly patient visits increase[10].

Based on the description above and in improving health services and the benefits obtained by the company if it has loyal customers, it is very important for the BatuaPuskesmas to have the right marketing strategy, with marketing programs that can be done to improve service quality. Therefore, to see whether marketing programs have been carried out effectively, it is necessary to conduct research to determine the relationship between marketing mix and patients' loyalty to dental polyclinic at BatuaPuskesmas.

Methodology

This research is a quantitative research in the form of a survey with cross sectional approach where the independent variables and dependent variables are examined simultaneously in the same period. The quantitative approach is done by collecting and processing data to find accurate facts and precise as well as systematic interpretations regarding the marketing mixrelationship with the loyalty of poly dental patients in BatuaPuskesmas.This research was carried out at the Dental Clinic of BatuaPuskesmas for a month from the 27th March-27th April 2017.

The populations in this study were all patients who had dental examinations at the BatuaPuskesmas. The number of patients in 2016 was 74565 patients with an average of 15 patients per day multiplied by 25 working days in dental polyclinic. Hence, there are 375 patients per month. The samples in this study were poly dental patients who were encountered during the study. The sampling procedure used the accidental sampling method, which is randomly taken by respondents or at the time of the research. Therefore, the number of samples in this study was 100 samples.

Data sources from this study were obtained from written documents/data on visits of poly dental patients at BatuaPuskesmas. The gathered data were analyzed using the SPSS program for univariate analysis and bivariate analysis. The research variable consisted of seven independent variables, the marketing mix, namely product, price, place, promotion, people, process and physical evidence, while the dependent variable was patients' loyalty.

Result and Discussion

Univariate Analysis: The distribution of respondents rating based on the product marketing mix (type of service) in BatuaPuskesmasis shown in Table 1. Based on the statement of dental poly products, 81 respondents gave answers strongly agree that the equipment used in dental poly is feasible to use. It can be concluded that the respondents who gave the most answers strongly agreed that examinations by doctors in dental poly were in accordance with the needs of patients with a percentage of 83.0%, 19.0% disagreed that the medicines needed by patients are available, while respondents who answered strongly disagreed that medicines needed by patients are provided with a total of 19 respondents. In addition, 6.0% strongly agreed that the services provided in BatuaPuskesmas covered a wide range of services. Although 4 respondents strongly disagreed that the nurses provided services in accordance to the patients' need, a majority of 84 respondents, strongly agreed with this statement.

Table 1: Distribution of respondents based on 'product' variable statements

Statements	Strongly agree	Agree	Disagree	Strongly disagree
Services in dental polyclinic in BatuaPuskesmas are diversifying.	86	6	4	4
Examination by dentists in dental polyclinic is in accordance with the patient's needs.	83	5	8	4
Nurse services in dental polyclinic are in accordance with patient needs.	84	9	3	4
The health inspection equipment used is assorted.	88	6	2	4

Conted…

Equipment used in dental poly is suitable for use.	81	9	5	5
Medications needed by patients are available.	57	12	12	19

Table 2 presented the distribution of respondents rating based on the price in BatuaPukesmas of Makassar city. Based on the statements of dental poly prices, 93 respondents gave a very agreeable answer that the details of the services cost in of the clinic was clear. While 94 respondents who strongly agreed that the payment method was easy and uncomplicated. Statement number two till number four had the same number of responses from the respondents. Majority of the respondents strongly agreed with these statements: information on examination ratesare given by the officer, affordable examination rates, and expenditures are proportional to the services.

Table 2: Distribution of respondents based on 'price' variable statements

Statements	Strongly agree	Agree	Disagree	Strongly disagree
The payment method is easy and not complicated.	94	0	5	1
Information on examination rates are given by the officer.	90	4	6	0
Affordable examination rates.	90	4	6	0
Expenditures are proportional to the services.	90	4	6	0
Cost details are clear at dental poly services.	93	0	7	0

Table 3 presented the distribution of respondents based on the people marketing mix (health workers) in the BatuaPuskesmas. Based on poly dental statements, 92 respondents (48.4%) gave answers strongly agree that doctors and dental nursesskilfully used medical devices. Whereas respondents gave the least answers for strongly agreed, was for the statement 'the doctors and nurses in the dental clinic examined patients carefully' which was voted by only 40 respondents. Among the eight statements, statement number two was highly agreed by most of the respondent with 85.0% strongly agree and only 15.0% opposed this statement.

Table 3: Distribution of respondents based on 'people' variable statements

Statements	Strongly agree	Agree	Disagree	Strongly disagree
Doctors and dental nurses are skilled at using medical devices	72	6	21	1
Service to all patients regardless of social status	85	0	5	10
Doctors and nurses examine patients carefully	40	32	20	8
Doctors and nurses pay attention to patients' complaints during examination	47	31	17	5
Doctors and nurses provide solutions to patients after being examined	46	33	15	6
Doctors and nurses provide good answers when patients ask	48	30	16	6
Doctors and nurses provide friendly and caring services	47	26	18	9
Doctors and nurses at the Batua Health Centre Dental Polyclinic look neat at work	41	31	20	8

Bivariate Analysis: Table 4 showed that of the 100 respondents who have been interviewed, it is known that 61 respondents said that on the context of 'product' it was acceptable and loyal whereas those who agreed that the 'product' was acceptable but not loyal were 11respondents (11.0%). Respondents who said the product was unacceptable but loyal, were as many as 15 respondents and those who said the 'product' was unacceptable and were not loyal as many as 13respondents. Furthermore, the results of the Chi-square test between variables obtained that there is a relationship between product and the loyalty of dental poly patients with a value of $p = 0.000$. Based on the results of the study, it can be concluded that the better the product, the more loyal the patients would be towards the health centre. This is in accordance with the research

by Husada[11] in Massenrempulu General Hospital, Kab. Enrekang which agreed that there is a relationship between product and patient loyalty in the inpatient unit, but it is different from the research conducted by Ika[12] in the outpatient polyclinic of Kediri Baptist Hospital which stated that there is no relationship between patient perceptions of products and patient loyalty.

Table 4: Relationship between products with loyalty

Product	Patients' loyalty		Total (n)	p-value
	Loyal (n)	Not loyal (n)		
Acceptable	61	11	72	0.000
Unacceptable	15	13	28	
Total	76	24	100	

The relationship between price and loyalty is presented in Table 5. Based on Table 5, it was known that respondents who said that the price was acceptable and loyal were 53 respondentswhile 24 respondents said it was acceptable but not loyal. Respondents who said the prices were unacceptable but loyal were as many as 12 respondents and those who said the prices were unacceptable and not loyal as many as 11 respondents. The results of the Chi-square test obtained a p-value of 0.076 which signified that there is no relationship between the price and loyalty of dental poly patients. This is consistent with the research conducted by Toding[13] at Elim Makassar Hospital which also proved that there is no relationship between the tariff strategy and the interest in returning inpatients. However, it was different from the research conducted by Yuliantine et al.[14] who reported that there was a relationship between rates/prices and patients' loyalty in the inpatient hospital of Muhammadiyah. In general, the consideration of a given price is generally influenced by one's work and socio-economic status. The better the person's job, the better the socio-economic status will be.

Table 5: Relationship between prices with loyalty

Price	Patients' loyalty		Total (n)	p-value
	Loyal (n)	Not loyal (n)		
Acceptable	53	24	77	0.076
Unacceptable	12	11	23	
Total	65	35	100	

Table 6 presented the relationship between people and loyalty. Based on the table, it is known that respondents who said that health workers were acceptable and loyal, were 61 respondents whereas acceptable but not loyal were 11 respondents. 15 respondents found it unacceptable yet they were loyal. Unlike the 13 respondents who said it was unacceptable and were not loyal. Chi-square test results between variables showed that there is a relationship between the people (health workers) and the loyalty of dental poly patients with a value of p = 0.000. This study is in accordance with the research by Sembor et al.[8] at Siloam Manado hospital, who reported that there was a relationship between staffs and patients' loyalty. Moreover, their study stated that among the other factors (product, price, place, promotion, process, physical evidence and facility services), staff was the most dominant factor influencing the patients' loyalty.

Table 6: Relationship between people with loyalty

People	Patients' loyalty		Total (n)	p-value
	Loyal (n)	Not loyal (n)		
Acceptable	61	11	72	0.000
Unacceptable	15	13	28	
Total	76	24	100	

Conclusion

Based on the results of the research and discussion described regarding the marketing mix with the loyalty of the dental poly patients in BatuaPuskesmas of Makassar, the following conclusions can be drawn:

1. There is a relationship between product and people with the loyalty of poly dental patients at BatuaPuskesmas, Makassar City
2. There is no relationship between price and the loyalty of poly dental patients at Batua Health Centre, Makassar City.

Acknowledgement

The authors are thankful to Faculty of Community Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to express their gratitude towards all the respondents (patients) of Dental Poly in BatuaPuskesmaswho was willing to participate in this study.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Iswandani W. Description of Knowledge of Children Aged 7 to 12 Years About Oral Hygiene Based on the Characteristics of SDN JalanAnyar Kota Bandung (Doctoral dissertation, Universitas Pendidikan Indonesia).
2. Situmorang N. Behavior Searching Medication and Health Care Visiting Dental Clinics in the Two Districts of Medan City, Dentika. Dentika Dental Journal. 2004;10(1).
3. Jin LJ, Lamster IB, Greenspan JS, Pitts NB, Scully C, Warnakulasuriya S. Global burden of oral diseases: emerging concepts, management and interplay with systemic health. Oral diseases. 2016 Oct;22(7):609-19.
4. Rowley J. Information marketing. Routledge; 2016 May 23.
5. Hawkins RJ, Zanetti DL, Main PA, Jokovic A, Dwyer JJ, Otchere DF, Locker D. Oral hygiene knowledge of high-risk Grade One children: an evaluation of two methods of dental health education. Community dentistry and oral epidemiology. 2000 Oct;28(5):336-43.
6. Maharani DA. Do the Indonesians receive the dental care treatment they need? A secondary analysis on self-perceived dental care need. ISRN dentistry. 2012 Jul 19;2012.
7. Hayati YS, Sandra C, Herawati YT. Relationship between the contribution of marketers and loyalty to patients in Nursing Homes Hospitals in Kalisat District, Jember Regency 2017.IKESMA. 2018 Mar 19;14(1):45-56.
8. Sembor PE, Posangi J, Kaunang WP. The relationship between patients is general about the marketing mix with loyalty of patients in Siloam Manado Hospital care unit. TumouTou. 2015;1(1).
9. Riana. Relationship between market mix with the utilization of dental polyclinic services in coastal areas working area of Sanrobone Public Health Center, District of 2014. (Thesis, Hasanuddin University).
10. Puskesmas 2013-2015b. Profile of Batua Health Center in 2015. Makassar: Batua Health Center.
11. Husada SK. Relationship between nurses' caring attitude towards the implementation of oral hygiene in the Intensive Room of Dr.Moewardi Hospital Surakarta.
12. IkaSHPD. Analysis on the influence of Patients Perception about Marketing Mix on Patients Loyalty at the Outpatient Clinic of Baptist Hospital in Kediri (Doctoral dissertation, MIKM UNDIP).
13. Toding, E. Relationship to Marketing Variations with Interest in Returning Nursing Patients at Elim Makassar Hospital. (Thesis, Hasanuddin University).
14. Yuliantine T, Indasah I, Siyoto S. Analysis of Marketing Mix Characteristics of Marketing Factor 7P (Product, Price, Place, Promotion, People, Process, Physical Building) to Patient Satisfaction of Inpatient Patient Hospital Muhammadiyah Ahmad Dahlan Kediri City. Journal for Quality in Public Health. 2018 May 11;1(2):50-7.

Relationship of Marketing Mix with Return of Outpatients' Interest at Dr.TadjuddinChalid Specialist Hospital, Makassar in 2017

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ABSTRACT

This quantitative study with a cross sectional approach aimed to determine the mix marketing relationship with interest in returning of outpatients to Dr.TadjuddinChalid Specialist Hospital, Makassar in 2017. The population was 8756 patients, taking 95 samples with non-probability sampling techniques. Data collection was done by interviewing using questionnaire. The collected data were analyzed using the Chi-square test. The results showed that there was a relationship between product (p = 0.000), price (p = 0.002), and people (p = 0.043). However, there is no relationship between place (p = 0.229) with interest in returning of outpatients. Based on the results, this study suggested some improvements to the overall supporting facilities in accordance to the patients' needs such as ATM machines, photo copy machines as well as make brochures to promote hospital services.

Keywords: *Marketing Mix, Dr.TadjuddinChalid, Specialist Hospital and Outpatients.*

Introduction

Hospital is a health service institution that organizes individual health services in a comprehensive manner that provides inpatient, outpatient and emergency services. Hospitals not only function to provide medical services but also provide nursing services and care activities, medical support services and non-medical, public health services and education[1]. In Indonesia, public hospitals are hospitals managed by the government, regional government, or non-profit legal entities whereas private hospitals are managed by a legal entity with the aim of profit in the form of a limited liability company. In 2015, 2488 hospitals in Indonesia were divided into public hospitals and private hospitals. This showed a significant increase in the previous two years, which were 2228 and 2406 respectively. In South Sulawesi alone, the increase occurred in both public hospitals and private hospitals, which was from 76 units in 2013 to 81 units in 2014[2].

Outpatient service is part of medical services that gives first impressions to patients as consumers. Outpatient services are also a place of transition for patients who come to the hospital to be hospitalized. The image of the hospital is contested herein, so that it can be said that the reputation of the hospital depends on its first service.

Dr.TadjuddinChalid Specialist Hospital Makassar City which was established in 1980 does have the outpatient services. Along with the continuous increase in number of hospitals in the province of South Sulawesi, it is crucial for Dr.TadjuddinChalid Specialist Hospital to improve the overall quality of health services. It needs to buff up the marketing strategy in making the hospital a choice among consumers. The most universal and widely developed marketing concept is the marketingmix. It is a set of marketing tools used by companies to continuously achieve marketing objectives in the targeted market.

To introduce the product or service offered, hospital needs to carry out several promotional combination alternatives which are part of the marketingmix; personal sales, advertising, word of mouth, sales promotion, public relations, and direct marketing[3]. Hospitals must be able to adjust between the marketingmix with the needs and desires of consumers, because by giving more satisfaction to consumers compared to other competitors, then it can attract more consumers. Satisfaction and dissatisfaction of consumers will influence the interest

to return. If the patient is satisfied, he/she will show a higher probability of repurchasing the product or service. Satisfied customers also tend to tell good things about the products or services they receive to others. Unsatisfied consumers act in reverse. They may take public actions, such as filing complaints against hospitals, going to lawyers, or complaining to other groups (such as business entities, the private sector, or the government). Personal actions can be in the form of deciding not to use the product or service[4].

The results of study by Setianingsih[5] showed a significant relationship between products (services) to patient loyalty with p value = 0.025. Whereas the perceptions of other marketing mixes such as location, promotion, price, people, physical evidence, and processes do not show a significant relationship in her study.Another study on marketing mix relations with loyalty among patients at Siti Khadijah Hospital Makassar City showed that there was a relationship of promotion with patient loyalty with a value of p = 0.008, there was a relationship between physical facilities and patient loyalty with a value of p = 0.000,there was a relationship between the process and patient loyalty with a value of p = 0.000. However, there was no relationship between service providers and patient loyalty with a value of p = 0.078. Thus, it can be concluded that there is a relationship between promotion, physical facilities, and processes with patients' loyalty[6].

In order to improve health services and maintain a number of visits, a better marketing strategy is needed which will later influence the decisions of patients in using hospital services. Therefore, the researchers of this study are interested in researching "relationship of marketing mix with return of outpatients' interest at Dr.TadjuddinChalid Specialist Hospital, Makassar" for the year of 2017.

Methodology

The type of research used is quantitative research which is an observational analytic with cross sectional approach. It is meant to know the relationship between marketing mix relations with returns of outpatients' at Dr. TadjuddinChalid Specialist Hospital Makassar City. The research was conducted at Dr. TadjuddinChalid Specialist Hospital's outpatient services from February 2017 to March 2017.

The population in this study was patients from 13 polyclinics that seek outpatient treatment at Dr. TadjuddinChalid Specialist Hospital with yearly average of 8756 patients. The sampling technique used in this study was carried out by non-probability sampling, namely the technique of incidental sampling whereby the sample coincidently exists at the time of the research and meets the criteria for research sample. The respondents of this research are those who qualified as follows:

a. Respondents are patients who have more than two visits.

b. Respondents are able to understand the questions contained in the questionnaire and answer the question itself whereas for respondents who have difficulty completing the questionnaire, they can be assisted by his/her family.

Based on this given criteria, the total number of samples accepted from the population was 95 respondents.

The primary data are obtained through a list of questions (questionnaires) that have been prepared previously and distributed to respondents. Meanwhile, the secondary data are obtained from document collection such as annual report and profile of Dr. TadjuddinChalid Specialist Hospital, and other sources related to research. The data collected from questionnaires are tabulated in a master table and analyzed using SPSS program which consisted of univariate and bivariate analysis.

Result and Discussion

Univariate Analysis: Table 1 presented the distribution of respondents' evaluation based on product (type of service), price, place and people (staffs) provided to outpatients by Dr. TadjuddinChalid Specialist Hospital Makassar City.

The respondents' assessment of products(type of services) can be measured through five elements consisting of a variety of health equipment used, completeness of health equipment, services provided by health workers according to patient needs, availability of medicines and availability of supporting services such as laboratories, radiology etc. Based on Table 1, it was shown that 89 respondents (93.7%) felt that the products available are quite good whereas 6 respondents (6.3%) showed disagreement.

The respondent's assessment on price of outpatient services provided is measured based on whether the service rates are affordable or the service rates are in line with the services received by respondents. Under price category,out of 95 respondents, there were 91 respondents (95.8%) who assessed the price charged for outpatient services was quite reasonable while 4 respondents (4.2%) felt that the price is not worth comparing to the available services.

Factors such as location easily accessible through personal or public transportation distance of residence close to the hospital location and easy to find a basic amenity influences the respondent's assessment to seek for outpatient services. As shown in Table 1, 54 respondents (56.8%) agreed that Dr. TadjuddinChalid Specialist Hospital is easily reachable while total of 41 respondents (43.2%) faced difficulty to reach the hospital.

Assessment from respondents' of health workers in the outpatient facility are measured based on good communication between patient and doctor, clean and neat appearance, polite and friendly health workers, highly skilled in using medical devices and keen to hear patients complaints. 93 respondents (97.9%) rated satisfactory in outpatient services found in Dr.TadjuddinChalid Specialist Hospital Makassar City. In contrast, only 2 respondents (2.1%) felt dissatisfied.

Table 1: Distribution of respondents' evaluation based on product (type of service), price, place and people (staffs) provided to outpatients by Dr. TadjuddinChalid Specialist Hospital Makassar City

Category		Frequency (n)	Percentage (%)
Product (type of service)	Good	89	93.7
	Poor	6	6.3
Price	Reasonable	91	95.8
	Unreasonable	4	4.2
Place	Reachable	54	56.8
	Not reachable	41	43.2
Staffs	Good	93	97.9
	Poor	2	2.1

Bivariate Analysis: The results of the bivariate analysis between the relationships of product, price, place and people (staffs)with outpatients' interest to return at Dr. TadjuddinChalid Specialist Hospital Makassar City are tabulated as in Table 2.

It shows that of all respondents who rated the product (type of service) as good, there were 75 respondents (84.3%) expressed interest and as many as 14 respondents (15.7%) expressed no interest. Respondents are not interested in returning to use the service because it is influenced by other factors such as distance from the patient's home to the hospital. While respondents who stated that the product (type of service) was not good, 0 respondents expressed interest to return and as many as 6 respondents expressed no interest to return. This is because the medicines needed by patients are sometimes not available and needs to be purchased outside the hospital.If the respondent's assessment is not good for the product/type of service, the respondent will feel dissatisfied. Dissatisfaction of respondents can cause respondents to move to other hospitals. The results of statistical tests using the Chi-square test show that there is a relationship between the product and the interest in returning outpatients where the value of p = 0.000.This is in line with the research conducted by Hidayat[7], that product influenced the service utilization decisions in Hasanuddin University Hospital Makassar in 2014 where the value of p = 0.006. Whereas, Akbar et al.[8] suggested that the product is related to the patient's decision to choose health services. The better the products of the hospital, more patients will choose health services at that particular hospital.

In terms of price, it shows that from all respondents who rated the price (service tariff) as reasonable, 75 people (82.4%) expressed interest to return while 16 people (17.6%) did not want to seek treatment again at this hospital. This could be due to lack of basic amenities surrounding the hospital. There were 4 people (100.0%) who felt the price is unreasonable and has no interest to return. This is due to the overall service rates charged by the hospital is not in accordance with the obtained services. The results of the analysis of the price (service

tariff) relationship with the return interest of patients who use outpatient services at Dr. TadjuddinChalid Specialist Hospital in Makassar using Chi-squared statistical tests obtained p = 0.002 which means that there is a relationship between price (service rates) and return interest in patients. The results of this study are in agreement with the research conducted by Syafar et al.[9] who stated that there was a relationship between price and the interests of returning patients to Hospital of Hasanuddin University. Nonetheless, the results of this study are not in line with the research conducted by Setianingsih[5] which stated that there is no relationship between the price and the interest in returning of outpatients in Dr. Sitanala Tangerang Hospital.

An overview of the results of the bivariate analysis between the relationship of place and interest in returning outpatients is shown that the total respondents that agreed the location of hospital are easy to reach and interested to return are 45 respondents (83.3%) while 9 respondents (16.7%) felt the otherwise. This shows that the location of the hospital is quite strategic and easy to reach. This is in accordance with the theory by Steiber and Boscari in Hidayat[7] whereby important reason for choosing the hospital is the location. Respondents who stated that the place (service location) is not as good but expressed their interest to seek again treatment as many as 30 people (73.2%) whereas 11 respondents (26.8%) expressed no interest to return. This demonstrated that even though respondents rated the place is difficult to reach, they are still interested in using again the outpatient services due to hospital staff being friendly and good at providing patients with explanations of the disease. From the table also obtained p = 0.229. This concludes that there is no relationship between the place and the interest in returning outpatients at Dr.TadjuddinChalid Specialist Hospital in Makassar. The result is accordance to research by Akbar et al.[8] who showed that there is no significant connection between place and the decision to choose health services.

Based on Table 2, it shows that all respondents that rated people (health workers) as good, 75 respondents (80.6%) expressed interest to return again and 18 respondents (19.4%) expressed no interest. While respondents who stated people (health workers) were not good and have no interest to return as outpatients, are 2 respondents (100.0%). The results of the analysis of the people (health workers) relationship with the return interest of patients who used outpatient services at Dr.TadjuddinChalid Specialist Hospital in Makassar using Chi-squared statistical tests obtained p = 0.043. This means that there is a relationship between people (health workers) and return interest in patients. This research is in line with the research conducted by Indar et al.[10] that there is a relationship between people and the decision to choose health services at Faisal Makassar Islamic Hospital. Widajat[11] suggested that attitude of health workers when serving patients also plays vital role in influencing patient's decision to return again.

Table 2: Relationship between productprice, place, and people (staffs)with outpatient's interest to return

Category		Outpatients' interest to return				Total		p
		Interested		Not Interested		n	%	
		n	%	n	%			
Product	Good	75	84.3	14	15.7	89	93.7	0.000
	Poor	0	0	6	100	6	6.3	
	Total	75	78.9	20	21.1	95	100	
Price	Reasonable	75	82.4	16	17.6	91	95.8	0.002
	Unreasonable	0	0	4	100	4	4.2	
	Total	75	78.9	20	21.1	95	100	
Place	Reachable	45	83.3	9	16.7	54	56.8	0.229
	Not Reachable	30	73.2	11	26.8	41	43.2	
	Total	75	78.9	20	21.1	95	100	
People	Good	75	80.6	18	19.4	93	97.9	0.043
	Poor	0	0	2	100	2	2.1	
	Total	75	78.9	20	21.1	95	100	

Conclusion

From the results of research conducted at Dr. TadjuddinChalid Specialist Hospital Makassar City about the relationship between the mix marketing and outpatients' interest to return, it can be summarized as follows:

1. There is a relationship between the product (type of service), price, and people with the interest in returning outpatients.
2. There is no relationship between the place with the interest in returning outpatients.

Acknowledgement

The authors are thankful to Faculty of Community Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to express their gratitude towards all the respondents (patients) from Dr. TadjuddinChalid Specialist Hospital who was willing to participate in this study.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Meesala A, Paul J. Service quality, consumer satisfaction and loyalty in hospitals: Thinking for the future. Journal of Retailing and Consumer Services. 2018 Jan 1;40:261-9.
2. RI Health. 2014 Data and Information (Indonesian Health Profile). Jakarta: Republic of Indonesia Ministry of Health Indonesia. 2015.
3. Hosseini SM, Etesaminia S, Jafari M. Identifying eleven factors of service marketing Mix (4Ps) effective on tendency of patients toward private hospital. Materia socio-medica. 2016 Oct;28(5):366.
4. Vogus TJ, McClelland LE. When the customer is the patient: Lessons from healthcare research on patient satisfaction and service quality ratings. Human Resource Management Review. 2016 Mar 1;26(1):37-49.
5. Setianingsih A. Relationship between Market Marketing and Customer Service with Patient Loyalty. Journal of Community Health Sciences. 2018 Mar 20;7(01):51-62.
6. Maulinda, K. Relationship between Market Mixing and Patient Loyalty in the Nursing Room of the Hospital and Child Sitti Khadijah City Makassar (dissertation, Hasanuddin University).
7. Hidayat, L. Analysis of the Effect of Market Variations on the Decision of Utilization of Outpatient Installation in Rumah Sakit Hasanuddin University Makassar in 2014 (thesis, Hasanuddin University)
8. Akbar AI, Darmawansyah&Hamzah A. Relationship to Marketing Sharing with Decisions Choosing Health Services in Inpatient Patients in Hospitals and Children of Fatimah Makassar in 2012. Journal of Administration and Health Policy. 2013.
9. Syafar M, Hamzah A, Amelia R. Effect of Market Variability on Patient Loyalty in Nursing in Rumah Sakit Hospital Hasanuddin Makassar 2013. Journal of Administration and Health Policy 2014;3(01).
10. Indar I, Hamzah A, Nurlia C. Relation of Marketing Mix with Decision Choosing Health Service Inpatient Unit of Faisal Islamic Hospital Makassar 2011. Journal of Administration and Health Policy Indonesia. 2012;1(1).
11. Widajat R. Being a great and sustainable hospital. Gramedia Main Library; 2013 Jan 15.

The Factors Related to Work Fatigue of Block Paving Workers at CV. SumberGalian in 2017

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ABSTRACT

Block paving workers play an important role in CV. SumberGalian with various tasks that require moderate to high work activities and they have to make as many as 600 blocks per day. This can cause workers to experience fatigue easily. Thus, this observational analytic with cross sectional approach research, aimed to determine the relationship of work stress, energy intake, work period and haemoglobin level with work fatigue in block paving workers in CV. SumberGalian, Makassar City in 2017. The total number of samples was 40 people, taken by exhaustive technique sampling. Data were taken from respondents using the Reaction Timer questionnaire to measure the work fatigue and Nutri Survey and food recall to obtain energy intake data. The data are then analysed using Chi-square test and logistic regression. The results showed that there was a relationship between work stress p = 0.002, energy intake p = 0.005, work period p= 0.028 with work fatigue among block paving workers at CV. SumberGalian. The most influential variable in this study was work stress.

Keywords: *SumberGalian, Block paving workers, CV and Work Fatigue.*

Introduction

Work exhaustion is a phenomenon that is often experienced by workers, but this cannot be ignored because it relates to the protection of labors' health. It is stated that of 80% of human errors, 50% are caused by work fatigue[1].Work exhaustion has been estimated to be a key factor as much as 41% of causes in various incidents of injuries, accidents and deaths[2].

According to research conducted by Ricci et al.[3] in America, there were 38% of workers experiencing fatigue related problems in work capacity. Fatigue problems arise due to low energy levels and insufficient sleep. 10% of workers reported unproductive time to reduce performance and disrupt their concentration. The results of study conducted by O'Neill et al.[4] on Queensland construction projects showed that when fatigue increased among workers, productivity decreased. This is confirmed through correlation analysis, which disclosed that fatigue has a relationship with the level of productivity. It was also found through productivity analysis that the average cost due to fatigue caused a decrease in the production rate of $ 50,000 per year.

From the data of research conducted by Putra et al.[5], it can be seen that work fatigue experienced by reinforcement production workers is in light work fatigue of 14 people (58.3%) and moderate work fatigue of 10 people (41.7%). According to the results of research conducted by Jacobs et al.[6], it showed that there is a significant relationship between work stress and work fatigue, where respondents who experienced work stress have a 5 times greater chance of getting work fatigue. Research by Tasmi et al.[7] obtained a relationship between energy intake and work fatigue. Based on these studies, the category of mild fatigue was found in the appropriate energy intake of 7 workers (11.5%) and in energy intake as inappropriate categories as many as 11 people (18.0%). Meanwhile, work fatigue in the tired category was found in the energy intake of the non-tired category as many as 31 people (50.8%). Meanwhile, heavy work fatigue category was found in inappropriate energy intake as many as 12 people (19.7%). In a study conducted by Pasira[8], there was a relationship between years of work and work fatigue among tofu factory workers. The results of the study showed that all 18 workers with long working years experienced fatigue. Workers with a short working period also experienced

fatigue as many as 12 workers (75.0%). Another factor associated with work fatigue is haemoglobin, Hb level. Lack of Hb can cause a lack of oxygen (O_2) channelled to cells of the body and brain, eventually causing symptoms of fatigue, lethargy and fatigue which results in employees being able to reduce work productivity[9].

Based on the description above, the authors are interested in conducting research on factors related to work fatigue in workers in the block paving production unit of CV SumberGalianBiringkanayasub-district, Makassar for the year 2017.

Methodology

The type of research used, was observational analytic research with a cross sectional study approach. The aim was to observe the relationship of the independent variables to the dependent variable, namely work period, work stress, energy intake and haemoglobin level among workers in the block paving production unit of CV. SumberGalian Makassar. This research was conducted in February 2017 at CV. SumberGalianJalanPerintisKemerdekaan km 18, Biringkanaya District, Makassar City.

The population in this study is all labour force in the block paving block production unit of CV. SumberGalian with as many as 40 people. The number of samples to be examined is taken using the exhaustive sampling method, which is based on a relatively small population of 40 people, and then the entire population is sampled in this study (total sample). Data and information are obtained by direct interviews using questionnaires distributed to respondents to find out data on work stress, energy intake, and work period. Furthermore, work fatigue measurements were carried out using a reaction timer for the 40 respondents. The collected data were analysed for univariate analysis, bivariate analysis and multivariate analysis and the findings were tabulated in table form.

Result and Discussion

Univariate Analysis: Table 1 presented the distribution of respondents according to job stress, energy intake, working period, haemoglobin level and work fatigue.

Job stress is grouped into 2 categories, namely low stress if total stress level ≤ 90 and high stress if the total score is > 90. Table 1 showed that from 40 respondents, the number of respondents with low work stress is 18 people or 45% and high stress is 22 people or 55%.

Energy intake is grouped into two categories, which are insufficient if<the total energy needed and sufficient if ≥the total energy needed. Table 1 revealed that from the 40 number of respondents, the number of respondents with not fulfilling energy intake was as many as 23 people and the number of respondents with energy intake that is sufficient was as many as 17 people.

The working period is grouped into short which is working period is <3 years and long if the years are ≥ 3 years. Table 1 showed that from the 40 respondents, it can be seen that the percentage of respondents with a short term of work as many as 47.5% and the number of respondents with long working period was 52.5%.

The work fatigue measured in this study is physical fatigue experienced by respondents using the reaction timer tool. Fatigue of work in this study is divided into 2 categories, namely experiencing fatigue if the reaction time is> 240 milliseconds and not experiencing fatigue if the reaction time is ≤ 240 milliseconds. The data in Table 1revealed that from 40 respondents, it was known that respondents who experienced fatigue were 22 people or 55% whereas the remaining 45% did not experience fatigue.

Table 1: Distribution of respondents according to job stress, energy intake, working period, and work fatigue

Category		Frequency	
		n	Percentage (%)
Job stress	Low (≤ 90)	18	45.0
	High (> 90)	22	55.0
Energy intake	Insufficient	23	57.5
	Sufficient	17	42.5
Working period	Short (< 3 years)	19	47.5
	Long (≥ 3 years)	21	52.5
Work fatigue	Experienced fatigue	22	55.0
	No fatigue experienced	18	45.0

The following in Table 2 is the measurement result of subjective feelings of fatigue after work based on the questionnaire. Based on the data in Table 2, it was found that out of 40 respondents, the feeling of fatigue that is often experienced by the workers are difficulty

in thinking with 55.0%, 16 people or 40% tired of talking, 9 people or 22.5% feeling nervous, 28 people or 70.0% having difficulty concentrating, 30 people or 75% having difficulty in focusing attention, 31 people or 77.5% often feeling forgetful, 23 people or 57.5% lack of self-conscious, 21 people or 52.5% feeling anxious, 21 people or 52.5% difficult to control attitude, 33 people or 82.5% feel lazy, 33 people or 82.5% feel headaches, 37 people or 92.5% suffering from stiff shoulders, 40 people experienced back pain, 27 people or 67.5% feel suffocated, 40 people feel dehydrated, 28 people or 70% feel hoarse and 36 people or 90% tremble.

Table 2: Distribution of respondents according to fatigue feeling

Fatigue feeling	Frequency	
	n	Percentage (%)
Thinking difficulties	22	55.0
Tired of talking	16	40.0
Nervous	9	22.5
Concentrating difficulties	28	70.0
Attention focusing difficulties	30	75.0
Often forget	31	77.5
Lack of self-conscious	23	57.5
Anxious	21	52.5
Attitude controlling difficulties	21	52.5
Laziness	33	82.5
Headaches	33	82.5
Stiff shoulders	37	92.5
Back pain	40	100.0
Suffocated	27	67.5
Dehydrated	40	100.0
Hoarse	28	70.0
Tremble	36	90.0

Bivariate Analysis: Based on the research that has been done, the data obtained regarding the relationship of work stress with work fatigue is presented in Table 3. Table 3 showed that the percentage of respondents who experienced more fatigue were workers with high work stress categories as many as 17 workers or 77.3% compared to low work stress as many as 5 workers or 27.8%. Whereas in the percentage of respondents who did not experience fatigue with low occupational stress categories as many as 13 workers or 72.2% compared to high work stress as many as 5 workers or 22.7%. Data analysis using Chi-square test obtained a value of p = 0.002 which can be interpreted that there is a relationship between work stress and the occurrence of work fatigue among block paving workers.

The following results of cross tabulation between energy intake and work fatigue showed that the percentage of respondents who experienced fatigue were workers with insufficient energy intake category as many as 17 workers or 73.9% compared to those with sufficient energy intake as many as 5 workers or 29.4%. While the percentage of respondents who did not experience fatigue were workers with sufficient energy intake category as many as 12 workers or 70.6% compared to the lack of energy intake as many as 6 workers or 26.1%. Based on data analysis using the Chi-square test, the value of p = 0.005 proved that there is a relationship between energy intake and the occurrence of fatigue in block paving workers.

With reference to Table 3, the percentage of respondents who experienced fatigue with a long working period was 15 workers compared to 7 new workers. Whereas the percentage of respondents who did not experience fatigue among workers with a short service period was 12 workers compared to the long working period of 6 workers. Based on data analysis using the Chi-square test, the value of p = 0.028 meant that there is a relationship between years of work and the occurrence of work fatigue.

Table 3: Relationship between job stress and fatigue

Category		Fatigue categories				Total		p value
		Experienced fatigue		No fatigue experienced		n	%	
		n	%	n	%			
Job stress	High	17	77.3	5	22.7	22	55.0	0.002
	Low	5	27.8	13	72.2	18	45.0	
Energy intake	Insufficient	17	73.9	6	26.1	23	57.5	0.005
	Sufficient	5	29.4	12	70.6	17	42.5	
Working period	Long	15	71.4	6	28.6	21	52.5	0.028
	Short	7	36.8	12	63.2	19	47.5	

Multivariate Analysis: The results of the Chi-square analysis of the 4 independent variables were examined in this study consisted of job stress, energy intake, and work period. From the four variables studied, the results showed that work stress variables, energy intake, and years of work were related to work fatigue among the workers. The results of logistic regression tests between independent variables and dependent variables can be seen in Table 4. Table 4 showed that the lowest p value is in the job stress variable with p = 0.025 and Wald value = 5.040, Exp (B) = 0.102. Since the value of p<0.05, it can be concluded that the most influential variable on work fatigue among block paving workers in CV. SumberGalian for the year 2017 is job stress.

Table 4: Regression of Fatigue among Block Paving Workers in CV. Galian Source for year 2017

Variable	Wald	p-value	Exp (B)
Job stress	5.040	0.025	0.102
Working period	4.502	0.034	0.070
Energy intake	3.527	0.060	9.895
Constant	3.266	0.071	20.374

Discussion

In this study, there are differences from the results of measurements using questionnaires and reaction timer measuring instruments. Based on the results of the questionnaire from 40 respondents, they stated that they experienced signs of fatigue whereas based on the reaction timer results, it was found that only 22 workers experienced physical fatigue. This is due to the measurement using the questionnaire is only subjective about what is felt by the workers while the measurement using the reaction timer is more of a measurement of physical fatigue with an approach to test the accuracy and speed of completing work.

The respondents who experienced fatigue were more compared to those who were not tired due to job stress factors, energy intake, and working period. The job stress experienced by block paving workers in this study was higher stress compared to those who with mild/low stress. Thus, these workers experienced fatigue faster. This is in line with the theory of Mehta[10] which stated that in reality stress is present in every individual and is part of life. There is no life free from stress. According to the DepKes[11],one of the clinical manifestations of job stress is work fatigue.

In this study due to insufficient energy intake status in block paving workers, there was an imbalance between the energy needed and the total energy intake which had an effect on the efficiency and productivity of these workers. Therefore, it was easier for these workers to experience fatigue. This is in line with Gavhed[12], theory whereby energy intake is needed by the workforce to maintain the body's condition to always be energetic. Lack of energy intake results in health problems and work productivity. The level of energy intake, especially for heavy workers is a determinant of the degree of work productivity. Heavy workers, if not balanced with sufficient energy intake, usually will speed up the fatigue process.

Furthermore, in this study the long working period of respondents, had created the boredom feeling due to monotonous work. Hence, this affects the level of fatigue experienced by many of the veterans block paving workers. This is justified by Sadeghniiat-Haghighi et al.[13] study that the long working period carried out monotonously and continuously can lead to feelings of fatigue and ones' work experience will affect the level of work fatigue. Syavina et al.[14] stated that the duration of work is one of the factors included in the component of occupational health science. Physical work carried out continuously for a long period will affect the mechanism in the body (circulatory, digestive, muscle, nerve, and respiratory systems). In this situation, fatigue occurred due to the accumulation of residual products in the muscles and blood circulation where the remaining products are limiting the continuity of muscle activity.

Conclusion

Based on the results of research and analysis of the variables studied about factors related to work fatigue in paving block workers in CV. SumberGalian, Biringkanaya District, Makassar City In 2017, the conclusions can be drawn are as follow:

1. There is a relationship between job stress, energy intake and working period with work fatigue in block paving workers in CV. Source of GalingBiringkanaya District, Makassar City, 2017.
2. The most influential factor on work fatigue in block paving workers in CV. SumberGalian, Biringkanaya District, Makassar City, 2017 is job stress factor.

Acknowledgement

The authors would also like to express their gratitude towards all the respondents at CV. Sumber Galianwho was willing to participate in this study.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Yeow JA, Ng PK, Tan KS, Chin TS, Lim WY. Effects of stress, repetition, fatigue and work environment on human error in manufacturing industries. Journal of Applied Sciences. 2014 Dec 15;14(24):3464-71.
2. Hofmann DA, Burke MJ, Zohar D. 100 years of occupational safety research: From basic protections and work analysis to a multilevel view of workplace safety and risk. Journal of applied psychology. 2017 Mar;102(3):375.
3. Ricci JA, Chee E, Lorandeau AL, Berger J. Fatigue in the US workforce: prevalence and implications for lost productive work time. Journal of Occupational and Environmental Medicine. 2007 Jan 1;49(1):1-0.
4. O'Neill C, Panuwatwanich K. The impact of fatigue on labour productivity: case study of dam construction project in Queensland. Proceedings from EPPM. 2013.
5. Putra H, Sinaga MM, Mahyuni EL, Kesehatan MP, USU KK, Kesehatan DD. Relationship between Work Fatigue and Work Productivity in Concrete Reinforcement Production Workers in Pt Wijaya Karya Beton Medan Year 2015. Journal of the Department of Occupational Health and Safety FKM USU. 2015.
6. Jacobs BW, Kawatu P, Maramis F. Relationship between Work Structures and Exhaustions at Employees in Resources Source Human at PT. Sulut Bank Manado Branch. Journal of Public Administration. 2015 Nov 4;4(32).
7. Tasmi D, Lubis HS, Mahyuni EL. Hubungan Status Nutrition and Energy Intake with Work Fatigue for Workers at PT. Perkebunan Nusantara II Three Years Palm Oil Mill 2015. Journal of Environmental and Occupational Health. 2015;4(2):1-7.
8. Pasira D. Related Factors With Fatigue Work At Work Factory Workers In District Mamajang Makassar City In 2016. (Thesis. Faculty of Public Health Hasanuddin University)
9. Untari R, Hersusanto HB. Anemia and fatigue in women who work at night. Gateway of Innovation. 2004;9(2004).
10. Mehta RK. Impacts of obesity and stress on neuromuscular fatigue development and associated heart rate variability. International Journal of Obesity. 2015 Feb;39(2):208.
11. Indonesian Ministry of Health. Ministry of Health Strategic Plan 2005-2009. Jakarta: Indonesian Ministry of Health. 2006.
12. Gavhed D. Work in Heat and Cold. In Occupational Physiology 2016 Apr 19 (pp. 248-281). CRC Press.
13. Sadeghniiat-Haghighi K, Yazdi Z. Fatigue management in the workplace. Industrial psychiatry journal. 2015 Jan;24(1):12.
14. Syavina M, Yuantari M, Nurjanah C. Factors Associated With Exhaustion at the Cleaning Service Officer in Rsud Semarang City in 2013. Semarang: Dian Nuswantoro University Health Faculty, Semarang. 2013.

Factors toward Diabetes Mellitus Type II Occurrence among Patients in Tenriawaru Hospital, Bone Regency 2014

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ABSTRACT

Diabetes mellitus among patients in Tenriawaru Hospital tend to increase from year 2009 until 2012. In 2009, patient numbers were 104 patients and increased to 166 patients in 2012. This study aimed to determine the risk of age, obesity, gender and hypertension on the diabetes mellitus (DM) type II among patients in Tenriawaru Hospital, Bone regency. The study had been used simple random sampling with cross sectional design. The study population were all patients had undergone treatment in inpatients ward at Tenriawaru Hospital, Bone regency. The sample sizes were 192 patients who met the inclusion criteria. The result showed that there was correlations between gender (p=0.000), age (p=0.001), hypertension (p=0.020) and obesity (p=0.000) with DM type II occurrence in patients at Tenriawaru Hospital. The recommendation that need early detection for DM diseases, prioritized non-pharmacological treatments such as diet changes, exercise regularly and healthy lifestyle habit. Meanwhile, the hospital management should provide medical nutrition consultation services for DM patients.

Keywords: *Diabetes mellitus, age, obesity, hypertension, gender*

Introduction

Diabetes mellitus (DM) is one health problem that tends to increase from year to year. DM also known as diabetic or blood sugar disease. An estimated 171 million people suffering diabetes globally in 2000 and increased to more than 366 million in 2011.[1] In 2017, approximately 425 million people aged between 20 years and 70 years were suffered DM and expected increased to 629 million by 2045.[2]

Diabetes mellitus (DM) is characterized by chronic hyperglycaemia and impaired carbohydrates, lipids and proteins metabolism due to partial or complete insufficiency of insulin secretion and/or insulin action.[2,3] DM type I was caused by absolute deficiency in insulin due to secretion failure by the pancreas, while DM type II is characterized by insulin resistance and relative insulin deficiency, either or both of which may be present at time diabetes is diagnosed.[4] DM type II is most common of DM which involved between 90% and 95% of all diabetic patients[3]. Besides, DM type II is caused by cardiovascular disease (CVD), blindness, renal failure and amputations with tremendous impact on health expenditure.[5] Furthermore, DM type II also caused by advanced age, obesity, family history of DM, smoking habit, alcohol consumption, lack of physical activity, poor nutrition during pregnancy, ethnicity and household income.[6] Meanwhile, stroke risk is increased by 150% to 400% while risk of stroke related to dementia is increased by more than 3 fold for DM type II patients.[6]

In 2007, Basic Health Research (Riskesdas) showed that DM prevalence was 5.7% while DM risk factors included disturbed glucose tolerance prevalence of 10.2%. The DM prevalence increased due to obesity, hyperglycaemia, hyper cholesterol, lack of physical activity, lack of fibre consumption, smoking habit and genetic factors.

In Indonesia, one province had experienced increment in DM type II cases was South Sulawesi province. Based on Health Service of South Sulawesi province, non-communicable diseases found DM (6.65%) in 2008. In 2009, DM was found 4.99% and increased to 14.24% with highest number of mortality was equal to 41.56%. Meanwhile, DM cases were 29.38% with mortality of 13.4% in 2011 and DM increased to 27.64% in 2012.

In Tenriawaru Hospital, DM was found increased from year 2009 to 2013. In 2009, DM patients were

104 patients and increased to 166 patients by 2012. Based on DM prevalence trends in various regions, thus understanding of future DM with its complications which caused morbidity and mortality in Indonesia. This study aimed to determine the risk of age, obesity, gender and hypertension on the diabetes mellitus (DM) type II among patients in Tenriawaru Hospital, Bone regency.

Methodology

The study was used observational with cross section approach which observed the relationship between risk factors for disease occurrence or certain health status at same times. The study was conducted at medical record room of Tenriawaru, Bone Regency which reference from public health centres (Puskesmas) or doctors visited by the community especially the Bone regency residence. The study was conducted in February 2016.

The study population were all patients who had undergone treatment in Tenriawaru Hospital, Bone regency. The sampling was selected using simple random sampling who met the inclusion criteria. The sample sizes were 192 patients. The data was collected through secondary data. The secondary data was obtained by collected and recorded from medical record or DM type II patients status books. The data was analysed with SPSS computer program. The data was represented in table form and narration.

Result and Discussion

In Table 1, 106 respondents were categorized as non-obese and 86 respondents (44.8%) were categorized as obesity.

Table 1: Respondent distribution based on body mass index (BMI) criteria in Tenriawaru Hospital, Bone regency 2014

BMI criteria	Frequency (n)	Percentage (%)
Non obesity	106	55.2
Obesity	86	44.8
Total	192	100.0

In Table 2, there were 135 respondents (70.3%) suffered hypertension and 57 respondents (29.7%) were non-hypertension patients.

Table 2: Respondent distributions based on hypertension in Tenriawaru Hospital, Bone regency 2014

Hypertension status	Frequency (n)	Percentage (%)
Hypertension	135	70.3
Non-hypertension	57	29.7
Total	192	100.0

In Table 3, there were 94 female respondents (69.1%) suffered DM type II and 42 female respondents were non- DM type II patients. In additions, 18 male respondents (32.1%) were suffered DM type II and 38 male respondents (67.9%) were non-DM type II. The result showed there was relationship between gender and DM type II occurrence in Tenriawaru Hospital.

Table 3: Relationship between gender and DM type II in Tenriawaru Hospital, Bone regency 2014

Gender	DM type II status						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Female	94	69.1	42	30.9	136	100.0	0.000
Male	18	32.1	38	67.9	56	100.0	

In Table 4, 93 respondents (65.5%) were aged below than 45 years old and 19 respondents (38%) were aged more than 45 years old with DM type II. Meanwhile, 49 respondents (34.5%) were aged more than 45 years old and 31 respondents who aged more than 45 years old did not suffered DM type II. The statistical test showed there was relationship between gender and DM type II occurrence in Tenriawaru Hospital.

Table 4: Relationship between age and DM type II in Tenriawaru Hospital, Bone regency 2014

Age (years)	DM type II status						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
≤45	93	65.5	49	34.5	142	100.0	0.001
>45	19	38.0	31	62.0	50	100.0	

Meanwhile, 50 respondents were obesity and 62 respondents (55.5%) were categorized as non-obesity with suffered DM type II as shown in Table 5. Besides, 56 respondents (55.2%) were obesity and 24 respondents (44.9%) were non-obesity which did not suffered DM type II. The statistical test showed there was relationship between BMI status and DM type II occurrence in Tenriawaru Hospital.

Table 5: Relationship between BMI status and DM type II occurrence in Tenriawaru Hospital, Bone regency 2014

BMI status	DM type II status						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Obesity	50	44.8	56	55.2	142	100.0	0.001
Non-obesity	62	55.1	24	44.9	50	100.0	

In Table 6, 86 respondents (63.7%) were hypertension and 26 respondents (45.6%) were non-hypertension with suffered DM type II. Meanwhile, 49 respondents (36.3%) were hypertension and 31 respondents (54.4%) were non-hypertension with non-DM type II. The result also showed that a relationship between hypertension and DM type II in Tenriawaru Hospital.

Table 6: Relationship between hypertension status and DM type II in Tenriawaru Hospital, Bone regency 2014

Hypertension status	DM type II status						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Hypertension	86	63.7	49	36.3	135	100.0	0.001

Discussion

In this study, the result found correlation between age and DM type II occurrence in Tenriawaru Hospital. The age is one of the factors associated with DM type II. DM was found increment cases in developing countries which most DM patients were aged between 45 years and 64 years.[7] In aging period, the cell production was decline lead to changes in beta cell morphology. Besides, DM in older adults dude to decrease in tissue function as changes in tissue itself.

Obesity is defined as abnormal or excessive fat accumulation that affect health with BMI≥30 kg/m^2.[8,9] The result also indicated that obesity was one of factor correlated with DM type II in Tenriawaru Hospital. This study found that there were 86 patients (44.8%) with low risk while there were 106 patients (55.2%) with high risk. Obesity also related with excess body fat which greatly increased risk for insulin resistance.[10] The insulin resistance contributed to increase glucose production in the liver and decrease glucose uptake in muscle and adipose tissue at set insulin level.[11] In Turkey, obesity was correlated with age (highest prevalence in adult aged between 50 years and 69 years old), female gender, hypertension, hyperlipidaemia, diabetes, parity, smoking habit, alcohol consumption, marital status (married and widowed), occupation (housewife, tradesman, officers and retied), household income, family history of obesity, diabetes and hypertension and lack of physical activity in Turkish adults.[12]

In additions, the result indicated that gender also one of factor correlated with DM type II occurrence in Tenriawaru Hospital. The obesity among factor caused DM type II in women. In global, the prevalence in male and female is very similar but men had higher incidence than women based on obesity occurrence in DM type II risk factor.[13] Meanwhile, a study found European male were usually diagnosed with diabetes at an earlier age with lower BMI than women.[14]

In this study, the result found correlation between hypertension and DM type II occurrence in Tenriawaru Hospital. There were 63.7% respondents were suffered DM while 36.3% respondents found did not suffered DM. Hypertension was two to three times more frequent in diabetic patients.[15] The pre-hypertensive state is categorized once systolic blood pressure between 120 and 138 mmHg and/or diastolic blood pressure between 80 and 89 mmHg.[16] Hypertension and DM type II were two conditions that closely related. Around 30%-60% of DM patients had history of hypertension.

Conclusion

In conclusion, the study found relationship between age, gender, obesity and hypertension with DM type II in Tenriawaru Hospital. The recommendation are high risk group should maintain healthy lifestyle and food consumption. Besides, the women is suggested to maintain their body weight and perform exercise to prevent the obesity which can contributes to DM.

Acknowledgement

The author would like to thank to Tenriawaru Hospital for information support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Alotaibi A, Perry L, Gholizadeh L, Al-Ganmi, A. Incidence and prevalence rates of diabetes mellitus in Saudi Arabia: an overview. Journal of Epidemiology and Global Health. 2017; 7(4): 211-218.
2. Aynalem SB,Zeleke, A. Prevalence of diabetes mellitus and its risk factors among individuals aged 15 years and above in Mizan-Aman town, Southwest Ethiopia, 2016: a cross sectional study. International Journal of Endocrinology, 2018.
3. Wu Y, Ding Y, Tanaka Y, Zhang, W. Risk factors contributing to type 2 diabetes and recent advances in the treatment and prevention. International Journal of Medical Science.2014; 11(11): 1185-1200.
4. Gao Y, Wang Y, Zhai X, He Y, Chen R, Zhou J, Li M, Wang Q. Publication trends of research on diabetes mellitus and T cells (1997-2016): a 20-year bibliometric study. PLoS ONE. 2017; 12(9).
5. Tentolouris A, Eleftheridou I, Athanasakis K, Kyriopoulos J, Tsilimigras DI, Grigoropoulou P, Doupis J,Tentol. Prevalence of diabetes mellitus as well as cardiac and other main comorbidities in a representative sample of the adult Greek population in comparison with the general population. Hellenic Journal of Cardiology; 2018: 1-8.
6. Fareed M., Salam N, Khoja AT, Mahmoud MA, Ahamed M.Life style related risk factors of type 2 diabetes mellitus and its increased prevalence in Saudi Arabia: a brief reviews. International Journal of Medical Research and Health Sciences. 2017; 6(3):125-132.
7. Olokoba AB, Obateru OA, Olokoba, LB. Type 2 diabetes mellitus: a review of current trends. Oman Medical Journal. 2012; 27(4): 269-273.
8. Ellulu M, Abed Y, Ranneh Y, Ali F. Epidemiology of obesity in developing countries: challenges and prevention. Global Epidemic Obesity. 2014; 2(2). doi: htpp://dx.doi.org/10.7243/2052-5966-2-2
9. Agofure, O. Prevalence of obesity among adults in Issele-Uku, Delta State Nigeria. Alexandria Journal of Medicine. 2018; 54(2018): 463-468.
10. Sharma AR, Lau DCW. Obesity and type 2 Diabetes Mellitus. Canadian Journal of Diabetes. 2013;37(2): 63-64.
11. Zheng Y, Ley SH, Hu FB. Global aetiology and epidemiology of type 2 diabetes mellitus and its complication. Nature Reviews Endocrinology. 2017; 14(2).
12. Erem, C. Prevalence of overweight and obesity in Turkey. IJC Metabolic and Endocrine. 2015; 8(2015): 38-41.
13. Sobers-Grannum N, Murphy MM, NielsenA, Guell C, Samuels TA, Bishop L, et al. Female gender is a social determinant of diabetes in the Caribbean: a systematic review and meta-analysis. PLoS ONE. 2014; 10(5).
14. Kautzky-Willer A, Harreiter J, Pacini G. Sex and gender differences in risk, pathophysiology and complications of type 2 diabetes mellitus. Endocrine Reviews. 2016; 37(3): 278-316.
15. Contreras F, Rivera M, Vasquez J, Parte MD, Velasco M. 2000. Diabetes and hypertension physiopathology and therapeutics. Journal of Human Hypertension. 2000; 14(Suppl 1): S26-S31.
16. Gyamfi D, Obirikorang C, Acheampong E, Danquah KO, Asamoah EA, Liman FZ, et al. Prevalence of pre-hypertension and hypertension and its related risk factors among undergraduate students in a Tertiary institution, Ghana. Alexandria Journal of Medicine. 2018; 54(2018): 475-480.

Mapping of Dengue Fever Incidence in Majjene Province, West Sulawesi 2016

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ABSTRACT

Majene province is an endemic area of dengue haemorrhagic fever. Several factors played a role in changes of dengue haemorrhagic fever cases were rainfall, population density and vector density of dengue haemorrhagic fever in term of larva-free numbers. This study aimed to describe the dengue haemorrhagic fever patients distribution in Majene district, West Sulawesi province. The study had been used observational with descriptive design. The study population was all positive dengue haemorrhagic fever patients recorded in Maejn Health Office report in 2016. The study samples were 199 positive patients. The data was analysed with SPSS program and ArcGis. The result indicated that spatial trend pattern in dengue haemorrhagic fever cases tend to concentrate in one area such as coastal areas especially urban areas which had high rainfall of 100-200 mm. In area with high rainfall also had very dense population that contributed transmission rapid spread. Besides, larvae free number did not meet the requirement issued by Ministry of Health which was> 95%. The dengue haemorrhagic fever program should be prioritized in areas with high rainfall and dense population. In additions, the larvae free program achievement will be further enhanced by increase budget and improved as cross program.

Keywords: *Dengue haemorrhagic fever, larvae free, dense population, rainfall*

Introduction

Dengue virus infection is worldwide health threat affecting at least 3.6 billion people living in more than 125 tropics or subtropics countries.[1,2] An approximately 50-100 million dengue fever and 200,000-500,000 dengue haemorrhagic fever (DHF) caused 24,000 mortality annually.[3,4]

World Health Organization (WHO) declared dengue and dengue haemorrhagic fever to be endemic in the Asian sub-continents.[3] Dengue virus is belonging to the genus Flavivirus (group B arbovirus, RNA virus) and includes structural and non-structural proteins.[5] There are four distinct serotypes such as DENV-1, DENV-2, DENV-3 and DENV-4 which transmitted to human through Aedes aegypti and Aedes albopictus mosquitoes.[6]

Aedes (Stegomyia) aegypti is the main vector global and found in urban environment and Aedes (Stegomyia) albopictus was considered secondary importance in transmission expect in Asian countries which present in rural or semi-urban habitats.[7] DHF is characterized by sudden onset of fever, thrombocytopenia and vascular leak syndrome and affected children under 15 years.[8] DHF can be correlated with poor outcomes depending on the facilities availabilities for patient management.[2]

DHF is one important public health problem in Indonesia. The mosquitoes transmission (vectors) of DHF are Aedes aegypti, Aedes albopictus and Aedes scutellaris. The existence of vectors (larvae of Aedes aegypti) in the area indicated presence of Aedes aegypti mosquitoes population in that area.

DHF vector density level can be observe through larvae surveillance. The larvae surveillance was carried out with calculation were obtained to find out the larvae index included larvae free number, house index, container index and breteau index. All regions in Indonesia are in risk of contracting dengue diseases. DHF is influenced by environmental conditions, population mobility, population density, presence of artificial and natural containers in landfills (TPA) and other garbage places.

High population density increases dengue infection since flying distance of mosquitoes is estimated at 50 meters. Besides, temperature and humidity are also among environmental conditions that affects development of Aedes aegypti.

In Majene district, dengue haemorrhagic fever incidence found increased annually. In 2015, there were 16 DHF patients who treated and increased to 199 DHF cases and four mortality cases were recorded. Meanwhile, Majene regency had DHF cases and outbreaks due to surge in cases and mortality. This study had represented in map form. Map can illustrate dengue haemorrhagic fever distribution that occurred in 2016 based on environmental factors such as climate change, population density and larvae free percentage. This study aimed to describe the dengue haemorrhagic fever patients distribution in Majene district, West Sulawesi province.

Methodology

The study was used observational study with descriptive research design to determine dengue haemorrhagic fever distribution by observe with population density and climate change and larval density based on Geographic Information Systems (GIS). The study location was conducted in Majene district, West Sulawesi province between February and April 2017. This district was selected due to this region was endemic to dengue haemorrhagic fever and included in outbreak area in 2016.

The population were 119 dengue haemorrhagic fever positive patients recorded in Majen health Office report. The samples were 199 positive patients in 2016. The primary data was obtained by conducted direct case survey, observed patient coordinates used GPS. The patients who moved to domicile was still taken coordinates at residence place on positive dengue haemorrhagic fever detection.

The secondary data were obtained from dengue haemorrhagic fever data from relevant agencies such as Majene District Health Office. Meanwhile, climate variation in form of monthly report at Majene Meteorology Station in 2016. The population density data was obtained from Majene Central Statistical Agency. The larvae free numbers per Public Health Centre (Puskesmas) was obtained from related office. The data was analysed with SPSS and GIS Arc computer programs. The data was represented in form of maps, tables, graphs and narrative.

Result and Discussion

In Table 1, 65 respondents (54.6%) were male and 64 respondents (45.6%) were female. Meanwhile, 55 respondents (46.2%) were aged between 0 year and 10 years old. Besides, there were 40 respondents (33.6%) aged between 11 years and 20 years old. There was only a respondent aged between 51 years and 60 years old. In additions, 67 respondents (56.3%) were students and 32 respondents (26.7%) were unemployment.

Table 1: Patient Distributions with dengue haemorrhagic fever based on characteristics in Majene district 2016

Characteristics	Total (n)	Percentage (%)
Gender		
Male	65	54.6
Female	64	45.6
Age group (years old)		
0-10	55	46.2
11-20	40	33.6
21-30	10	8.4
31-40	6	5
41-50	2	1.7
51-60	1	0.8
>60	5	4.2
Employment		
Unemployment	32	26.9
Student	67	56.3
Civil servant/ lecturers	6	5
Housewives	6	5
Entrepreneur	3	2.5
Farmers/Fisherman	5	4.2
Total	119	100

Based in Table 2, there were seven respondents with mobility history from endemic areas from Makassar city. Meanwhile, seven respondents came from Malunda subdistrict. Meanwhile, 5 respondents were from Mamuju regency.

Table 2: Patient distribution with dengue haemorrhagic fever based on mobility history in Majene district 2016

Mobility history	Total (n)	Percentage (%)
Endemic area	16	13.4
Not traveling	103	86.6
Total	119	100

Table 3 showed average rainfall occurred in Majene district in 2016. There were 4 sub district with extreme categories and another 4 sub district with high rainfall categories. Highest rainfall occurred in Ulumanda subdistrict with 240 mm and Tammeroddo had recorded rainfall with 208 mm (extreme) and lowest rainfall was in East Banggae with 142 mm (high).

Table 3: Rainfall distribution in Majene district 2016

Sub district	Rainfall	Category
Banggae	168	High
East Banggae	142	High
Pamboang	162	High
Sendana	160	High
Tammeroddo	208	Extreme
Tubo Sendana	207	Extreme
Malunda	205	Extreme
Ulumanda	240	Extreme

Table 4 showed Banggae subdistrict had highest population density of 1579 population/km2 while Ulumanda district which had population of 19 population/ km2. There were 4 subdistrict had very dense population included Banggae and East Banggae. Meanwhile, Pamboang and Sendana had dense population. Ulumanda subdistrict had normal population density.

Table 4: Population density population by category in Majene district 2016

Sub district	Population/km^2	Category
Banggae	1579	Very dense
East Banggae	1010	Very dense
Pamboang	311	Dense
Sendana	269	Dense
Tammeroddo	202	Less dense
Tubo Sendana	212	Less dense
Malunda	97	Less dense
Ulumanda	19	Normal

In Table 5, the larvae free numbers achievement in each subdistrict in Majene did not reached Ministry of Health target set which was >95%. Highest achievement in Pamboang subdistrict was 92.2% and lowest was in Banggae subdistrict, 78.8%.

Table 5: Larvae free number distribution achievement in Manene district 2016

Subdistrict	Total house	Checked house	Larvae free	Percentage
Banggae	7787	3757	2962	78.8
East Banggae	6555	3170	2742	86.5
Pamboang	4208	2730	2516	92.2
Sendana	4419	1665	1456	87.4
Tammeroddo	2371	560	514	91.8
Tubo Sendana	1721	730	658	90.1
Malunda	3775	1195	1077	90.1
Ulumanda	1688	720	657	91.3

Discussion

In this study, the maps showed distribution pattern of dengue haemorrhagic fever patients more likely to be close together due to ability flying vector ability caused of dengue haemorrhagic fever which was only between 50m and 100m.

In additions, the dengue haemorrhagic fever also strongly influenced by height of the area since the result obtained in Majene district was mostly in the coastal areas along Majene district.

In Majene district, the coastal areas were most resided areas and connected with South Sulawesi, West Sulawesi and Central Sulawesi province which meant community in Majene district were living in lowland that were very potential as breeding place for dengue.

Meanwhile, positive dengue haemorrhagic fever patients in Majene district were widely spread in urban areas which very closely related to environment sanitation such as waste management. In urban areas, waste production was more than rural areas which contributed in Aedes mosquitoes breeding area if did not treated well.

The dengue haemorrhagic fever incidence was widespread in areas with high rainfall (100-200mm) than areas had extreme rainfall (>200mm). High rainfall category was found in Southern part of Majene district while extreme rainfall category was found in Northern part of Majene district.

High dengue haemorrhagic fever incidence in high rainfall areas compared to extreme rainfall areas due to inundation created breeding ground for Aedes mosquitoes while extreme rainfall caused flood lead water flows full with Aedes mosquitoes larvae. The rain affected the mosquitoes life in two ways such as increased relative humidity and breeding ground.

Baggae subdistrict which had highest number of positive dengue haemorrhagic fever patients in Majene district which was 76.9% in adjacent to the shoreline. In general, distribution of dengue haemorrhagic fever patients in all sub district was more prevalent in adjacent areas to the coast.

Population density was resident number living per unit area (km^2). Denser the area, greater potential for disease transmission. The population density affected the vulnerability of an area to several diseases especially those that were closely related to the environment. The disease was more easily transmitted to the areas that were densely populated due to transmission range was getting closer. In additions, density and population were among the factors that influenced dengue incidence in the region.

The region had very dense population such as in urban areas had public facilities included health facilities (hospitals, public health centres and general practitioners), other public facilities such as markets, schools, tourist attraction, hotels that caused dengue haemorrhagic fever was very easily transmitted the diseases.

Besides, population mobility was also risk factors caused dengue haemorrhagic fever spread in Majene district. Most positive dengue haemorrhagic fever patients came from endemic areas such as Makassar city and Mamuju regency.

The larvae free number achievement in seven district was <95% that did not meet the Ministry of Health requirement. The presence of Aedes larvae mosquitoes in the region indicated that there was potential for dengue haemorrhagic fever to occur.

The spot check activities were not carried out in all houses or building in their respective areas due to lack of energy and costs allocated. Tubo Sendana subdistrict had 90.1% larvae free achievement but did not received by positive dengue haemorrhagic fever patients. The larvae free numbers was measure of larvae density in an area to reduce the dengue fever risk or dengue haemorrhagic fever transmission which necessary to eradicate mosquito nests.

Conclusion

In conclusion, positive dengue haemorrhagic fever patients found more in areas with high rainfall (100-200mm) compared to areas with extreme rainfall. High rainfall was caused inundation as breeding ground for Aedes mosquitoes. Meanwhile, areas with very dense population had more dengue haemorrhagic fever patients. The population density also affected dengue transmission since flying vector of disease was estimated to be only 50-100 meter. All subdistrict in Majene district had <95% larvae free number or did not fulfil the requirement of Ministry Health.

Acknowledgement

The author would like to thank to Majene District Health Office and related agencies for resources and information support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Sam SS, Omar SFA, Teoh BT, Jamil JA, AbuBakar S. Review of dengue hemorrhagic fever fatal cases seen among adults: a retrospective study. PLoS Neglected Tropical Diseases. 2013; 7(5).
2. Khurram M, Qayyum W, Hassan SJ, Mumtaz S, Bushra HT, UmarM. Dengue hemorrhagic fever: comparison of patients with primary and secondary infections. Journal of Infection and Public Health. 2014; 7(2014): 489-495.
3. Itrat A, Khan A, Javaid S, Kamal M, Khan H, Javed S, Kalia S, Khan AH, Sethi MI, Jehan, I.

Knowledge, awareness and practices regarding dengue fever among the adult population of dengue hit cosmopolitan. PLoS ONE. 2008; 3(7):1-6.

4. Khan E, Kisat M, Khan N, Nasir A, Ayub S, Hasan, R. Demographic and clinical features of dengue fever in Pakistan from 2003-2007: a retrospective cross-sectional study. PLoS ONE. 2010; 5(9):1-7.
5. Fujimoto DE, Koifman S.Clinical and laboratory characteristics of patients with dengue hemorrhagic fever manifestations and their transfusion profile. Brazilian Journal of Hematology and Hemotherapy. 2014 36(2): 115-120.
6. Raza FA, Rehman S, Khalid R, Ahmad J, Ashraf S, Iqbal M, Hasnain S. Demographic and clinico-epidemiological features of dengue fever in Faisalabad, Pakistan. PLoS ONE. 2013; 9(3).
7. Melo DPO, Scherrer LR, Eiras ÁE.Dengue fever occurrence and vector detection by larval survey, Ovitrap and MosquiTRAP: a space-time clusters analysis. PLoS ONE. 2012; 7(7).
8. Senyaolu A, OkorieC, Badaru O, Adetona K, Ahmed M, et al. Global epidemiology of dengue hemorrhagic fever: an update. Journal of Human Virology and Retrovirology. 2017; 5(6).

Factors Contribute to KB Contraception Equipment Service in Reproductive Age Couples in Tamalanrea Public Health Center

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ABSTRACT

The contraceptive service is an effort to improve family planning quality. The study aimed to determine the relationship between age, knowledge, education, employment, information provision and spouse support in contraceptive services for reproductive age couples. The study was used quantitative research with cross sectional study approach. This study was conducted at Tamalanrea Public Health Center (Puskesmas). The study population were 3332 couples with samples of 97 reproductive age couples. The data collection was done by distributed questionnaires to the samples. The data was processed with SPSS program and the data was represented in frequency distribution table form. The result indicated there was correlation between family planning contraceptive service in reproductive age couples with age (p=0.009), education level (p=0.046), information provider (p=0.036) and spouse support (p=0.038). Meanwhile, there was no relationship between family planning conceptive service with work (p=0.291) and knowledge (p=0.448). The recommendation for health officers in provide information on contraceptive service usages for reproductive age couples.

Keywords: *Contraceptive, family planning, age, fertile, spouses*

Introduction

Family planning is defined as set activities, procedures and interventions that provide the population with counselling, health education and modern contraceptive methods (CMs) for individuals may choose their right to decide freely and responsibly whether to have children and if so, the number and appropriate timing of their children.[1] Most developing countries had higher unmet need for modern family planning compared to developed countries. Meanwhile, most sub-Saharan countries had unmet need for family planning between 13% and 34% in 2013.[2] The unmet need level is one of standard indication for measuring family planning effectiveness program in any country.[3] Family planning has potential to prevent most of maternal mortality and children and has economic and social benefits by providing correspondence between resources and population.[4]

There are around 210 million pregnancies happens global which nearly 75-80 million of these pregnancies are unintended and more than half of these unintended pregnancies undergo unsafe abortion annually. [5] 95% of unintended pregnancies happened among women who either use their method inconsistently or incorrectly or use no method at all.[6] In Egypt, 14% of pregnancies in five years prior to the survey were reported unwanted and 5% of births were identified as mistimed.[3] In 2010, American women unmet need was estimated at 5.9% and 23.2% in Africa.[7]The unmet need for contraceptive contributes to 7.4 million disability-adjusted life years.[8]

The contraceptive services is an effort to improve family quality. Over past two decades, contraceptive services in family planning development in Indonesia is considered successful. Hence, there is increasing reproductive age women prevalence who used contraceptive methods. The family planning program is helps Indonesian through improving mothers, children and families development.

The Indonesia health data showed family planning among reproductive age couples participation in Indonesia had reached 76.73% in 2013 with injection and pills. In South Sulawesi province, highest percentage of family planning methods used by active family planning participants were injections (47.39%), pills (22.90%), condoms (13.45%) and other methods (0.56%). Meanwhile, contraceptive method percentage used for new family planning participant was injections (44.61%), pills (24.78%), condoms (16.85%), implants (8.84%), IUDs (3.21%) and others (0.28%).

In Tamalanrea Public Health Centres (Puskesmas), contraceptive method had increased compared previous year. The increment in family planning participants who selected injection method compared to other contraceptive methods was influenced by several factors such as age, education level, employment status, number of children, age at first marriage, knowledge, information and contraceptive. The study aimed to determine the relationship between age, knowledge, education, employment, information provision and spouse support in contraceptive services for reproductive age couples.

Methodology

The study was used quantitative research with cross sectional study approach. The study was conducted in Tamalanrea Puskesmas, Makassar city from December 2016 until January 2017.

Meanwhile, the study population were married couples in reproductive age in Tamalanrea Puskesmas which total of 3332 people. The sample sizes were 97 people which selected using non-random sampling method.

The primary data was obtained through questionnaire and interview. The secondary data is obtained through documentation and other data. The data was analysed used SPSS program.

The univariate analysis was performed on each variable used frequency analysis. The binary analysis was performed used Chi square test to determine the relationship between independent and dependent variables. The data was represented in form of frequency distribution tables and percentages.

Result and Discussion

In Table 1, 5 respondents (62.5%) were aged below than 20 years old and 25 respondents (89.3%) aged more than 50 years old had utilized family planning contraceptive. Meanwhile, 25 respondents (41.0%) aged between 20 years old and 35 years old and 3 respondents (37.5%) aged below than 20 years old did not utilized family planning concentrative service. The statistical test showed there was relationship between age and family planning contraceptive service utilization.

Table 1: Relationship between age and family planning contraceptive in Tamalanrea Puskesmas, Makassar city

Age (years)	Family planning concentrative service						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
<20	5	62.5	3	37.5	8	100	0.009
20-35	36	59.0	25	41.0	61	100	
>50	25	89.3	3	10.7	28	100	
Total	66	68.0	31	32.0	97	100	

In Table 2, there were 41 respondents (71.9%) had knowledge and 25 respondents (62.5%) had no knowledge on contraceptive with utilized family planning contraceptive services in Tamalanrea Puskesmas. In additions, 16 respondents (28.1%) had knowledge and 15 respondents (37.5%) had no knowledge on contraceptive without utilized family planning contraceptive services. There was no relationship between knowledge and family planning contraceptive services utilization in Tamalanrea Puskesmas.

Table 2: Relationship between knowledge and family planning contraceptive service utilization in Tamalanrea Puskesmas, Makassar city

Knowledge	Family planning concentrative service						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	41	71.9	16	28.1	57	100.0	0.448
No	25	62.5	15	37.5	40	100.0	
Total	66	68.0	31	32.0	97	100	

In Table 3, there were 31 respondents (58.5%) had high education level and 35 respondents (79.5%) had low education level with utilized family planning contraceptive services in Tamalanrea Puskesmas, Makassar city. Besides, 22 respondents (41.5%) had high education level and 9 respondents (20.5%) had low education level without utilized family planning contraceptive services. The statistical test showed there was relationship between education level and family planning contraceptive services utilization in Tamalanrea Puskesmas, Makassar city.

Table 3: Relationship between education level and family planning contraceptive service utilization in Tamalanrea Puskesmas, Makassar city

Education level	Family planning contraceptive services utilization						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
High	31	58.5	22	41.5	53	100.0	0.046
Low	35	79.5	9	20.5	44	100.0	
Total	66	68.0	31	32.0	97	100	

In Table 4, 41 respondents (73.2%) were worked and 25 respondents (61.0%) were jobless with utilized family planning contraceptive services. There were 15 respondents (26.8%) worked and 16 respondents (39.0%) were jobless without utilized family planning contraceptive services. There was no relationship between employment and family planning contraceptive services utilization.

Table 4: Relationship between employment and family planning contraceptive service utilization in Tamalanrea Puskesmas, Makassar city

Employment	Family planning contraceptive services utilization						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	41	73.2	15	26.8	56	100.0	0.291
No	25	61.0	16	39.0	41	100.0	
Total	**66**	**68.0**	**31**	**32.0**	**97**	**100**	

Based on Table 5, 40 respondents (78.4%) had received information and 26 respondents (56.5%) did not received information in contraceptive with utilized family planning contraceptive services. Furthermore, 11 respondents (21.6%) had received information and 20 respondents (43.5%) did not received information on contraceptive without utilized family planning contraceptive services utilization in Tamalanrea Puskesmas, Makassar city.

Table 5: Relationship between information and family planning contraceptive service utilization in Tamalanrea Puskesmas, Makassar city

Information	Family planning contraceptive services utilization						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	40	78.4	11	21.6	51	100.0	0.036
No	26	56.5	20	43.5	46	100.0	
Total	66	68.0	31	32.0	97	100	

In Table 6, 35 respondents (59.3%) had spouse support and 31 respondents (81.6%) did not received spouse support with utilized family planning contraceptive services utilization. Besides, there were 24 respondents (18.9%) had spouse support and 7 respondents (18.4%) did not had spouse support without utilized family planning contraceptive services utilization in Tamanlanrea Puskesmas, Makassar city.

Table 6: Relationship between spouse support and family planning contraceptive service utilization in Tamalanrea Puskesmas, Makassar city

Spouse support	Family planning contraceptive services utilization						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	35	59.3	24	18.9	59	100.0	0.038
No	31	81.6	7	18.4	38	100.0	
Total	**66**	**68.0**	**31**	**32.0**	**97**	**100**	

Discussion

The pregnancy prevention is recommended for women with age less than 20 years. The contraceptive such as pills, IUDs, condoms which good in pregnancy spacing. Meanwhile, women aged between 20 years and 35 years old is recommended to use contraceptive such as IUDs, pills, injections and implants. The women aged more than 35 years old is recommended to use IUDs, implants, injections, pills and condoms. Hence, the age was determining the choices of contraceptive. The study was indicated that there was relationship between age and family planning contraceptive service utilization among reproductive age couples in Tamalnarea Puskesmas.

The study also found there was no relationship between knowledge and family planning contraceptive service utilization among reproductive age couples in Tamalanrea Puskesmas. The reproductive age couples had sufficient knowledge in long term contraceptive method selection through social media, electronics, magazines. Meanwhile, 62.5% reproductive age couples had lack of knowledge and did not utilized family planning contraceptive services. Besides, the reproductive age couples who had sufficient knowledge and did not utilized the family planning contraceptive services caused by other factors which their spouse did not support in contraceptive usage.

The reproductive age couples who had insufficient knowledge due to influences such as lack of information about contraceptives and their side effects, lack attendance in family planning counselling programs but still obtained information from family and health officers. Furthermore, reproductive age couples who had lack of knowledge and did not utilized family planning contraceptive services due to their ignorance in contraceptive usage. The women who inactive in participating in counselling in local area which expected able to consult with midwives about contraceptive method that suitable for their need.

The women education level also important in accessing to family planning information. Nowadays, the women had dual role as housewife and also role in community activities. The study had indicated there was relationship between education level and family planning contraceptive services utilization. The study also showed reproductive age couples who ha low education utilized family planning contraceptive services more which meant tendency of women with higher education will affect in contraceptive usage.

Besides, there was relationship between information and family planning contraceptive services utilization. The reproductive age couples who had received information and did not utilized contraceptive services caused by family advice on contraceptive method. The information from health officers did not affected the reproductive age couples decision in contraceptive method unless the contraceptive method had side effects and requested for contraceptive method replacement which matched age and health. Besides, there were many women who determined their contraceptive method based on information from other experiences. Some health officers also had lack of counselling in providing information caused lack of knowledge in contraceptive type selection.

Husband support such as agree, understand and know family planning and contraceptive types and monitored contraceptive side effect. The spouse role in household was in charge of leading, protecting and responsible for their family. The relationship between men and women was not based on dichotomous conflict nor functional structural but based on togetherness needs to build a harmonious partnership. The study found there was relationship between spouse support and family planning contraceptive services utilization. This result showed the respondents claimed their spouse dud not oversee the contraceptive side effects. The spouse support also influenced their wife in contraceptive usage. The lack of spouse support toward contraceptive side effect need improvement with paying attention to their wife health.

Conclusion

In conclusion, the study found there was correlation between family planning contraceptive service in reproductive age couples with age, education level, information and spouse support. Meanwhile, there was no relationship between family planning conceptive service with work and knowledge. The recommendation for health officers in provide information on contraceptive service usages for reproductive age couples.

Acknowledgement

The author would like to thank to all respondents in Tamalanrea Puskesmas.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Pereda PT, Pi IBH, Cuevas MI, Burgos LA. Quality of family planning services in Mexico: the perspective of demand. PLoS ONE. 2019; 14(1).
2. Nanvubya A, Ssempiira J,Mpendo J, Ssetaala A,Nalutaaya A, Wambuzi M, et al. Use of modern family planning methods in fishing communities of Lake Victoria, Uganda. PLoS ONE. 2015; 10(10).
3. Elweshahi HMT, Gewaifel GI,Sadek SS, El-Sharkawy OG. Unmet need for postpartum family planning in Alexandria, Egypt. Alexandria Journal of Medicine. 2017; 54(2018): 143-147.
4. Enache RG. Psychological counselling and family planning for teenagers. Procedia- Social and Behavioral Sciences. 2013; 84(2013): 264-268.
5. Ramesh J, Chandrababu R. Community-based educational intervention on necklace method as

a natural family planning amongst reproductive age group women in India. International Journal of Nursing Science. 2017; 5(2018): 29-32.

6. KavanaughML, Jerman J. Contraceptive method use in the United States: trends and characteristics between 2008, 2012 and 2014. Contraception. 2018; 97(2018): 14-21.

7. Dorman E, Perry B, Polis CB, Engelstein LC, Shattuck D, Hamlin A, Aiken A, et al. Modelling the impact of novel male contraceptive methods on reductions in unintended pregnancies in Nigeria, South Africa, and the United States. Contraception. 2018; 97(2018): 62-69.

8. Khan S, Grady B,Tifft S. Estimating demand for a new contraceptive method: projections for the introduction of Sayana Press. International Journal of Gynecology and Obstetrics. 2015; 130(Suppl 3): E21-E24.

Factors toward Dengue Haemorrhagic Fever Occurrence in Patte'ne Village, North Wara District, Palopo City

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ABSTRACT

Dengue Hemorrhagic Fever (DHF) is transmission disease through mosquitoes bites from genus Aedes especially Aedes aegypti or Aedes albopictus. This study aimed to determine the relationship between civil service efforts, hanging clothes habit, insect repellent usage, water reservoirs potential for mosquitoes breeding and abate powder usage in Patte'ne village, North Wara district, Palopo city. The study was used analytic observational with cross sectional study design. The study population were all household resided in Patte'ne village which total of 745. The study samples were head of the family. The samples were used proportional random sampling with samples of 254 households. The result showed that there was relationship between hanging clothes habit, mosquitoes repellent usage, outside water reservoirs potential for mosquitoes breeding, resting places inside the house existence and abate powder usage with DHF occurrence in Patte'ne village, North Wara district. Meanwhile, there were no relationship between civil service efforts, inside water reservoirs potential for mosquitoes breeding and resting places outside the house with DHF occurrence in Patte'ne village, North Wara district. Health agencies is recommended to provide counselling on 3M implementation to raise awareness in important of community participation in dengue prevention.

Keywords: *Dengue haemorrhagic fever, abate powder, civil service, mosquitoes*

Introduction

In 2010, International Research Consortium on Dengue Risk Assessment, Management and Surveillance (IDAMS) estimated that 390 million dengue infections global and 96 million are symptomatic cases.[1] Meanwhile, World Health Organization (WHO) approximated 2.5 billion people were at risk of dengue which living in Africa, America, Eastern Mediterranean, South East Asia and Western Pacific.[2]

According to WHO, dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) which classified as with or without warning signs and severe dengue.[3] Dengue infection might cause complications in nervous system and other clinical complications with mortality consequences.[4] Besides, dengue also known as arboviral disease caused by the dengue virus and have four subtypes such as DEN-1, DEN-2, DEN-3 and DEN-4 with Aedes aegypti and Aedes albopictus as principal vectors.[5,6] People who had single primary infection have higher risk of developing dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) which contributed to antibody-dependent enhancement (ADE).[7] The dengue virus is maintained in nature through cycle transmitted by Aedes mosquitoes between humans or monkeys for the jungle cycle.[8]

In Indonesia, DHF endemic area was South Sulawesi province. Based on Prevention, Control and Environmental Health (P2PL), DHF incident rate was 35.10% per 100, 000 population with highest incident rate was Palopo city had recorded 92.18% per 100,000 population. Palopo city is an endemic area of dengue fever had 123 DHF outbreaks in February 2016.

Therefore, the study was conducted on dengue occurrence in the city. However, this study only done in one Public Health Center working area such as Patte'ne village, North Wara district. The study aimed to determine the relationship between civil service efforts, hanging clothes habit, insect repellent usage, water reservoirs potential for mosquitoes breeding and abate powder usage in Patte'ne village, North Wara district, Palopo city.

Methodology

The study was used quantitative research which was observational analytic with cross sectional study design.

The study was conducted at North Wara district Public Health Centre working area in Patte'ne village in Palopo city due to DHF outbreak area in 2016 within 21st February until 9th March 2017.The study population were 745 household living in Patte' ne village, North Wara district, Palopo city. The study samples were head of the family who willing became study respondents. The samples were 254 households. The samples were selected with proportional random sampling.

The study instrument was questionnaire sheet contained close questions related to study purpose. The questionnaire consisted of 8 parts such as respondent contribution, civil service efforts, hanging clothes habit, mosquitoes repellent usage, water reservoirs potential for mosquitoes breeding, resting places existence, abate powder usage and fogging.

The primary data was obtained through questionnaires. Meanwhile, secondary data was obtained from North Wara Puskesmas regarded the DHF occurrence description in Patte'ne village in 2016.

The univariate analysis was represented frequency distribution and percentage of each study variable. The bivariate analysis was used to determine the relationship and prove the hypothesis between independent and dependent variables. The analysis was used chi-square test analysis.

Result and Discussion

In Table 1, there were 51 respondents (21.1%) claimed did not water reservoirs became mosquitoes breeding place in their house with DHF occurrence in Patte'ne village. Meanwhile, 191 respondents (78.9%) did not had water reservoirs became mosquitoes breeding place with no DHF occurrence in Patte'ne village. There was no relationship between water reservoirs became mosquitoes breeding place and DHF occurrence in Patte'ne village.

Table 1: Relationship between water reservoirs potential became mosquitoes breeding in the house and DHF occurrence in Patte'ne village, North Wara district, Palopo city

Water reservoirs potential became mosquitoes breeding place	DHF occurrence						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	51	21.1	191	78.9	242	100	0.132
No	0	0.0	12	100.0	12	100	
Total	51	20.1	203	79.9	254	100	

In Table 2, 50 respondents (23.7%) had water reservoirs became potential for mosquitoes bleeding place and only 1 respondents did not had water reservoirs which potential for mosquitoes bleeding place putside the house with DHF occurrence in Patte'ne village, North Wara district, Palopo city. There was relationship between water reservoirs potential became mosquitoes breeding place outside the house and DHF occurrence in Patte'ne village, North Wara district, Palopo city.

Table 2: Relationship between water reservoirs potential became mosquitoes breeding outside the house and DHF occurrence in Patte'ne village, North Wara district, Palopo city

Water reservoirs potential became mosquitoes breeding place	DHF occurrence						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	50	23.7	161	76.3	211	100	0.001
No	1	2.3	42	97.7	43	100	
Total	51	20.1	203	79.9	254	100	

In Table 3, there were 48 respondents (20.4%) had resting place for mosquitoes inside the house with DHF occurrence and 3 respondents had no resting place for mosquitoes inside the house without DHF occurrence. There was no relationship between resting place for mosquitoes inside the house and DHF occurrence in Patte'ne village, North Wara district, Palopo city.

Table 3: Relationship between resting place for mosquitoes inside the house and DHF occurrence in Patte'ne village, North Wara district, Palopo city

Resting place for mosquitoes inside the house	DHF occurrence						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	48	20.4	162	77.1	210	100	0.016
No	3	15.8	41	93.2	44	100	
Total	51	20.1	203	79.9	254	100	

In Table 4, 41 respondents (19.5%) had resting place for mosquitoes outside the house with DHF occurrence in Patte'ne village, North Wara, Palopo city. Meanwhile, 169 respondents (80.5%) had resting place for mosquitoes outside the house without DHF occurrence. The statistical test showed no relationship between resting place mosquitoes outside the house and DHF occurrence in Patte' ne village, North Wara district, Palopo city.

Table 4: Relationship between resting place for mosquitoes outside the house and DHF occurrence in Patte'ne village, North Wara district, Palopo city

Resting place for mosquitoes outside the house	DHF occurrence						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
Yes	41	19.5	169	80.5	210	100	0.630
No	10	22.7	34	77.3	44	100	
Total	51	20.1	203	79.9	254	100	

In Table 5, 27 respondents (38.0%) did not used abate powder and 24 respondents (13.1%) were used abate powder with DHF occurrence in Patte'ne village, North Wara district, Palopo city. There was no relationship between abate powder usage and DHF occurrence in Patte'ne village, North Wara district, Palopo city.

Table 5: Relationship between abate powder usage and DHF occurrence in Patte'ne village, North Wara district, Palopo city

Abate powder usage	DHF occurrence						p-value
	Yes		No		Total		
	n	%	n	%	n	%	
No	27	38.0	44	62.0	210	100	0.000
Yes	24	13.1	159	77.3	44	100	
Total	51	20.1	203	79.9	254	100	

Discussion

Eradication of mosquito nests was an activity to eradicate eggs, larvae and pupa of Aedes awgypti mosquitoes that transmit dengue disease in their breeding sites. The Aedes aegypti larvae existence in the environment is correlated with human behaviour. Environmental sanitation management that applied to suppress the Aedes aegypti larvae habitat through eradicated mosquito nests by 3M implementation.

The civil service efforts to implement 3M in Patte'ne village, North Wara district, Palopo city were fairly bad since 51 respondents had suffered dengue in last three years. In this study, 153 respondents who claimed poor civil service efforts and found 36 respondents (23.5%) suffered dengue in last three years.

The statistical test showed no relationship between civil service and DHF occurrence in Patte'ne village, North Wara district, Palopo city. Good civil service efforts in 3M implementation but the villagers still affected by dengue due to other factors that influenced the dengue occurrence such as environmental conditions.

The hanging clothes habit also medium favoured by mosquitoes transmission dengue and risk factors in dengue occurrence had increased. The community in Patte' ne village had hanging clothes habit had hanged clothes outside cupboard such as behind the door. Meanwhile, 51 respondents (20.1%) were affected by

dengue in last three years. There were 210 respondents who had good habit and 48 respondents were suffered DHF. In this study, there was relationship between hanging clothes habit with DHF occurrence. The community in Patte'ne village claimed hanged their clothes temporary at behind the door since the clothes were did not too dirty and smelly. Some respondents who practiced hanging clothes habit since received information on dengue prevention.

Healthy practices in DHF occurrence such as mosquitoes repellent usage. There were 189 respondents used mosquitoes repellent and only 22 respondents (11.6%) were affected by dengue. Meanwhile, the respondents who did not used mosquitoes repellent were more affected by dengue which was 44.6% from found suffered dengue in last three years. There was relationship between mosquitoes repellent usage with DHF occurrence in Patte'ne village. In additions, some respondents claimed never used mosquitoes repellent during day only used mosquitoes repellent at night.

The water reservoir potential became breeding place for Aedes aegypti mosquitoes in form of pupa such as containers. Most respondents had habit did not closed properly the water reservoirs such as bathtubs. There were 152 respondents (59.8%) did not closed their water reservoirs which only done once per week. The community in Patte'ne village who suffered dengue which had water reservoirs that potential became breeding places inside the house. Besides, water reservoirs which did not closed properly also increased potential in Aedes aegypti mosquitoes breeding. The environment around respondents house also increased potential became mosquitoes breeding place.

Furthermore, Aedes aegypti mosquitoes resting place inside the house were dark, moist and slightly clod places such as curtains, mosquito nets and clothes hanging from inside house. The result showed 210 respondents had mosquitoes resting place in their houses. Besides, 51 respondents were suffered DHF which 48 respondents had mosquitoes resting place in their houses. Hence, most respondents were affected by dengue found had mosquitoes resting place inside the house. There was relationship between mosquitoes resting places in the house and DHF occurrence in Patte'ne village, North Wara district, Palopo city. The hanging clothes habit in Patte'ne village in the house also caused resting place for Aedes aegypti mosquitoes.

The study also found relationship between abate powder and DHF occurrence in Patte' ne village, North Wara district, Palopo city. In this study, there were 183 respondents who used abate powder and 24 respondents (13.1%) who suffered from dengue. Based on the interview, there were several reasons that did not used abate powder which were abate powder was sprinkled into the water reservoir. Besides, some respondents who felt the powder was not important since no one had suffered dengue. The health workers was provided abate powder for every houses in Patte' ne village since there was an DHF outbreak in 2016.

Fogging was carried out if there are any dengue cases from Health workers. The study found the respondents claimed that fogging was carried out throughout Patte'ne village area. The result showed that 212 respondents who claimed fogging was conducted around their houses and 49 respondents were suffered dengue. The fogging implementation in Patte' ne village was carried out due to existing of DHF cases reported by Puskesmas officers. After fogging implementation, DHF cases was observed reduced, thus there was relationship between fogging implementation and DHF occurrence in Patte' ne village, North Wara district, Palopo city.

Conclusion

In conclusion, there was relationship between hanging clothes habit, mosquitoes repellent usage, outside water reservoirs potential for mosquitoes breeding, resting places inside the house existence and abate powder usage with DHF occurrence in Patte'ne village, North Wara district. Meanwhile, there were no relationship between civil service efforts, inside water reservoirs potential for mosquitoes breeding and resting places outside the house with DHF occurrence in Patte'ne village, North Wara district. Health agencies is recommended to provide counselling on 3M implementation to raise awareness in important of community participation in dengue prevention.

Acknowledgement

The author would like to thank to all respondents at Patte'ne village, North Wara district, Palopo city for unconditional support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Swaminathan S, Khanna N. Dengue vaccine development: global and Indian scenarios. International Journal of Infectious Diseases. 2019.
2. Cheah WK, Ng KS, Marzilawati AR, Lum LCS.A review of dengue research in Malaysia. The Medical Journal of Malaysia. 2014; 69 (Suppl A): 59-67.
3. Rathakrishnan A, Klekamp B, Wang SM, Komarasamy TV, Nathunam SK, Sathar J, Azizan A, Sanchez-Anguiano A, Manikam R, Sekaran SD. Clinical and immunological markers of dengue progression in a study cohort from a hyperendemic area in Malaysia. PLoS ONE. 2014; 9(3).
4. Ramadona AL, Lazuardi L, Hii YL, Holmner A, Kusnanto H,Rocklöv J. Prediction of dengue outbreaks based on disease surveillance and meteorological data. PLoS ONE. 2016;11(3).
5. Zulkipli MS, Dahlui M, Jamil N, Peramalah D, Wai C, Bulgiba A,Rampal, S. The association between obesity and dengue severity among pediatric patients: a systematic review and meta-analysis. PLoS ONE. 2018; 12(2).
6. Atique S, Chan TC, Chen CC, Hsu CY, Iqtidar S, Louis VR, Shabbir SA, Chuan, TW. Investigating spatio-temporal distribution and diffusion patterns of the dengue outbreak in Swat, Pakistan. Journal of Infection and Public Health. 2018; 11(2018): 550-557.
7. Shim, E. 2017. Cost-effectiveness of dengue vaccination in Yucatán, Mexico using a dynamic dengue transmission model. PLoS ONE. 2017; 12(4).
8. Chen, W. J.Dengue outbreaks and the geographic distribution of dengue vectors in Taiwan: a 20-year epidemiological analysis. Biomedical Journal. 2018; 41(2018): 283-289.

Factors that Influence Patients in Utilizing Outpatient Services in Hasanuddin University Hospitals

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ABSTRACT

This study aims to analyze the factors that influence patients in utilizing outpatient services at Hospital of Universitas Hasanuddin, which consists of hospital facility variables, physician services, nursing service or midwife, service fee, ease of information, and service utilization decisions. This research type is quantitative research with cross sectional design. Sampling technique with stratified random sampling. The number of samples in this study is 100 respondents. Data collection using questionnaire instrument. Data were analyzed by SPSS with Chi-Square statistic test. Chi-Square analysis showed that there were correlation between hospital facility variable (p=0,004), physician service (p=0.033), nurse service or midwife (p=0.011), ease of information (p=0.001) with service utilization decision. The advice given is to maintain and provide the best service, should the hospital continue to make improvements on the availability of facilities, type, or variety of health services more complete.

Keywords: *Hospital; outpatient; services*

Introduction

Consumer behavior is a process or activity when someone searches, selects, purchases, uses, and evaluates products and services to fulfill all aspects needed and desired[1]. Consumer behavior is an action that is directly involved in acquiring, consuming, and consuming products and services, including decisions to overtake and follow these actions[2].

Parsons et al.[3] stated that service is any action or activity that can be offered by a party to another party which is basically intangible and does not result in any ownership. David et al.[4] also defines service as a form of product consisting of activities, benefits or satisfaction offered for sale and basically intangible and does not result in ownership of something. For example, banking, hotels, airlines, taxes and home improvement services[3,4].

Purchasing health services is something that is often found by consumers. This type of purchasing service has special characteristics where most consumers feel compelled to use it[5].This ultimately affects the level of customer satisfaction and affects the willingness to use the service again.

Hospitals are unique organizations, because they blend between solid technology, labor intensive and capital intensive, so that hospital management becomes a separate scientific discipline that produces two things at once, namely technology and human behavior in organizations[6]. Thus the hospital as a form of health service facilities engaged in the service sector actually provides full attention to the quality of service, so that it is used as an indicator of assessment by consumers or in this case patients.

Tjiptono et al.[7] stated that the creation of customer satisfaction can provide several benefits including: 1) the relationship between the company and its customers become harmonious, 2) provide a basis for repurchasing and creating loyalty, and the formation of word of mouth recommendations which can be profitable for the company.

The potential of the hospital includes all the resources owned including all hospital resources as input, management as a process and health service products as an outcome are expected to be able to sell the products produced. In order to remain competitive, the products produced must be of quality and in accordance with the criteria of community needs. In determining target consumers, hospitals need to understand consumer behavior in the decision-making process[8].

The service process provided starts from the registration stage until the patient receives treatment and

healing. The form and procedure of services provided by the hospital is tailored to the type of patient who is treated. Today, the types of patients who go to each hospital are categorized as patients with health insurance or general patients[9].

Health service utilization is the process of interaction or relationship between consumers who use services and health service providers. Where the interaction process is very complex and is influenced by many factors. These factors come from consumers, the consumer environment, and providers in this case the Hospital[9,10]

Basically, the community began to be smart in accessing health services, they began to demand good service in government institutions, where at the time they only hoped for good service to private institutions[9-11]. Today government institutions are public institutions that must provide good servants to the community as a form of responsibility. Every leader of government agencies is always required to improve the quality of service of the agencies they lead, especially agencies directly related to public services such as hospitals and health centers[11].

From the marketing perspective itself, in such a competitive situation, the hospital management needs to be able to design and implement a marketing strategy that can create, maintain and increase customer satisfaction in this case, so that it can ultimately influence patient decision-making of the product offered by the hospital[9-11].

Based on Hibbard et al.[12] study, it was shown that there was a significant relationship between patient education, patient income, cost insurer, hospital facilities, and doctor's service with the decision on the place of delivery. The factors that influence the most are patient income and hospital facilities.

According Grol et al.[13] hospital competition it is necessary to develop services that are oriented towards meeting consumer needs. One of the things that must be considered in the health service system in the 21st century is patient-centered health services, which pay attention to individual desires, needs, patient values, and ensure that the values given by patients direct all treatment decisions [9,13].

Hasanuddin University Hospital is one of the government-owned hospitals under the ministries of research, technology and higher education that has a vision of becoming a trusted pioneer in integrating international standard education, research and health care. So that with this vision hospitals are challenged in facing the current era of competition with the number of hospitals in the city of Makassar.

To achieve this vision Hasanuddin University Hospital implements the mission of creating international-standard professionals in education, research and health care; creating an optimal academic environment to support education, research and health care; pioneering health care innovations through superior research and continuous improvement in service quality; provide integrated health care with education, international standard research without forgetting social functions; developing networks with other institutions both regionally and internationally.

Therefore, this work aimed at identifying the factors that influence patients in utilizing outpatient services at Hasanuddin University Hospital. This is done in order to assess the characteristics of patients in the hospital, so they can determine the description of what kind of service a patient wants to be satisfied with the service and have the willingness to use health services. In addition, these results can be used as benchmarks in the development of hospitals.

Methodology

Types of Research: The type of research used is cross-sectional. In cross-sectional studies, the number of variables is one or more. Data collection is done only once or one time. If more than one variable is examined, the data is collected relatively simultaneously. This research was conducted to explain the factors that influence patients in utilizing outpatient services at Hasanuddin University Hospital.

Location and Time of Research: This research was conducted at Hasanuddin University Hospital, in February - March 2017.

Population and Samples: The population in this study were all outpatients at Hasanuddin University Hospital. The data used to determine the population number is assumed from the total number of outpatient visits at Hasanuddin University Hospital in 2015, which amounted to 101,903 patients. The sample size is determined by Slovin formula[14] and the number of samples in this study were 100 respondents. The sampling technique used in this study is the stratified random sampling.

Data Collection: Primary data is data taken directly by researchers from the source obtained using questionnaires. The questionnaire used in this study is a modified questionnaire about the factors that influence patients in utilizing health services. Secondary data sources in this study were obtained from reports and documents from Hasanuddin University Hospital, namely data on the number of outpatient visits in 2013-2015.

Data Analysis: The collected data is processed using SPSS. The analytical method used in this study is bivariate analysis for each independent variable with the dependent variable presented in the form of tables and narrative explanations.

Result and Discussion

This research was conducted at Hasanuddin University Hospital from 11 February 2017 to 11 March 2017. Data collection was conducted through direct interviews with respondents using questionnaires. The sample size was 100 outpatients. The way that researchers do in getting respondents is when they will conduct interviews, the researchers first ask patients who visit, whether they are willing to be interviewed or not. Then if the patient does not meet the criteria as a respondent who can be interviewed, the researcher will not conduct an interview and will look for other patients who meet the predetermined criteria. The results are displayed in table form accompanied by explanations.

General Characteristics of Respondents: The research results from the characteristics of the respondents are described as follows. Age is the age of the respondent at the time of the study. Distribution of respondents based on age groups is listed in Table 1.It is seen that out of 100 respondents, the majority of respondents were in the age group of 25-34 years (28%) and at least in the age group of 65 years (5%). In additionthat most of the respondents were female, with 57 respondents (57%). While respondents male were 43 respondents (43%).

Table 1: Distribution of Respondents by Age Group at Hasanuddin University Hospital In 2017

Age Range (years)	Frequency	Percentage (%)
≤ 24	19	19.0
25-34	28	28.0
35-44	25	25.0
45-54	15	15.0
55-64	8	8.0
≥65	5	5.0
Total	100	100.0

Relationship of Hospital Facilities and Utilization of Services: The relationship between hospital facilities and service utilization is listed in Table 2. The results showed that of the 91 respondents who stated that hospital facilities were in good category, there were 80 respondents (87.9%) who stated that they would use hospital services again and 11 respondents (12.1%) stated that they would not use the same services. The chi-square test results showed ($p = 0.004$), ($p < 0.05$) so that Ho is rejected means that there is a significant relationship between facilities and utilization of services in the hospital.

Table 2: Relationship between Facilities and Utilization of Outpatient Services at Hasanuddin University Hospital In 2017

Facilities	Utilization of Services				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	80	87.9	11	12.1	91	100	0.004
Not Good	4	44.4	5	55.6	9	100	

Relationship between Doctor Services and Utilization of Services: The relationship between physician services and service utilization is listed in Table 3. The results showed that of the 95 respondents who stated that the doctor's service in the hospital was in a good category, there were 82 respondents (86.3%) who stated that they would use hospital services again and 13 respondents (13.7%) stated that they would not use the same service. The results of the chi-square test shows value of ($p = 0.033$), ($p < 0.05$) so that Ho is rejected, meaning that there is a significant relationship between the service of doctors and the utilization of services in hospitals.

Table 3: Relationship between Doctor Services and Utilization of Outpatient Services at Hasanuddin University Hospital In 2017

Doctor services	Utilization of Services				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	82	86.3	13	13.7	95	100	0.033
Not Good	2	40	3	60	5	100	

Relationship between Nurse Services and Midwives with Use of Services: The relationship between nurse or midwife services and service utilization is listed in Table 4. The results showed that of the 93 respondents who stated that the services of nurses or midwives in hospitals were in good category, 81 respondents (87.1%) stated that they would use hospital services again and 12 respondents (12.9%) stated that they would not use the services. The results of the chi-square test shows value of ($p = 0.011$), ($p < 0.05$) so that Ho is rejected, meaning that there is a significant relationship between service services for nurses or midwives with the use of services in hospitals.

Table 4: Relationship between Nurse Services and Midwives with Utilization of Outpatient Services at Hasanuddin University Hospital In 2017

Nurse Services and Midwives	Utilization of Services				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	81	87.1	12	12.9	93	100	0.011
Not Good	3	42.8	4	57.2	7	100	

Relationship between Service Costs and Utilization of Services: The relationship between service costs and service utilization can be seen in the following Table 5.The results showed that of the 98 respondents who stated that the cost of service in hospitals in the affordable category, there were 82 respondents (83.6%) who stated that they would use hospital services again and 16 respondents (16.4%) stated that they would not use the same service. The chi-square test results showed ($p = 1{,}000$), ($p > 0.05$) so that Ho is rejected means that there is no relationship between service costs and utilization of services in hospitals.

Table 5: Relationship between Service Costs and Utilization of Outpatient Services at Hasanuddin University Hospital In 2017

Service Fee	Utilization of Services				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Affordable	82	83.6	16	16.4	98	100	1.000
Not Affordable	2	100	0	0	2	100	

Relationship between Ease of Information and Utilization of Services: The easy relationship of information with service utilization can be seen in the following Table 6. The results showed that of the 95 respondents who stated the ease of information in the hospital in the good category, there were 83 respondents (87.4%) who stated that they would use hospital services again and 12 respondents (12.6%) stated that they would not use the same service. The results of the chi-square test showed ($p = 0.001$), ($p < 0.05$) so that Ho is rejected. Thus this means that there is a significant relationship between the ease of information and the utilization of services in the hospital.

Table 6: Relationship between Ease of Information and Utilization of Services Outpatient at Hasanuddin University Hospital In 2017

Ease of Information	Utilization of Services				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	83	87.4	12	12.6	95	100	0.001
Not Good	1	20	4	80	5	100	

Conclusion

Based on the results of this study, namely the factors that influence patients in the use of outpatient services at Hasanuddin University Hospital. Conclusions can be taken as follows. There is a relationship between hospital facilities, doctor's service, services of nurses or midwives and ease of information with the utilization of outpatient services, at Hasanuddin University Hospital. However, there is no relationship between service costs and utilization of outpatient services at Hasanuddin University Hospital.

Acknowledgment

The author would like to thank the Faculty Of Community Health, Hasanuddin University for unconditionally support and funding. The ethical clearance was attained from Hasanuddin University Hospital. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. De Mooij M. Consumer behavior and culture: Consequences for global marketing and advertising. Sage; 2010 Sep 29.
2. Zhang KZ, Benyoucef M. Consumer behavior in social commerce: A literature review. Decision Support Systems. 2016 Jun 1;86:95-108.
3. Parsons E, Maclaran P, Chatzidakis A. Contemporary issues in marketing and consumer behaviour. Routledge; 2017 Jul 20.
4. David FR, David FR. Strategic management: A competitive advantage approach, concepts and cases. Pearson; 2016 Feb 8.
5. Damberg CL, Sorbero ME, Lovejoy SL, Martsolf GR, Raaen L, Mandel D. Measuring success in health care value-based purchasing programs: Findings from an environmental scan, literature review, and expert panel discussions. Rand health quarterly. 2014 Dec 30;4(3).
6. Geist P, Hardesty M. Negotiating the crisis: DRGs and the transformation of hospitals. Routledge; 2014 Jun 3.
7. Tjiptono F, Arli D, Bucic T. Consumer confusion proneness: insights from a developing economy. Marketing Intelligence & Planning. 2014 Aug 26;32(6):722-34.
8. Chen YS, Cheng CH, Lai CJ, Hsu CY, Syu HJ. Identifying patients in target customer segments using a two-stage clustering-classification approach: A hospital-based assessment. Computers in Biology and Medicine. 2012 Feb 1;42(2):213-21.
9. Rathert C, Wyrwich MD, Boren SA. Patient-centered care and outcomes: a systematic review of the literature. Medical Care Research and Review. 2013 Aug;70(4):351-79.
10. Saramunee K, Krska J, Mackridge A, Richards J, Suttajit S, Phillips-Howard P. How to enhance public health service utilization in community pharmacy?: general public and health providers' perspectives. Research in Social and Administrative Pharmacy. 2014 Mar 1;10(2):272-84.
11. Dzakpasu S, Powell-Jackson T, Campbell OM. Impact of user fees on maternal health service utilization and related health outcomes: a systematic review. Health policy and planning. 2013 Jan 30;29(2):137-50.
12. Hibbard JH, Greene J. What the evidence shows about patient activation: better health outcomes and care experiences; fewer data on costs. Health affairs. 2013 Feb 1;32(2):207-14.
13. Grol R, Wensing M, Eccles M, Davis D, editors. Improving patient care: the implementation of change in health care. John Wiley & Sons; 2013 Mar 18.
14. Slovin E. Slovin's formula for sampling technique. Retrieved on February. 1960;13:2013.

Relationship of Marketing Mixes with the Return Interest of Patients at ArifinNu'mang Hospital

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ABSTRACT

Marketing mix is a combination of variables or activities which are the core of the planning system, variables that can be controlled to influence the reaction of buyers or consumers. This work aims to analyze the marketing mix relationship (product, people, physical evidence, and process) with the patient's interest in returning for treatment at ArifinNu'mang Hospital, Sidrap. Sampling is done by simple random sampling technique. The number of samples is 100 people, all of whom are inpatients of ArifinNu'mang Hospital, Sidrap. The results of this study indicate that the product strategy (p = 0.002), people (p = 0,000), process (p = 0,000), and physical facilities (p = 0.002) have a relationship of interest in returning to inpatient services at the hospital. ArifinNu'mang, Sidrap District. Based on the results of the research, ArifinNu'mang Hospital, Sidrap Regency is expected to continue to be able to improve and develop the quality of services, it is expected that all parties within the hospital understand the elements and marketing mix strategies.

Keywords: *Marketing mix; return interest; hospital*

Introduction

Marketing is a social and managerial process where individuals and groups get what they need and want by creating, offering and exchanging valuable products on the market[1]. Marketing is a planning process and implementation of the price-giving manifestation, promotion and distribution of service items and ideas to create exchanges with target groups that meet customer and organizational goals[2].

The marketing goal is to make the maximum sale or use of services. Marketing is the activity of modern organizations in order to survive and succeed. Organizations must know the market, attract resources, turn these resources into products and services, ideas that are in accordance with the effective ways of various people in need[3].

Services have many meanings, ranging from personal services to product services[4]. Every organization always tries to stay alive, develop and compete in terms of its service[5]. In this context, each organization always sets out and implements strategies and ways to implement its marketing activities[5].

The marketing mix is one of established marketing strategy[6]. Marketing mix is a combination of variables or activities that are the core of the planning system, variables that can be controlled to influence buyers or consumers ' reactions. Marketing mix aims at creating market share (access) through the uniqueness or differentiation of service products offered and ended with sales or transactions[6].

The healthcare market has moved towards becoming a customer-focused and anticipating amazing consideration at reasonable cost[7]. Additionally, the mushroomed advancement of the worldwide rivalry facilities of corporate doctors acquires gigantic changes in the structure of the industry. In this particular situation, hospital services marketing is gradually and unquestionably transforming and is being woven into the texture of hospital planning and advertising programs[8]. Throughout the last two decades, however, huge numbers of corporate doctor's facilities have created advertising society in their setting – which has empowered them to scale new statures in their endeavors[9].

Several studies has been reported on marketing mixes for hospitals. Sreenivas et al.[10] investigatedthe Marketing procedure in corporate health centers and analyzed the view of Administrative staff, Doctors and Nursing staff towards advertising process. Varkevisser et al.[11] inspected the connection between clinic quality,

as estimated by freely accessible quality appraisals, and patient doctor's facility decision and found that patients have a high penchant to pick health centers with a decent notoriety. Moscone et al.[12] studied the impact of social cooperation on patients' decision of doctor's facility and its association with the quality that is conveyed by clinics and found that past involvement in the use of wellbeing administrations by the system assumes a critical job in clarifying current patients' decisions of doctor's facility. Jung et al.[13] analyzed the impacts of differing measurements of doctor's facility quality including consumer decision in selecting future health center and found that consumers' view of notoriety and therapeutic administrations contribute considerably in selecting a health center. De Groot et al.[14] evaluated the impact of past patients' encounters in respect to other data while picking a health center for treatment and found that the decisions depends most on data in regards to doctors' mastery, holding up time, and doctors' correspondence while picking a healing facility. Zwijnenberg et al.[15] investigated patients' inclinations on doctor's facilities and found that there us a requirement for data about the medicinal pro while picking a health center

Hospitals as providers of health services are increasingly in both state-owned hospitals and private hospitals. In particular, at South Sulawesi, inpatient visits at ArifinNu'mang Hospital, Kab. Sidrap has increased for the last three years, namely in 2012 the number of inpatients reached 3,136 patients, in 2013 reached 3,838 patients, and in 2014 reached 4,439 patients. In order to improve health services and maintain the number of visits and as a regional southeastern pilot and referral hospital in South Sulawesi, there is a need for a better marketing strategy which will influence the decisions of patients in using hospital services. Thus, this work aims to analyze the marketing mix relationship (product, people, physical evidence, and process) with the patient's interest in returning for treatment at ArifinNu'mang Hospital, Sidrap.

Methodology

Research Design and Location: This research is a quantitative research survey form with the design of the Cross Sectional Study, which is a study that conducts descriptive analysis and explains causal relationships between independent variables and the dependent variable simultaneously. This research was conducted at the hospital. ArifinNu'mangKab.Sidrap.

Population and Samples: The population in this study were all patients in the hospital inpatient unit. ArifinNu'mangKab.Sidrap Year 2016. The average inpatient from 2012 - 2014 was 3,804 patients/year. Sampling is done by simple random sampling technique. The number of samples were100 respondents.

Data Source: Primary data is data obtained directly from respondents. This data is obtained by distributing questionnaires to respondents who use services at the research location. The secondary data is collected from reports or other written documents available from the hospital. The independent variables that will be analyzed in this work consist of products, physical facilities, people, processes. The dependent variable in this study is return interest.

Data Analysis: Primary data in this study was processed using computer software through the SPSS program. Based on the objectives of the study, namely to find out the relationship of the independent variable with the dependent variable, the method of analysis of multiple linear regression is used to determine which tendency of independent variables is more related to the dependent variable. Bivariate analysis is to do an analysis relationship between each independent variable and the dependent variable using Chi Square (X2). This test is used to test the freedom between two variables arranged in table rows and columns with $\alpha = 0.05$, which means the null hypothesis (Ho) is rejected if p value $<\alpha$ which means there is a relationship between the dependent variable and the independent variable.

Result and Discussion

Description of Respondents Characteristics: Respondents in this study were 100 respondents. All respondents were patients in the hospital of ArifinNu'mangKab. Sidrap. Distribution of respondents based on age at the hospital. ArifinNu'mangKab.Sidrap can be seen in the Table 1. Table 1 above shows that the percentage of the highest age group of respondents in the age group 21-30 years is 22 respondents (22.0%). Furthermore, the lowest age group of respondents in the 81-90 year group was 1 respondent (1%).Results showed that the percentage of the highest gender respondents is male as many as 61 respondents (61.0%), then the lowest gender of the respondents is female as many as 39 respondents (39.0%).

Table 1: Distribution of Respondents by Age Group

Age Group (Years)	Total	
	N	Percentage %
1-10 years	3	3.0
11-20 years	11	11.0
21-30 years	22	22.0
31-40 years	10	10.0
41-50 years	17	17.0
51-60 years	20	20.0
61-70 years	12	12.0
71 –80 years	4	4.0
81-90 years	1	1.0
Total	100	100.0

Relationship between Product with Patient Interest: Based on Table 2, result showed that of all respondents who rated good product as much as 85.5% expressed interest and as many as 57.9% stated no interest, while for respondents who stated that product was not good as much as 14.5% expressed interest and as many as 42.1% stated no interest. The results of the analysis are to see the relationship between the product and the interest in returning of patients was done using the chi-Square statistical test, and result showed the value p = 0.002 because the value of p <0.05 then Ho is rejected and Ha is accepted. This means there is a relationship between the product and the patient's interest in the hospital.

The results indicate that there is relationship of the product with the interest of returning patients. If the patient's perception of the product is good then the patient will be satisfied with the product or service in the installation, so they are interested in continuing to use the service. The outcome of this work is inline with findings reported in De Groot et al[14] where it was stated that patient tend to choose if the product is good.

Table 2: Relationship between Product with Patient's Return Interest

Product	Return Interest of Patient				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	53	85.5	22	57.9	75	100	0.002
Not Good	9	14.5	16	42.1	25	100	
Total	62	100	38	100	100	100	

Relationship between People with Patient Interest: Based on Table 3, the results showed that of all respondents who rated good people as much as 95.2% expressed interest and as many as 65.8% stated no interest, while for respondents who said people were not good as much as 4.8% expressed interest and as many as 34.2% stated no interest. The results of the analysis are to see the relationship between people and the interest in returning of patients was done using the Chi-Square statistical test, and result showed the value p = 0.000 because the value of p <0.05, then Ho is rejected and Ha is accepted. This means that there is a relationship between people and the interest of returning among patients in hospitals. The outcome of this work is inline with the findings reported in Jung et al.[13] as the patient's perception of health personnel is good, the patient will feel satisfied with the skills and abilities of the health personnel involved in providing services at the Installation.

Table 3: Relationship between People with Patient's Return Interest

People	Return Interest of Patient				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	59	95.2	25	65.8	84	84	0.000
Not Good	3	4.8	13	34.2	16	116	
Total	62	100	38	100	100	100	

Relationship of Process with Patient Interest: Based on Table 4, the results showed that of all respondents who rated the process well as many as 77.4% expressed interest and as many as 39.5% stated no interest, while for respondents who said the process was not good as many as 22.6% expressed interest and as many as 60.5% expressed no interest. The results of the analysis are to see the relationship between the process and the interest in returning of patients was done using the Chi-Square statistical test, and result showed the value p = 0,000 because the value of p> 0.05, then Ho is rejected and Ha is accepted. This means there is a relationship between the process and the interest in returning of patients in the hospital. The outcome of this work is inline with the results reported in De Groot et al.[14] where it was reported that process of healthcare has significant influence on patient's return interest.

Table 4: Relationship between Process with Patient's Return Interest

Process	Return Interest of Patient				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	48	77.4	15	39.5	63	100	0.000
Not Good	14	22.6	23	60.5	37	100	
Total	62	100	38	100	100	100	

Relationship between Physical Evidence and Patient Interest: Based on Table 5, the result showed that of all respondents who assessed physical evidence as good as 90.3% expressed interest and as many as 65.8% stated no interest, while for respondents who stated physical evidence (physical facilities) were not good as many as 9.7% expressed interest and 34.2% stated no interest. The results of the analysis to see the relationship of physical evidence with the interest of returning of patients was done using the Chi-Square statistical test, and result showed the value = 0.002 because the value of p <0.05 then Ho is rejected and Ha is accepted. This means there is a relationship between physical evidence with the interest of returning patients in the hospital. The outcome of this analysis is inline with the work done by Zwijnenberg et al.[15] where physical evidence of health care information plays a key role in patient's decision.

Table 5: Relationship between Physical Evidence and Patient's Return Interest

Physical evidence	Return Interest of Patient				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	56	90.3	25	65.8	81	100	0.002
Not Good	6	9.7	13	34.2	19	100	
Total	62	100	38	100	100	100	

Relationship between Elements of Marketing Mix with Patient Return Interest: Based on Table 6, it can be seen that the elements of the marketing mix that are most associated with the interest in returning patients are people and processes with p = 0.000 <0.05.

Table 6: Recapitulation of Chi Square Test Results Relationship between Marketing Mix Elements with Patient Return Interest

Marketing Mixes	Chi Square Test	
	P (P<0.05)	Outcome
Product	P < 0.002	Related
People	P < 0.000	Related
Process	P < 0.000	Related
Physical Evidence	P < 0.002	Related

Conclusion

The conclusions that can be generated from this study are as follows. Based on the results of the analysis and discussion, there is a relationship between product, people, process and physical evidence with an interest in returning patients to the hospital. Of all the elements of the marketing mix, the people and process elements that are most related to the patient's returning interest. Thus, it is recommended that hospitals to improve or develop the quality of service for patients because over time, service standards will continue to increase along with increasing levels of satisfaction and standards desired by service users.

Acknowledgment

The author would like to thank the Faculty Of Community Health, Hasanuddin University for unconditionally support and funding. The ethical clearance was attained from ArifinNu'mang Hospital. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Rowley J. Information marketing. Routledge; 2016 May 23.
2. Baker MJ, Hart S, editors. The marketing book. Routledge; 2016 Apr 14.
3. Lindgreen A, Hingley MK, Grant DB, Morgan RE. Value in business and industrial marketing: Past, present, and future. Industrial Marketing Management. 2012 Jan 1;41(1):207-14.
4. Goodwin K. Designing for the digital age: How to create human-centered products and services. John Wiley & Sons; 2011 Mar 25.
5. Wünderlich NV, Wangenheim FV, Bitner MJ. High tech and high touch: a framework for understanding user attitudes and behaviors related to smart interactive services. Journal of Service Research. 2013 Feb;16(1):3-20.

6. Fan S, Lau RY, Zhao JL. Demystifying big data analytics for business intelligence through the lens of marketing mix. Big Data Research. 2015 Mar 1;2(1):28-32.

7. Porter ME, Lee TH. The strategy that will fix health care. Harvard business review. 2013 Oct 1;91(10):1-9.

8. Kumar NP, Jacob A, Thota S. Impact of healthcare marketing and branding on hospital services. International Journal of Research Foundation of Hospital & Healthcare Administration. 2014;2(1):19-24.

9. Wu CC. The impact of hospital brand image on service quality, patient satisfaction and loyalty. African Journal of Business Management. 2011 Jun 30;5(12):4873-82.

10. Sreenivas T, Srinivasarao B, SrinivasaRao U. An analysis on marketing mix in hospitals. Int. J. Adv. Res. Manage. Soc. Sci. 2013 Feb;2(4):187-207.

11. Varkevisser M, van der Geest SA, Schut FT. Do patients choose hospitals with high quality ratings? Empirical evidence from the market for angioplasty in the Netherlands. Journal of Health Economics. 2012 Mar 1;31(2):371-8.

12. Moscone F, Tosetti E, Vittadini G. Social interaction in patients' hospital choice: evidence from Italy. Journal of the Royal Statistical Society: Series A (Statistics in Society). 2012 Apr 1;175(2):453-72.

13. Jung K, Feldman R, Scanlon D. Where would you go for your next hospitalization?. Journal of health economics. 2011 Jul 1;30(4):832-41.

14. De Groot IB, Otten W, Dijs-Elsinga J, Smeets HJ, Kievit J, Marang-van de Mheen PJ, CHOICE-2 Study Group. Choosing between hospitals: the influence of the experiences of other patients. Medical decision making. 2012 Nov;32(6):764-78.

15. Zwijnenberg NC, Hendriks M, Bloemendal E, Damman OC, de Jong JD, Delnoij DM, Rademakers JJ. Patients' need for tailored comparative health care information: a qualitative study on choosing a hospital. Journal of medical Internet research. 2016;18(11):e297.

Relationship Analysis between the Quality of Health Services and Patients Satisfaction in Kapasa Health Center Makassar City

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ABSTRACT

Health center is tasked with implementing health policies to achieve health development goals in its working area. By increasing the quality of service, the service function in the health center needs to be improved so that it becomes more effective and efficient and gives satisfaction to patients and the community. The purpose of this study was to determine the relationship between the quality of health services and the satisfaction of patients at the Kapasa City Health Center in Makassar. This research is a quantitative study with a cross sectional study design. The population in this study were 1,956 patients who had used services at the KapasaHealth Center. Sampling using systematic random sampling technique, obtained a sample of 92 respondents. Based on the results of the study indicate that there is a relationship between the dimensions of technical competence ($p = 0.046 < 0.05$), convenience ($p = 0.023 < 0.05$), relations between humans ($p = 0.001 < 0.05$), and timeliness ($p = 0.001 < 0.05$) with patient satisfaction at the Kapasa Health Center, and there was no relationship between the dimensions of access to services ($p = 0.316 < 0.05$) and patient satisfaction at the Kapasa Health Center. Based on the results of these studies it is recommended that Kapasa Health Center retain and/or improve the quality of services that are already good. The puskesmas has more attention to the needs of patients and the environmental conditions of the community health center.

Keywords: *Service quality; patient satisfaction; health center; indonesia*

Introduction

The world report defines the notion of health as a state of physical, mental, and social welfare which is a unity and not only free from disease or disability[1]. Therefore, every element of society, both individuals, families, has the right to obtain services for their health and the government is responsible for proclaiming, regulating the organization and supervision of health services evenly and affordable by the community[2].

Health care is a critical factor in enhancing the wellbeing and prosperity of each individual on the planet. Everybody has the directly to get wellbeing administrations and the legislature is in charge of the accessibility of all types of value, protected, proficient and reasonable wellbeing endeavors by all dimensions of society[3]. One such exertion is to expand the accessibility and value of essential social insurance offices, for example, wellbeing focuses in every locale[4].

Users of health care services demand quality services not only regarding physical illness but also satisfaction with the attitudes, knowledge and skills of officers in providing services and the availability of adequate facilities and infrastructure that can provide comfort[5]. By increasing the quality of service, the service function in the health center needs to be improved so that it becomes more effective and efficient and gives satisfaction to patients and the community. The function of the health centers in providing services to the community is faced with several challenges in terms of increasingly sophisticated human resources and health equipment, but however must continue to provide the best service[5].

Patient satisfaction is considered as a critical factor in medicinal services maintainability. Patient satisfaction identifies with each of the three of the manageability columns[6]. Understanding this factor and its connections enhances manageability contemplations. The essential goal of a healthcare framework is to accomplish a more beneficial populace[6]. Healthcare social maintainability guarantees the present patients get quality administration and tries to adjust the assets and requirements[6].

For users of health services, the quality/quality of services is more related to the responsiveness of officers to meet the needs of patients and the smooth communication

between officers and patients. Several studies has been conducted to evaluate customer's view and satisfaction on the service provided by health centers. Faezipouret al.[7] investigated imperative factors that influences human services with patient fulfillment utilizing a framework elements approach. Lee et al.[8] experimentally tested the impacts of high end frameworks on consumer loyalty, and client faithfulness in social insurance associations. Kessler et al.[9] evaluated patient fulfillment that influences patients to return for future administrations and found that there is a measurably noteworthy connection among fulfillment and return interest. Gallan et al.[10] surveyed how circumstance explicit feelings and patients satisfaction influences the experience of using health center services. Ndubisi et al.[11] inspected the impacts of administration dependability on consumer loyalty and satisfaction in health care conveyance in Malaysia. Kitapci et al.[12] analyzed the effect of administration quality measurements on patient fulfillment, repurchase expectations and verbal correspondence in general society human services industry. Murti et al.[13] work measured the nature of administrations and its results on patient's fulfillment based on the service provided by health center in India. Ramez et al.[14] assessed the dimension of administration nature of medicinal services suppliers in Bahrain with the end goal of revealing, essentially; the connection between administration quality measurements and the general patients' fulfillment and breaking down conduct aim of patient.

Patient satisfaction is related to the quality of health services. If a health institution, one of which is a health center, will make efforts to improve the quality of health services, measurement of the level of patient satisfaction must be done. Through these measurements, it can be known to what extent the quality dimensions of health services that have been held can meet patient expectations.

Thus, to the best knowledge of the authors, there has been very minimal work done in evaluating customer's satisfaction on health centers in Indonesia, in particular on the Kapasa Health Center that located is Tamalanrea District, Makassar City, Indonesia. Hence in this work, The authors were interested in conducting research at the Kapasa Health Center regarding the quality of health care services for patient satisfaction because good service would establish loyalty for patients to reuse the service or at least recommend services received to others who also needed the same service. Therefore, this work reports the relationship between the quality of health services and the satisfaction of patients at the Kapasa City Health Center in Makassar.

Methodology

Types of Research: The type of research used in this study is quantitative research with the cross sectional study approach. The variables in this study consisted of dependent variables, namely patient satisfaction and independent variables which consisted of variables of technical competence, access to services, human relations, timeliness, and comfort.

Location and Time of Research: This research was conducted at the Kapasa Community Health Center which is located in Tamalanrea District, Makassar City, South Sulawesi Province. The research was conducted on March 24 - April 24, 2017.

Population and Samples: The population in this study were all patients who came to visit the Kapasa Health Center, Makassar City, South Sulawesi Province. The computed number of samples in this study was 92 samples.The sampling technique in this study is with using the accidental sampling method.

Data Collection: Primary data is obtained by providing aids in the form of a questionnaire to respondents accompanied by interviews to collect data about patient satisfaction with health care services. Primary data is taken from the results of questionnaires for quantitative data covering five dimensions of quality, namely, technical competence, access to services, comfort, human relations, timeliness and patient satisfaction. Secondary data was investigated by visiting the relevant agencies, namely the Kapasa Health Center to obtain related data.

Data Analysis: Data obtained in the study were then obtained and analyzed using a computer software SPSS. Bivariate analysis was carried out on two variables that allegedly related or correlated. In this study analyzed the relationship of the quality of health care services to the level of satisfaction of patients at the Kapasa Health Center. Data analysis was done by tabulating data and testing hypotheses. Ho will be tested with a significance level of 0.05.

Result and Discussion

Technical Competency Variables with Patient Satisfaction: Based on Table 1, It is known that the number of respondents who said quite good was 83 respondents (90.2%) and respondents who said that good were 9 respondents (9.8%). From these results can be seen respondents feel good and satisfied are 81 respondents (88%) and respondents who feel good and feel quite satisfied are 2 respondents (2.2%).

The results of the statistical test obtained p = 0.046 or p <0.05. Thus Ho is rejected and Ha is accepted. This shows that there is a relationship between the variable technical competence and the satisfaction of patients at the Kapasa Health Center. Thus the outcome of this work which showed technical competence is significant is line with the findings reported by Faezipour[7]. Thus, the increasingly fulfilled technical competence by the health center will lead to higher patient satisfaction.

Table 1: Relationship between Technical Competence and Satisfaction of Patient

Technical Competency	Frequency				Total		P value
	Satisfied		Quite Satisfied				
	n	%	n	%	n	%	
Good	81	88	2	2.2	84	84	0.046
Quite Good	7	7.6	2	2.2	9	116	
Total	88	95.6	4	4.4	92	100	

Access Variables on Services with Patient Satisfaction: Based on Table 2, it is known that the number of respondents who felt good was 66 respondents (71.7%) and respondents who felt quite good were 26 respondents (28.3%). The results of statistical tests obtained p = 0.316 or p> 0.05. Thus Ho is accepted and Ha is rejected. This shows that there is no relationship between the access variable to service and the satisfaction of BPJS patients in Kapasa Health Center. Thus the outcome of this study is inline with the work done by Owusu-Frimpong et al.[15] means that there is no significant relationship between variable access to services with patient satisfaction.

Table 2: Relationship between Access to Services and Patient Satisfaction

Access Variables on Services	Frequency				Total		P value
	Satisfied		Quite Satisfied				
	n	%	n	%	n	%	
Good	64	69.6	2	2.2	66	71.7	0.316
Quite Good	24	26.1	2	2.2	26	28.3	
Total	88	95.7	4	4.4	92	100	

Convenience Variable with Patient Satisfaction: Based on Table 3, it is known that the number of respondents who felt good was 74 respondents (80.4%) and respondents who felt that quite good were 18 respondents (19.6%). The results of the statistical test obtained a value of p = 0.023 or p value <0.05. Thus Ho is rejected and Ha is accepted. This shows that there is a relationship between the convenience variable and the satisfaction of BPJS patients in Kapasa Health Center. Hence, the outcome of this study is inline with the work done by Kitapci et al.[12] means that there is no significant relationship between convenience and patients satisfaction

Table 3: The Relationship between Convenience and Patient Satisfaction

Convenience	Frequency				Total		P value
	Satisfied		Quite Satisfied				
	n	%	n	%	n	%	
Good	73	79.3	1	1.1	74	80.4	0.023
Quite Good	15	16.3	3	3.3	18	19.6	
Total	88	95.7	4	4.4	92	100	

Relationship Between Interpersonal Relations with Patient Satisfaction: Based on Table 4 it is known that the number of respondents who felt good was 85 respondents (92.4%) and respondents who felt was quite good were 7 respondents (7.6%). The results of statistical tests obtained p = 0.001 or p <0.05. Thus Ho is rejected and Ha is accepted. This shows that there is a relationship between variables between human relationships with satisfaction of patients in Kapasa Health Center. Hence, the outcome of this work is inline with the work done by Murti et al.[13] as it was reported that good human relations instill trust and credibility by respecting, keeping secrets, respecting, responsive and attentive between the health care personal and patient.

Table 4: The Relationship Between Interpersonal Relations with Patient Satisfaction

Interpersonal Relations	Frequency				Total		P value
	Satisfied		Quite Satisfied				
	n	%	n	%	n	%	
Good	84	91.3	1	1.1	85	92.4	0.001
Quite Good	4	4.3	3	3.3	7	7.6	
Total	88	95.7	4	4.4	92	100	

Timeliness Variable with Patient Satisfaction: Based on Table 5, it is known that the number of respondents who said good was 85 respondents (92.4%) and respondents who said that they were quite good enough were 7 respondents (7.6%). From these results it can be seen that respondents who say good and feel satisfied are 84 respondents (91.3%) and respondents who say good and feel quite satisfied are 1 respondent (1.1%). While respondents who said they were quite good and felt satisfied were 4 (4.3%) and respondents who said they were quite good and felt quite satisfied were 3 (3.3%). The results of statistical tests obtained p = 0.001 or p <0.05.Thus Ho is rejected and Ha is accepted. This shows that there is a relationship between the timeliness and satisfaction of patients in Kapasa Health Center. The results of this study are in accordance with the theory which states that timeliness is a condition where everything must be done in accordance with the time[12,13].

Table 5: The Relationship between Timeliness and Satisfaction Patient

Timeliness	Frequency				Total		P value
	Satisfied		Quite Satisfied				
	n	%	n	%	n	%	
Good	84	91.3	1	1.1	85	92.4	0.001
Quite Good	4	4.3	3	3.3	7	7.6	
Total	88	95.7	4	4.4	92	100	

Conclusion

Based on the findings of this work regarding the relationship between the quality of health services and the satisfaction patients at the Kapasa City Makassar Health Center, the following conclusion can be drawn. There is a relationship between variables of technical competence, comfort, human relations, timeliness with satisfaction of patients in Kapasa Health Center. However, there is no relationship between the variables of access to services and the satisfaction of patients at the Kapasa Health Center. Thus, it is recommended to the management of the health center to better monitor and analyze community complaints related to access to services so that the services can be improved and satisfy the customers.

Acknowledgment

The author would like to thank the Faculty Of Community Health, Hasanuddin University for unconditionally support and funding. The ethical clearance was attained from Kapasa Health Center. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Beard JR, Officer A, de Carvalho IA, Sadana R, Pot AM, Michel JP, Lloyd-Sherlock P, Epping-Jordan JE, Peeters GG, Mahanani WR, Thiyagarajan JA. The World report on ageing and health: a policy framework for healthy ageing. The Lancet. 2016 May 21;387(10033):2145-54.
2. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. International journal for equity in health. 2013 Dec;12(1):18.
3. Grol R, Wensing M, Eccles M, Davis D, editors. Improving patient care: the implementation of change in health care. John Wiley & Sons; 2013 Mar 18.
4. Coulter A. Engaging patients in healthcare. McGraw-Hill Education (UK); 2011 Sep 1.
5. Balarajan Y, Selvaraj S, Subramanian SV. Health care and equity in India. The Lancet. 2011 Feb 5;377(9764):505-15.
6. Aiken LH, Sermeus W, Van den Heede K, Sloane DM, Busse R, McKee M, Bruyneel L, Rafferty AM, Griffiths P, Moreno-Casbas MT, Tishelman C. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. Bmj. 2012 Mar 20;344:e1717.
7. Faezipour M, Ferreira S. A system dynamics perspective of patient satisfaction in healthcare. Procedia Computer Science. 2013 Jan 1;16:148-56.
8. Lee SM, Lee D, Kang CY. The impact of high-performance work systems in the health-care

industry: employee reactions, service quality, customer satisfaction, and customer loyalty. The Service Industries Journal. 2012 Jan 1;32(1):17-36.

9. Kessler DP, Mylod D. Does patient satisfaction affect patient loyalty?. International journal of health care quality assurance. 2011 May 3;24(4):266-73.
10. Gallan AS, Jarvis CB, Brown SW, Bitner MJ. Customer positivity and participation in services: an empirical test in a health care context. Journal of the Academy of Marketing Science. 2013 May 1;41(3):338-56.
11. Ndubisi NO. Mindfulness, reliability, pre-emptive conflict handling, customer orientation and outcomes in Malaysia's healthcare sector. Journal of Business Research. 2012 Apr 1;65(4):537-46.
12. Kitapci O, Akdogan C, Dortyol IT. The impact of service quality dimensions on patient satisfaction, repurchase intentions and word-of-mouth communication in the public healthcare industry. Procedia-Social and Behavioral Sciences. 2014 Aug 25;148:161-9.
13. Murti A, Deshpande A, Srivastava N. Service quality, customer (patient) satisfaction and behavioural intention in health care services: exploring the Indian perspective. Journal of Health Management. 2013 Mar;15(1):29-44.
14. Ramez WS. Patients' perception of health care quality, satisfaction and behavioral intention: an empirical study in Bahrain. International Journal of Business and Social Science. 2012 Sep 1;3(18).
15. Owusu-Frimpong N, Nwankwo S, Dason B. Measuring service quality and patient satisfaction with access to public and private healthcare delivery. International Journal of Public Sector Management. 2010 Apr 6;23(3):203-20.

Factors Related to Complaints of Low Back Pain in Workers in Pt Maruki International Indonesia Makassar City

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ABSTRACT

Low Back Pain (LBP) is a musculoskeletal disorder that occurs in the lower back caused by various diseases and poor body activities. This study aims to determine the risk factors associated with complaints of low back pain in workers at PT Maruki International Indonesia Makassar City in 2017. This type of research is analytic observation with a cross sectional approach. The sample technique uses 72 purposive sampling. Data analysis was univariate and bivariate using computer programs and using chi square test analysis to determine the relationship between dependent and independent variables. The study found that the prevalence of LBP complaints was felt by 49 workers (68.1%). The results of the analysis of the relationship of each variable with complaints of low back pain are work attitude (p = 0,000), age (p = 0,594), work period (p = 0,010), Body Mass Index (p = 0,036) and smoking habits (p = 0,715). The conclusions of this study are work attitudes, years of service and body mass index have a relationship with complaints of low back pain. While age and smoking habits have no relationship with complaints of low back pain.

Keywords: *Low back pain; worker; risk factor*

Introduction

Much work has been done in recent times with machines, ranging from very simple machines to high-tech machines. On the other hand, it turns out that there is still a lot of work to be done manually in different industries, which requires physical contact. One result of manual work is the emergence of various kinds of health problems, such as back and waist pain, neck tension, wrist pain, arms and legs, eye fatigue and many other complaints[1].

The emergence of various kinds of occupational health issues invited the attention of company managers and many parties outside the companies concerned, such as government and trade unions. This has led to the application of rules on occupational safety and health management systems in the hope that they can overcome or at least reduce the problems of occupational diseases[2].

Occupational disease is an artificial disease because it occurs due to human work. One form of work-related interference, particularly in the industry, is low back pain with different levels of complaints, ranging from mild complaints of pain to severe complaints that cause patients unable to work or carry out activities[3].

The National Safety Council reports that work-related illnesses with the highest frequency of occurrence are back pain with 22% of 1,700,000 cases[4]. Low back pain (LBP) is a musculoskeletal disorder that occurs in the lower back area caused by various diseases and poor body activities. LBP can be either local pain or radicular pain or both[5]. This pain is felt between the corners of the lower ribs to the lower buttocks, namely in the lumbar or lumbosacral region and is often accompanied by spreading pain towards the legs and feet. Generally LBP is short, but the risk of recurrence is very high[6].

LBP is a symptom often described as blunt, deep pain, stiffness, persistent, and radiating to the bottom of the buttocks, legs, and feet. Pain often occurs suddenly in strains (back pain disorders that occur because muscles and ligaments are attracted when lifting heavy objects or sudden movements) or real injuries and sometimes also appear slowly[7].

Several studies have been reported on LBP. Yue et al.[8] explored the predominance of and hazard factors for LBP among secondary teachers. Their investigation demonstrated that LBP was all the more reliably connected with curving stance, awkward back help and delayed sitting and static stance. Durmus et al.[9] assessed

the pervasiveness of work related musculoskeletal pain among educators in Samsun, Turkey and they found that pain in low back locales are every now and again found in instructors and expressed that alterations of ergonomics in working conditions may diminish the torment. Vandergrift et al.[10] analyze the relationship between ergonomic physical and psychosocial exposures and the danger of predominant and occurrence low back torment (LBP) in a longitudinal companion of car fabricating laborers and found that unbalanced back stance, hand drive, physical exertion and entire body vibration were each related cross-sectionally with LBP. Janwantanakul et al.[11] performed a review to recognize chance components for the beginning of low back agony (LBP) in office laborers and found that LBP was caused by few factors such as previous history, work related and psychosocial risk factor. Manchikanti et al.[12] contemplated the pervasiveness of low back pain in adults and found that comorbid factors with mental disarranges and different medicinal issues, including heftiness, smoking, absence of activity, expanding age, and way of life factors, are considered as hazard factors for low back pain. Coenen et al.[13] examined the imminent relationship of combined low back burdens with LBP and found huge affiliation between lifting and working in a flexed stance with LBP. Yu et al.[14] depicts the recurrence of event work related muscle pain among assembly line laborers in Shenzhen, China and found that long work hours, high mental worry at work and past damage history were critical hazard factors for work related pain. Fujii et al.[15] evaluated low back pain (LBP) predominance in a Japanese grown-up populace and found that Smoking, bring down instructive dimension, history of impairing back agony among relatives, word related LBP, traffic damage, repaid work damage, emanating torment and low back medical procedure were related with LBP over a lifetime.Das et al.[16] evaluated the commonness of low back pain (LBP) among brick field workers and found that LBP happened among female laborers because of cumbersome stance and dreary work.

PT Maruki International Indonesia is a branch of a company in Indonesia that exports Butsudan. Butsudan is furniture that serves as a place to respect and communicate with deceased ancestors. Most of the production process still relies on human power, such as wood cutting, refining, gluing, coloring, assembly and packaging. In doing its work, workers always work in a standing position long enough or sit with their backs bent. Working conditions like this force workers to always be in an attitude and position that is not natural that lasts long and settles/static. In addition, some of the seats used do not meet the standards because they do not have a backrest. Such work positions are very risky to cause work risks in ergonomics which can lead to complaints of low back pain. Thus, this work aims to determine the risk factors associated with complaints of low back pain in workers at PT Maruki International Indonesia Makassar City in 2017.

Methodology

Type of Research: The type of research used is observational analytic with the cross sectional approach. The dependent variable in this study is complaints of low back pain and the independent variables are work attitude, age, years of service, body mass index (BMI) and smoking habits.

Time and Location of Research: The study was conducted on January 21-25, 2017. The location of this study was at PT Maruki International Indonesia, Makassar City.

Population and Sample: The population in this study were employees of PT Maruki International Indonesia who worked in a production unit of 300 people divided into six factories. Determine the minimum sample so that this research is valid, the researcher uses the formula from Stanley Lemeshow. Thus, then the sample size computed for this study is 72. This study uses purposive sampling.

Data Collection: Data collection carried out in this study is primary data collection and secondary data. Primary data is data obtained through questionnaire. Secondary data was attained in terms of company profile of PT Maruki International Indonesia Makassar City.

Data Analysis: Data processing was doneusing the SPSS program. Analysis was conducted to determine the relationship of work attitudes, age, years of service, Body Mass Index (BMI) and smoking habits with complaints of low back pain using the Chi Square test. Taking hypothesis acceptance decisions based on a significant level (α value) of 95%. If the value is> 0.05, the research hypothesis is accepted. Conversely, if P value is <0.05, the research hypothesis is rejected.

Result and Discussion

Relationship between Work Attitudes and Low Back Pain Complaints (LBP): The data in Table 1 shows that more workers who experience LBP complaints in collapsing work positions than workers who are classified as job positions are not at risk. When viewed from a working position, workers with more risky work positions experience complaints compared to those who do not experience complaints. The results of data analysis using the fisher exact test obtained a value of p = 0,000 (p <0.05), it can be concluded that Ho is rejected so that there is a relationship of work position with LBP complaints on workers at PT Maruki International Indonesia Makassar City. The outcome of this work is inline with the work done by Das[16] which stated that body posture has a significant effect on LBP.

Table 1: Relationship between Work Attitudes and Low Back Pain Complaints on Workers

Work Attitudes	LBP complaints				Total		P value
	There is a complaint		No complaints				
	n	%	n	%	n	%	
At risk	48	84.2	9	15.8	57	100	0.000
Not at risk	1	6.7	14	93.3	15	1100	
Total	49	68.1	23	31.9	72	100	

Age Relationship with Low Back Pain Complaints (LBP): Based on data in Table 2, results shows that more workers experience LBP complaints in high risk age categories (≥ 35 years) than workers with low risk categories (<35 years). The results of data analysis using the chi square test obtained a value of p = 0.594 (p> 0.05), it can be concluded that Ho is accepted so that there is no relationship of age with complaints LBP on workers at PT Maruki International Indonesia Makassar City. The outcome of this work is inline with the review done by Janwantanakul et al[11] as age had minimal significance with LPB occurrences.

Table 2: Relationships between Age with Low Back Pain Complaints for Workers

Age	LBP complaints				Total		P value
	There is a complaint		No complaints				
	n	%	n	%	n	%	
At risk	35	70	15	30	50	100	0.594
Not at risk	14	63.6	8	36.4	22	1100	
Total	49	68.1	23	31.9	72	100	

Relationship between Years of Service and Low Back Pain Complaints (LBP): Based on the data in Table 3, results shows that more workers experience LBP complaints in the old working period (≥ 5 years) than workers belonging to the new employment period (<5 years). The results of data analysis using the fisher exact test obtained a value of p = 0.010 (p <0.05), it can be concluded that Ho is rejected so that there is a relationship of work period with LBP complaints on workers at PT Maruki International Indonesia Makassar City. The outcome of this work is inline with Yu et al. [14] where it was stated that work period is significant for LBP.

Table 3: Relationship of Years of service with Low Back Pain Complaints For Workers

Years of service	LBP complaints				Total		P value
	There is a complaint		No complaints				
	n	%	n	%	n	%	
Long	46	74.2	16	25.8	62	100	0.010
New	3	30.0	7	70.0	10	1100	
Total	49	68.1	23	31.9	72	100	

Relationship between Body Mass Index (BMI) and Low Back Pain Complaints (LBP): Based on Table 4, results shows that workers who experience complaints are more in the normal BMI category (18.5 - 25) than abnormal BMI (<18.5 or> 25). The results of data analysis using the chi square test obtained a value of p = 0.036 (p <0.05), it can be concluded that Ho is rejected so that there is a relationship between BMI and LBP complaints. The outcome of this work is inline with the work done by Yu et al.[14] as it was reported that although the effect is relatively small, body weight, height and muscle mass are factors that can cause complaints of skeletal muscles pain and LBP.

Table 4: Relationship between Body Mass Index (BMI) and Low Back Pain Complaints (LBP)

BMI	LBP complaints				Total		P value
	There is a complaint		No complaints				
	n	%	n	%	n	%	
Not Normal	19	55.9	15	44.1	34	100	0.036
Normal	30	78.9	8	21.1	38	1100	
Total	49	68.1	23	31.9	72	100	

Relationship between Smoking Habits with Low Back Pain Complaints (LBP): Based on Table 5, results shows that more respondents experienced LBP complaints in the high risk category than the low risk category. The results of data analysis using the chi square test obtained a value of p = 0.715 (p> 0.05), it can be concluded that Ho was accepted so that there was no correlation between smoking habits and LBP complaints in workers at PT Maruki International Indonesia Makassar City. However the outcome of this work was not inline with work done by Fujii et al.[15] where is was said that smoking is a significant factor for LBP.

Table 5: Relationship between of Smoking Habits with Low Back Pain Complaints on Workers

Smoking	LBP complaints				Total		P value
	There is a complaint		No complaints				
	n	%	n	%	n	%	
High Risk	17	65.4	9	34.6	26	100	0.715
Low Risk	32	69.6	14	30.4	46	1100	
Total	49	68.1	23	31.9	72	100	

Conclusion

Based on the results of this work, it can be concluded that work attitudes, years of service, and body mass index (BMI) are associated with complaints of low back pain on workers at PT Maruki International Indonesia Makassar City in 2017. However, age and smoking habits not related to complaints of low back pain to workers at PT Maruki International Indonesia Makassar City in 2017. In addition, the authors recommend that the company managers provide information about ergonomic work positions, make adjustments to work desks and work benches with users and add backs for seats that do not yet have a backrest to avoid LBP.

Acknowledgment

The author would like to thank the Faculty of Community Health, Hasanuddin University for unconditionally support and funding. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Borenstein D, Calin A. Fast facts: low back pain. Karger Medical and Scientific Publishers; 2012 Mar 1.
2. Zanko M, Dawson P. Occupational health and safety management in organizations: A review. International Journal of Management Reviews. 2012 Sep;14(3):328-44.
3. Leigh JP. Economic burden of occupational injury and illness in the United States. The Milbank Quarterly. 2011 Dec;89(4):728-72.
4. Siti R, Zulfia M. Factors affecting low back pain complaint to workers in gravity casting area automotive industry Indonesia. InE3S Web of Conferences 2018 (Vol. 73, p. 06013). EDP Sciences.
5. Hoy D, Bain C, Williams G, March L, Brooks P, Blyth F, Woolf A, Vos T, Buchbinder R. A systematic review of the global prevalence of low back pain. Arthritis & Rheumatism. 2012 Jun;64(6):2028-37.
6. Burström L, Nilsson T, Wahlström J. Whole-body vibration and the risk of low back pain and sciatica: a systematic review and meta-analysis. International archives of occupational and environmental health. 2015 May 1;88(4):403-18.
7. Hooten WM, Cohen SP. Evaluation and treatment of low back pain: a clinically focused review for primary care specialists. InMayo Clinic Proceedings 2015 Dec 1 (Vol. 90, No. 12, pp. 1699-1718). Elsevier.
8. Yue P, Liu F, Li L. Neck/shoulder pain and low back pain among school teachers in China, prevalence and risk factors. BMC public health. 2012 Dec;12(1):789.
9. Durmus D, Ilhanli I. Are there work-related musculoskeletal problems among teachers in Samsun, Turkey?. Journal of back and musculoskeletal rehabilitation. 2012 Jan 1;25(1):5-12.

10. Vandergrift JL, Gold JE, Hanlon A, Punnett L. Physical and psychosocial ergonomic risk factors for low back pain in automobile manufacturing workers. Occup Environ Med. 2012 Jan 1;69(1):29-34.

11. Janwantanakul P, Sitthipornvorakul E, Paksaichol A. Risk factors for the onset of nonspecific low back pain in office workers: a systematic review of prospective cohort studies. Journal of manipulative and physiological therapeutics. 2012 Sep 1;35(7):568-77.

12. Manchikanti L, Singh V, Falco FJ, Benyamin RM, Hirsch JA. Epidemiology of low back pain in adults. Neuromodulation: Technology at the Neural Interface. 2014 Oct;17:3-10.

13. Coenen P, Kingma I, Boot CR, Twisk JW, Bongers PM, van Dieën JH. Cumulative low back load at work as a risk factor of low back pain: a prospective cohort study. Journal of occupational rehabilitation. 2013 Mar 1;23(1):11-8.

14. Yu W, Ignatius TS, Li Z, Wang X, Sun T, Lin H, Wan S, Qiu H, Xie S. Work-related injuries and musculoskeletal disorders among factory workers in a major city of China. Accident Analysis & Prevention. 2012 Sep 1;48:457-63.

15. Fujii T, Matsudaira K. Prevalence of low back pain and factors associated with chronic disabling back pain in Japan. European Spine Journal. 2013 Feb 1;22(2):432-8.

16. Das B. An evaluation of low back pain among female brick field workers of West Bengal, India. Environmental health and preventive medicine. 2015 Sep;20(5):360.

Relationship of Marketing Mixes and Utilization of Dental Poly in KassiKassi Health Center

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ABSTRACT

The success of health services is determined by the management's ability to take advantage of opportunities that exist in the community and manage the existing marketing mix. Thus, this work reports the relationship between Marketing Mix and Utilization of Dental Poly in KassiKassi Health Center. This type of research is quantitative research with an observational analytical approach with Cros Sectional design that aims to determine the relationship of independent variables with dependent variables. As for the variables in this study, namely products, prices, places/locations, promotions, people/health workers, processes, physical facilities and utilization of poly dental services. The population in this study were patients who visited KassiKassi's poly dental services from March to April 2017 were 94 people. Chi-Square and Fisher's analysis test results showed that in this study the variables related to the utilization of dental poly in theKassiKassi Health Center were products (p = 0.00), price (p = 0.00), place/location (p = 0,00), promotion (p = 0,00), persons/health personnel (p = 0,00), and process (p = 0,00). While the variables that are not related to the utilization of dental poly in KassiKassiHealth center are physical facilities (p = 0.019).

Keywords: *Marketing mixes; dental; poly; product; patient*

Introduction

Oral and dental health is an integral part of complete human health, thus efforts in the field of dental health will ultimately play a role in improving the quality and productivity of human resources[1].

According to WHO tooth decay is still a major health problem for most industrialized countries because the problem affects 60% -90% of school-age children and most adults[2]. It has been reported that dental caries is the most common infectious disease in children around the world. Where at the time of entering elementary school: 50% of children suffer from caries[3,4].

The definition of health services is many kinds. In the opinion of health services are any efforts that are held alone or jointly in an organization to maintain and improve health, prevent and cure diseases and restore the health of individuals, families, groups and or communities[5,6]. Health centers need to design marketing programs so that products get a response from the target market. Because it needs tools, so that the program reaches the target[7]. The tool here is a program that can be controlled by the organization, the tool is commonly called the marketing mix[8]. The marketing mix defined as a set of marketing tools used by companies to achieve marketing goals within the target market. Marketing mixes are controlled variables that can be used by companies to influence consumers of certain market segments that the company is aiming for[9].

There are several studies based on marketing mixes for health centres. Purcărea et al.[10] investigated the use Servqual scale to characterize the statistic profiles of social health service users who utilized open administrations in Romania. Elg et al.[11] assessed a model for the procedure of patient co-creation and diverse instruments through which healthcare specialist can gain from the patient. Abedi et al.[12] examinedthe marketing mixes components on patients' inclination to the emergency clinics utilizing diagnostic chain of importance process and found that the principle critical variables were cost, physical resources. benefit, services, individuals and management. Abedi et al.[13] has reviewed the effect of marketing mixes in patients' propensity towards the general population and private clinics in Sari and found that medical cost and staff's administration was noteworthy factor in picking clinic. Hyder et al.[14] presented a review on medicinal services benefit showcasing between Brazil, China and Philippines and

found that treatment, benefit quality and trust was a factor that impacts quiet decisions. Keyvanara et al.[15] evaluated the role of institutions and its marketing strategies on the demand of their products by patients. Yaghoubi et al.[16] displayed a precise survey of elements in influencing medicinal services administrations showcasing in Iran and found that nature of gave administrations, bring down costs, benefit accessibility, as huge variables for health care promotion. Hosseini et al.[17] analyzed the propensity Of patients toward private Clinic and found that individuals, physical proof, effectiveness, profitability and quality are the essential variables for patient in picking a health center.

Thus health care marketing is an overall system of activities - business activities aimed at planning, pricing, promoting, and distributing goods and services that can satisfy the needs of the patients and users. KassiKassi Health Center[18] is a Nursing Health Center and based on the annual KassiKassi Health Center data report, the number of visits in dental polyclinic services in the last three years has decreased, namely in 2013, which was 4,418, in 2014 which was 3,519 and in 2015, 3,259[18].

Based on the description above and in order to improve the utilization of poly dental health services, it is necessary to have a better marketing strategy which will affect patients in utilizing health services at KassiKassi Community Health Center. Therefore, thus, this work has examined the relationship of marketing mixtures with the utilization of dental poly in the KassiKassi health center.

Methodology

Research Design: This study is a quantitative study with an observational analytical approach with a cross sectional design with the intention of identifying the variables to be studied, namely knowing the relationship of the marketing mix with the utilization of dental poly at the KassiKassi Health Center in Makassar City.

Research Location: This research was conducted at the KasiKassi Health Center in Makassar City, South Sulawesi. This research was conducted on 13 March 2017 - 13 April 2017.

Population and Sample: The population in this study was a dental poly patient at the KassiKassi Community Health Center, Makassar City. As for the number of dental poly patients in 2015, 3259 patients.The sample in this study is the patient in Makassar's KassiKassi Community Health Center utilizing dental poly services. The sample size of this work is n=94.

Data Collection: Primary data is obtained by directly visiting respondents who are in the KassiKassi Health Center. The tool used is using a questionnaire by giving a set of questions or written statements to the respondent to answer. Secondary data was obtained from documents and reports of patients visit with dental and oral diseases at KassiKassi health center.

Data Analysis: In this study, bivariate analysis was used to determine the relationship between the marketing mix and the use of dental poly using the SPSS program with Chi-Square and Fisher statistical tests.

Result and Discussion

Relationship between Product with the Usage of Dental Poly: Based on Table 1, result shows that of the 94 respondents who stated good products and used dental poly services were 70 respondents (100%) and those who stated good and not utilizing were 0 respondents (0%). The results of statistical tests using Fisher obtained a value of p = 0.00 <0.5 so Ho was rejected and Ha was accepted. This shows that there is a relationship between the product and the utilization of poly dental services at KassiKassi Health Center. The outcome of this work is inline with Hosseiniet al.[17] that showed product is a significant factor.

Table 1: Relationship between Product with the Utilization of Dental Poly

Product	Utilization of Dental Poly				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	70	100	0	0.0	70	100	0.000
Not Good	4	16.7	20	83.3	24	1100	
Total	74	78.7	20	21.3	94	100	

Relationship between Price with Utilization of Dental Poly: Based on Table 2, result showed that shows that of the 94 respondents who stated that the price is good and utilizing dental poly services were 69 respondents (93.2%) and those who stated that they were good and did not use were 5 respondents (25.5%). The results

of statistical tests using Fisher obtained a value of p = 0.00 <0.5 so Ho was rejected and Ha was accepted. This shows that there is a relationship between price and utilization of poly dental services at KassiKassi Health Center. The outcome of this work is inline with Abedi et al.[13] that showed price is a significant factor.

Table 2: Relationship between Pricewith the Utilization of Dental Poly

Price	Utilization of Dental Poly				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	69	93.2	5	25.5	74	100	0.000
Not Good	5	6.8	15	75.0	20	1100	
Total	74	100	20	100	94	100	

Relationship between Place with Utilization of Dental Poly: Based on Table 3, result showed that of the 94 respondents who stated that the place/location was affordable and utilizing dental poly services were 72 respondents (100%) and those who stated that they were good and did not use were 0 respondents (0.0%). The results of statistical tests using Chi Square obtained a value of p = 0.00 <0.5 so Ho was rejected and Ha was accepted. This shows that there is a relationship between place/location and utilization of poly dental services at KassiKassi Health Center. The outcome of this work is inline with Abedi et al.[12] that showed place is a significant factor.

Table 3: Relationship between Place with the Utilization of Dental Poly

Place	Utilization of Dental Poly				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Affordable	72	100	0	0.0	72	100	0.000
Not Affordable	2	9.1	20	90.9	22	1100	
Total	74	100	20	100	94	100	

Relationship between Promotion with Utilization of Dental Poly: Based on Table 4, results shows that of the 94 respondents who stated that promotion and utilizing dental poly services were 69 respondents (100%) and those who stated that they were good and not utilizing were 0 respondents (0.0%). The results of statistical tests using Chi Square obtained a value of p = 0.00 <0.5 so Ho was rejected and Ha was accepted. This shows that there is a relationship between promotion and utilization of poly dental services at KassiKassi Health Center. The outcome of this work is inline with Hosseini et al.[17] that showed promotion is a significant factor.

Table 4: Relationship between Promotion with the Utilization of Dental Poly

Promotion	Utilization of Dental Poly				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	69	100	0	0.0	69	100	0.000
Not Good	5	20.0	20	80	25	1100	
Total	74	100	20	80	94	100	

Relationship between People with Utilization of Dental Poly: Based on Table 5, result showed that out of 94 respondents who stated that people/health personnel and utilizing dental poly services were 73 respondents (92.4%) and those who stated that they were good and did not use as much as 6 respondents (7.6%). The results of statistical tests using Fisher obtained a value of p = 0.00 <0.5 so Ho was rejected and Ha was accepted. This shows that there is a relationship between people/health workers with the utilization of poly dental services at KassiKassiHealth Center. The outcome of this work is inline with Abedi et al.[13] and Hosseini et al.[17] that showed people and health personnel is a significant factor.

Table 5: Relationship between People with the Utilization of Dental Poly

People	Utilization of Dental Poly				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	73	92.4	6	7.6	79	100	0.000
Notgood	1	6.7	14	93.3	15	1100	
Total	74	100	20	100	94	100	

Relationship between Process with Utilization of Dental Poly: Based on Table 6, results shows that of the 94 respondents who stated that the health process and utilizing dental poly services were 69 respondents (98.6%) and those who said that they were good and not utilizing were 1 respondent (1.4%). The results of statistical tests using Chi Square obtained a value of p

= 0.00 <0.5 so Ho was rejected and Ha was accepted. This shows that there is a relationship between the health process and the utilization of poly dental services at KassiKassi Health Center. The outcome of this work is inline with Abedi et al.[12] that showed process is a significant factor.

Table 6: Relationship between Process with the Utilization of Dental Poly

Process	Utilization of Dental Poly				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	69	98.6	1	1.4	79	100	0.000
Not good	5	20.8	19	79.2	24	100	
Total	74	100	20	100	94	100	

Relationship between Physical Facilities with Utilization of Dental Poly: Result showed that of the 94 respondents who stated that the health process and utilizing dental poly services were 70 respondents (82.4%) and those who stated that they were good and did not use as many as 15 respondents (17.6%). The results of statistical tests using Fisher obtained a value of p = 0.08> 0.5 so Ho was accepted and Ha was rejected. This shows that there is no relationship between physical facilities and the utilization of poly dental services at KassiKassi Health Center.

Conclusion

Based on the results of the analysis of the study, there is a relationship between the product, price, place, promotion, people, and process with the utilization of dental poly in the KassiKassi Health Center in Makassar City. However, there is no relationship between physical facilities and the utilization of dental poly at the KassiKassi Health Center in Makassar City with a value of p = 0.019. Thus, it is recommended to KaasiKaasi Health center to further improve health services, especially in dental polyclinics and health centers, that are more likely to maintain products, prices, promotions, processes.

Acknowledgment

The author would like to thank the Faculty of Community Health, Hasanuddin University for unconditionally support and funding. The ethical clearance was attained from KassiKassi Health Center. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Daly B, Batchelor P, Treasure E, Watt R. Essential dental public health. OUP Oxford; 2013 May 23.
2. Oredugba F, Agbaje M, Ayedun O, Onajole A. Assessment of mothers' oral health knowledge: Towards oral health promotion for infants and children. Health. 2014 Apr 2;6(10):908.
3. Simón-Soro A, Mira A. Solving the etiology of dental caries. Trends in microbiology. 2015 Feb 1;23(2):76-82.
4. Vujicic M, Nasseh K. A decade in dental care utilization among adults and children (2001–2010). Health services research. 2014 Apr;49(2):460-80.
5. Bowling A. Research methods in health: investigating health and health services. McGraw-hill education (UK); 2014 Jul 1.
6. Evans RG, Stoddart GL. Producing health, consuming health care. Why are some people healthy and others not. 1994:27-64.
7. Lefebvre RC. Social marketing and social change: Strategies and tools for improving health, well-being, and the environment. John Wiley & Sons; 2013 Jan 18.
8. Schenker Y, Arnold RM, London AJ. The ethics of advertising for health care services. The American Journal of Bioethics. 2014 Mar 1;14(3):34-43.
9. Baker MJ. Marketing strategy and management. Macmillan International Higher Education; 2014 Dec 5.
10. Purcărea VL, Gheorghe IR, Petrescu CM. The assessment of perceived service quality of public health care services in Romania using the SERVQUAL scale. Procedia Economics and Finance. 2013 Jan 1;6:573-85.

11. Elg M, Engström J, Witell L, Poksinska B. Co-creation and learning in health-care service development. Journal of Service Management. 2012 Jun 22;23(3):328-43.

12. Abedi G, Abedini E. Prioritizing of marketing mix elements effects on patients' tendency to the hospital using analytic hierarchy process. International Journal of Healthcare Management. 2017 Jan 2;10(1):34-41.

13. Abedi G, Rahmani Z, Abedini E, Rostami F. Surveying the impact of services marketing mix components (7Ps) on patients' disposition towards the public & private hospitals of Sari City. Journal of Hospital. 2015 Mar 15;13(4):63-71.

14. Hyder AS, Fregidou-Malama M. Health care services marketing of Swedish innovation–a comparative study. InThriving in a New World Economy 2016;318-324. Springer, Cham.

15. Keyvanara M, Karimi S, Khorasani E, JafarianJazi M. Are Health Institutions Involved In Health Care Induced Demand?(A Qualitative Study). PayavardSalamat. 2014 Aug 1;8(4).

16. Yaghoubi M, Rafiei S, Khosravizadeh O, Mirbahaeddin E, Jalilvand M, Sarkhosh S, Ranjbar M. A systematic review of factors influencing healthcare services marketing in Iran. Bali Med J. 2017 Jan 1;6:268-78.

17. Hosseini SM, Etesaminia S, Jafari M. Identifying eleven factors of service marketing Mix (4Ps) effective on tendency of patients toward private hospital. Materia socio-medica. 2016 Oct;28(5):366.

18. Putri A, Arsin A, Dwinata I. Behavioral Prevention of Family Toward Typhoid FEVER Among Children in Kassi-Kassi Public Health Center Working Area at Makassar City 2014-2015. InProceedings of the International Conference on Healthcare Service Management 2018. 2018 Jun 8;208-211. ACM.

Factors Related to the Fatigue in Workers in the Cargo Unit of Pt. AngkasaPura Logistic Makassar

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ABSTRACT

Fatigue showed different condition to each individual that can lead to loss of efficiency and a reduction in work capacity and endurance. In this work, the fatigue in of workers in the cargo unit of Pt. AngkasaPura Logistic Makassarwas analyzed. This work is an observational analytic with cross sectional study aimed to determine the relationship of age, energy intake, workload, and work attitude with fatigue in workers in cargo unit. The number of samples were 51 people. Questionnaire was utilized for data collection. SPSS program was used for data analysis. The results showed that there was a relationship between age P = 0.004 (p <0.05), the workload of p = 0.004 (p <0.05), energy intake P = 0.004 (P <0.05) and workload of P = 0.000 (P <0.05) with fatigue workers. Based on the result of research that has been done can be concluded that there is relationship between age, workload, energy intake and work attitude with fatigue in cargo unit at the PT. AngkasaPura LogisticMakassar in 2017.

Keywords: *Fatigue work; cargo unit; workers; load*

Introduction

Technological advances have raised standards and quality of human life better through increased production and work productivity[1]. On the other hand, technological advances have also resulted in a variety of adverse impacts, namely in the form of an increase in environmental pollution, workplace accidents and the emergence of various kinds of occupational diseases[2]. Overcoming these problems requires a high performance of human resources[3].

Besides the increasingly sophisticated aspects of technology, the progress of industrialization in the world cannot be separated from the role of labor. Labor is an asset for companies in work activities[4]. Activities carried out in the form of physical and mental activity. Work capacity that is not in accordance with the workload carried out will speed up someone feeling tired. Labor has a role and position that is very important as an actor and development goal[5]. The involvement of humans, especially labor in the development process is increasing[6].In order for workers to be healthy and productive, the role of occupational health and safety becomes increasingly important. The purpose of occupational health is to create a healthy and productive workforce. This goal can be achieved if supported by a work environment that meets health requirements[7].

Problems that involve the workforce if not addressed immediately will cause physical fatigue as a result of short-term and psychological fatigue as a result of its long-term[8]. Physical fatigue is characterized by weak body muscles, difficult to move and sometimes accompanied by pain and dizziness. This is usually caused by the weight of the workload, the length of sitting, the length of use of certain physical parts such as hands, feet, eyes, and ears[8]. Continuing without treatment for recovery, such as exercise, can cause a decrease in stamina, easy emotions, lazy work and difficulty sleeping[9].

Fatigue is a condition that is accompanied by a decrease in efficiency and endurance at work. Fatigue shows different conditions of each individual, but all lead to loss of efficiency and decrease in work capacity and fatigue is a mechanism for protecting the body so that the body avoids further damage, resulting in recovery[10].

Studies has been reported on work fatigue analysis and its outcome. Fernandes-Junior et al.[11] evaluated the rest time, weakness and personal satisfaction of night shift workers and confirmed the connection between these factors with the presence or absence of kids in various age, and found that laborers without kids had higher rest time amid the working days. These laborers

additionally were more averse to feel exhausted amid night work than workers with kids. Pinetti et al.[12] analysed if the fatigue of the workers can be reduced with exercise and ergonomic conditions and found that workers whom performed exercise showed less fatigue compared to those who did not exercise. Yu et al.[13] analyzed the work fatigue of workers in the furniture industry using simulation software and found that improved ergonomics and work flow reduces the fatigue of the workers. Lee et al.[14] decided the burdensome manifestations and their relationship with rest quality, word related pressure and fatigue among the workers and found that workload contributed to fatigue and depression. Gell et al.[15] broke down the hazard factors for lower extremity fatigue among industry workers and found that fatigue among workers was related with a higher pervasiveness of smoking, rheumatoid joint inflammation and work dissatisfaction. Thomas et al.[16] examined the empathy fatigue among clinical social specialists and found that higher individual pain is related with higher sympathy fatigue among the clinical labourers. Hwang et al.[17] studied the impacts of rest quality, discouragement and fatigue on occupation stress of geriatric medical clinic specialists and found that the most dominant indicator of employment stress was fatigue. Wang et al.[18] inspected the mental and physiological fatigue variety in airline maintenance laborers and found that enhancing workplaces may additionally diminish the apparent exhaustion of maintenance crew. Hébert et al.[19] evaluated rest, light introduction designs, social rhythms, and business related fatigue of student workers and found that absence of rest lead to the weariness in student workers.

PT. AngkasaPuraLogistik is a company engaged in logistics in Indonesia. Work processes in cargo units include receiving goods, weighing goods, making/ checking transport documents, storing goods in warehouses until the time is put into cargo compartment aircraft, withdrawal of goods from warehouse to aircraft and vice versa, a series of work processes carried out by these workers can lead to fatigue in workers that can affect productivity. Thus in this work, the fatigue in workers in the cargo unit Pt. AngkasaPura Logistic Makassar was analyzed. The purpose of this study was to determine the factors associated with work fatigue in workers in the cargo unit.

Methodology

Types of Research: The type of research used is an observational analytic study with a cross sectional study approach, which aims to see the relationship of independent variables to the dependent variable, namely the relationship of age, energy adequacy, workload and work attitude to workers in the cargo unit of PT. AngkasaPura Logistic Makassar.

Time and Location of Research: This research was conducted in January - February 2017 located in the cargo unit of PT. AngkasaPura Logistic Makassar.

Population and Sample: The population in this study were all workers in the cargo unit of PT. AngkasaPuraLogistic Makassar. The number of samples computed was 51 people who are all workers in the cargo unit of PT. AngkasaPura Logistic. The sampling technique is using simple random sampling technique.

Data Collection: The data used in this study comprised of primary data and secondary data. Primary data was collected through questionnaire that was distributed to the samples. Secondary data obtained from the General Manager of PT. AngkasaPura Logistic in the form of data on company profiles, work processes and data on the number of workers in the cargo unit.

Data Analysis: Data analysis performed using SPSS. The data analysis model performed is Bivariate analysis was performed on two variables that were suspected to be related. Data analysis was performed using statistical tests namely Chi Square.

Result and Discussion

Age Relationships with Work Fatigue: Based on this work, the data obtained regarding the relationship of age with work fatigue and it cross tabulation can be seen in Table 1. Result in Table 1 shows that the percentage of respondents who experience more fatigue in workers with a decreased physical resistance category (> 25 years) is 21 workers (77.8%) compared to workers with good physical resistance (≤ 25 years) are 5 workers (20.8%). While the percentage of respondents who did not experience fatigue, most of the workers including the category of good physical security (≤ 25 years) were 19 workers (79.2%) while workers with decreased physical resilience (> 25 years) were only 6 workers (22.2%). Based on data analysis using the chi-square test, the

value of p = 0.000 (p <0.05) means that Ho is rejected and Ha is accepted, so it can be interpreted that there is a relationship between age and the occurrence of work fatigue in the cargo unit of PT. AngkasaPura Logistic Makassar.

Table 1: Relationship between Age and Work Fatigue for Workers

Age	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Decreased Physical Resilience (> 25 years old)	21	77.8	6	22.2	27	100	0.000
Good Physical Resilience (Age ≤ 25 years)	5	20.8	19	79.2	24	100	
Total	26	51	25	49	51	100	

Relationship between Workload and Fatigue: Based on this work, the data obtained regarding the relationship of age with work fatiguecan be seen in Table 2. Results in Table 2 shows that the majority of respondents who experienced fatigue were workers with a heavy workload of 23 people (74.2%) compared to workers with a light workload of 3 people (15.0%). While the majority of the respondents who did not experience fatigue were workers with a light workload of 17 workers (85%) compared to workers with a heavy workload of 8 workers (25.8%).Based on data analysis using the Fisher Exact Test, the value of p = 0.000 (p <0.05) means that Ho is rejected and Ha is accepted, so that it can be interpreted that there is a relationship between workload and work fatigue in the cargo unit of PT. AngkasaPura Logistic Makassar.

Table 2: Relationship between Workload and Work Fatigue for Workers

Work load	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Weight (≥100 beats/minute)	23	74.2	8	25.8	31	100	0.000
Mild (<100 beats/minute)	3	15	17	85	20	100	
Total	26	51	25	49	51	100	

Relationship between Energy Intake and Fatigue: Based on this work, the data obtained regarding the relationship of energy intake with work fatigue. can be seen in Table 3. Results in Table 3 shows that the percentage of respondents who experience more fatigue in workers with an energy intake that does not meet is 20 people (74.1%) compared to workers with fulfilling energy intake is 6 people (25.0%). While the percentage of respondents who did not experience more fatigue in workers with an energy intake category that fulfilled was 18 workers (75%) compared to workers with fulfilling energy intake were 7 workers (25.9%). Based on data analysis using the chi-square test, the value of p = 0.000 (p <0.05) means that Ho is rejected and Ha is accepted, so it can be interpreted that there is a relationship between energy intake and work fatigue in workers in the cargo unit of PT. AngkasaPura Logistic Makassar.

Table 3: Relationship between Energy Intake and Fatigue in Workers

Energy	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Does not Meet	20	74.1	7	25.9	27	100	0.000
Meets	6	25	18	75	24	100	
Total	26	51	25	49	51	100	

Relationship between Work Attitudes and Fatigue: Result in Table 4 shows that the percentage of respondents who experience more fatigue in workers with non-ergonomic work attitudes is 24 workers (85.7%) compared to workers with ergonomic work attitudes as much as 2 workers (8.7%). While the percentage of respondents who did not experience more fatigue in workers with

ergonomic work attitudes was 21 workers (91.3%) compared to workers with non-ergonomic work attitude were 4 workers (14.3%). Based on the data analysis using Fisher's Exact Test, the value of p = 0.000 (p <0.05) means that Ho is rejected and Ha is accepted, so that it can be interpreted that there is a relationship between work attitudes and work fatigue in workers in the cargo unit PT. AngkasaPura Logistic Makassar.

Table 4: Relationship between Work Attitudes and Work Fatigue for Workers

Work Attitude	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Not ergonomic	24	85.7	4	14.3	28	100	0.000
Ergonomic	2	8.7	21	91.3	23	100	
Total	26	51	25	49	51	100	

Conclusion

Based on the results of the research and analysis of the variables studied about factors related to work fatigue in workers in the cargo unit of PT. AngkasaPura Logistic Makassar, conclusions can be drawn as follow. There is a relationship between age, workload, energy intake and work attitude with work fatigue on workers in the cargo unit of PT. AngkasaPura Logistic Makassar. Thus, it is recommended that the management of the company needs to conduct training for workers regarding ergonomic work attitudes when carrying out work activities primarily on workers who lift, pull and move goods because they have a heavier workload and improve the overall work output and reduce fatigue.

Acknowledgment

The author would like to thank the Faculty of Community Health, Hasanuddin University for unconditionally support and funding. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Peet R, Hartwick E. Theories of development: Contentions, arguments, alternatives. Guilford Publications. 2015 May 7.
2. Brynjolfsson E, McAfee A. The second machine age: Work, progress, and prosperity in a time of brilliant technologies. WW Norton & Company. 2014 Jan 20.
3. Armstrong M, Taylor S. Armstrong's handbook of human resource management practice. Kogan Page Publishers. 2014 Apr 3.
4. De Stefano V. The rise of the just-in-time workforce: On-demand work, crowdwork, and labor protection in the gig-economy. Comp. Lab. L. &Pol'y J.2015;37:471.
5. Neff G. Venture labor: Work and the burden of risk in innovative industries. MIT press. 2012 Apr 6.
6. Ghai D, Vivian JM. Grassroots environmental action: people's participation in sustainable development. Routledge. 2014 Jan 14.
7. Hymel PA, Loeppke RR, Baase CM, Burton WN, Hartenbaum NP, Hudson TW, McLellan RK, Mueller KL, Roberts MA, Yarborough CM, Konicki DL. Workplace health protection and promotion: a new pathway for a healthier—and safer—workforce. Journal of occupational and environmental medicine. 2011 Jun 1;53(6):695-702.
8. Lerman SE, Eskin E, Flower DJ, George EC, Gerson B, Hartenbaum N, Hursh SR, Moore-Ede M. Fatigue risk management in the workplace. Journal of Occupational and Environmental Medicine. 2012 Feb 1;54(2):231-58.
9. Smolders KC, de Kort YA. Bright light and mental fatigue: Effects on alertness, vitality, performance and physiological arousal. Journal of environmental psychology. 2014 Sep 1;39:77-91.
10. Hockey R. The psychology of fatigue: Work, effort and control. Cambridge University Press. 2013 May 16.
11. Fernandes-Junior SA, Ruiz FS, Antonietti LS, Tufik S, de Mello MT. Sleep, fatigue and quality of life: A comparative analysis among night shift workers with and without children. PloSone. 2016 Jul 8;11(7):e0158580.

12. Pinetti AC, Mercer NC, Zorzi YA, Poli F, Nogiri E, Lima AC, Oliveira MR. Impact of Exercise and Ergonomics on the Perception of Fatigue in Workers: A Pilot Study. InCongress of the International Ergonomics Association. Springer, Cham. 2018 Aug 26;3-7.

13. Yu N, Guo J, Hong L, Wu P, Li J. Study on Fatigue of Workers in the Row Drilling Operation of Furniture Manufacturing Based on Operational Energy Efficiency Analysis. InInternational Conference on Man-Machine-Environment System Engineering. Springer, Singapore. 2018 Oct 20;57-64.

14. Lee MR. Relationship between occupational stress and depression of construction workers. Korean Journal of Occupational Health Nursing. 2011;20(3):279-88.

15. Werner RA, Gell N, Hartigan A, Wiggermann N, Keyserling WM. Risk factors for foot and ankle disorders among assembly plant workers. American journal of industrial medicine. 2010 Dec;53(12):1233-9.

16. Thomas J. Association of personal distress with burnout, compassion fatigue, and compassion satisfaction among clinical social workers. Journal of Social Service Research. 2013 May 1;39(3):365-79.

17. Hwang EH. Influence of sleep quality, depression and fatigue on job stress of geriatric hospital workers. Journal of the Korea Academia-Industrial cooperation Society. 2015;16(8):5413-21.

18. Wang TC, Chuang LH. Psychological and physiological fatigue variation and fatigue factors in aircraft line maintenance crews. International Journal of Industrial Ergonomics. 2014 Jan 1;44(1):107-13.

19. Martin JS, Hébert M, Ledoux É, Gaudreault M, Laberge L. Relationship of chronotype to sleep, light exposure, and work-related fatigue in student workers. Chronobiology international. 2012 Apr 1;29(3):295-304.

Relationship of Climate Factors with Diarrhea Evaluation in City of Makassar

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ABSTRACT

Diarrhea is still a public health problem in developing countries like Indonesia. Environment is one of the determinants of the occurrence of diseases due to uncertain climate change. The purpose of this study was to determine the relationship of climate factors (air temperature, humidity, and rainfall) with the incidence of diarrhea in Makassar City. This study used an ecological study design with univariate and bivariate analysis. Bivariate analysis using correlation analysis. The study sample is the number of months in five years from 2011-2015, which is 60 months. Univariate results show that the average air temperature of Makassar City in 2011-2015 has increased every year, while humidity and rainfall in general have decreased. The results of bivariate analysis showed that there was a relationship between humidity (p = 0,000; r = 0,501) and rainfall (p = 0,001; r = 0,429) with the incidence of diarrhea in Makassar City in 2011-2015 with a moderate strength relationship. While the temperature variable has no relationship with the incidence of diarrhea in Makassar City in 2011-2015 (p = 0.113).

Keywords: *Air Temperature; Humidity; Rainfall; Diarrhea*

Introduction

Humans as living beings are very dependent on the environment for their survival[1]. An easy example, living things need an environment to live in and fulfill their metabolic needs. Therefore, living things have a very close relationship with nature. Right now our nature is being hit by uncertainty about weather and climate or what is called climate change[2].

Climate change or better known as global warming is often considered the same, but has different meanings[3]. Because climate parameters are not hot, there are other parameters such as rainfall, cloud conditions, wind, and sunlight radiation. The occurrence of climate change is inseparable from natural factors and the consequences of human activities[3]. Climate change occurs due to an increase in greenhouse gases. The increase in greenhouse gases is predominantly caused by industry, especially in the fields of forestry, peat land, waste, agriculture, transportation, and energy[4]. Increased greenhouse gases have an effect that will accelerate the process of global warming and increase the frequency of extreme weather events[2-4].

The current global environmental problem is the increase in greenhouse gas (GHG) emissions, especially carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)[5]. Changes in composition of some of these gases will lead to climate change. This causes the conditions on the surface of the earth to become unstable[6]. The temperature on the earth's surface is increasing and it is estimated that in 2020 the increase in earth's temperature can be 2°C[7].

The greenhouse effect occurs because the sun's rays in the atmosphere vibrate the molecules of greenhouse gases so that the solar radiation energy is absorbed by the molecule. The energy of solar radiation that should be reflected back into space. The presence of greenhouse gases, the solar radiation energy is held in the atmosphere and causes an increase in the temperature of the earth[6,7].

Global climate change affects human health through varied and complex roads, in different scales and time frames. Some of the diseases that have increased due to climate change include mosquito-borne diseases that can cause dengue fever, malaria, chikungunya, and others[8]. Diseases due to increased environmental temperature and pollutants result in acute respiratory infections, malnutrition to malnutrition, heart disease, respiratory diseases, asthma, allergies, and other chronic pulmonary diseases[8]. Then the lack of availability of clean water results in diarrhea and skin diseases.

Water is one of the most important components in the survival of human life and other living things[9]. Water has the ability or direct influence on humans, especially human health. The health effects depend heavily on the quality of water used and water can also function as a distributor or spreader of diseases[9]. Diseases transmitted through water are called waterborne disease. The occurrence of an illness certainly requires agents and sometimes vectors[9].

The causes of diarrhea diseases vary, can be caused by a virus, where the virus attaches to the surface of the intestinal mucous cells and causes damage to the intestinal cells. Absorption of the intestine decreases and the release of water and electrolytes increases[8,9].

Several studies has been reported on association of climate change and diarrhea. Chou et al.[10] explored and evaluated the connection between climate changes and diarrhea related issue in Taiwan where it dissected the neighbourhood climatic factors and the quantity of diarrhea related contamination cases. Moors et al.[11] evaluated the effect of environmental change on diarrhea as a delegate of a waterborne irresistible ailment influencing human wellbeing in the Ganges bowl of northern India. Alexander et al.[12] assessed month to month reports of diarrheal ailment among patients showing to Botswana wellbeing offices and contrasted this with climatic factors. Kolstad et al.[13] demonstrate a strategy to evaluate a scope of conceivable wellbeing effects of environmental change on diarrhea while taking care of vulnerabilities in an unambiguous way. Phung et al.[14] assessed the diarrhea and climate change relationship in Can Tho city, Mekong Delta region in Vietnam where waterborne infection frequently takes place. Levy et al.[15] reviewed of connections between Diarrheal Diseases and Temperature, Rainfall, Flooding, and Drought brought about by environmental change. Xu et al.[16] utilized the information on satellite remote detecting temperature and dissected the impact of temperature on children diarrhea. Wu et al.[17] analyzed the logical confirmations on the effect of environmental change on human irresistible illnesses and how human culture may react to, adjust to, and plan for the related changes. Bhandari et al.[18] evaluated the connection between climatic factors, and jungle fever and discovered the scope of non-climatic variables that can frustrate the relationship of environmental change and human wellbeing.

Based on diarrheal disease data in the Makassar City Health Office in 2015, through recording and reporting on morbidity from year to year it was found that diarrhea was among the highest ten diseases in Makassar in 2011 with 37,940 cases, in 2012 it dropped to 29,265 cases, in 2013 as many as 28,908 cases, in 2014 there were 26,485 cases and increased again in 2015 by 28,257 cases according to gender. Thus in this study was done to evaluate the relationship of climate factors (air temperature, humidity, and rainfall) to the incidence of diarrhea in Makassar City in 2011 - 2015.

Methodology

Research Concept Framework: In this concept framework consists of independent variables and dependent variables. This research was carried out based on framework as shown in Figure 1. The independent variable of this work is air temperature, humidity and rainfall. The dependent variable of this work is diarrhea events.

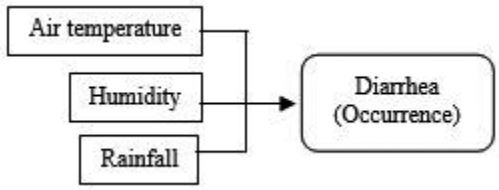


Figure 1: Conceptual framework

Type of Research: This research is a time series study of time is a study design that is used to see the relationship of the frequency of morbidity or mortality due to a disease that occurs in the community over time. While based on the level of analysis this study uses correlation analysis methods

Time and Location of Research: The research location is in the Makassar City area, with 14 sub-districts. The location was used as the location of the study taking into account that diarrhea cases were among the 10 highest diseases in Makassar City. The timing of data collection and processing is carried out during January-February 2017.

Population and Samples: The population in this study is the number of months in the period 2011-2015 from the data that will be used, namely data on air temperature, rainfall, air humidity, and the incidence of diarrhea. The sample in this study was the number of months in the five-year period namely in 2011-2015 which was namely 60 months. In this study total sampling was carried out because the population was taken all for analysis.

Data Collection: The data used in this research is secondary data. Data collection of diarrheal diseases was carried out by taking secondary data from the Makassar City Health Office. Diarrhea data contains all sub-districts in Makassar City. While data on climate factors (air temperature, humidity, and rainfall,) were obtained from the Office of the Meteorology and Geophysics Agency of Region IV Makassar in the form of monthly reports during 2011-2015.

Data Analysis: Climate data and diarrhea case data are obtained in the form of monthly data were processed using SPSS software. Statistically bivariate analysis using correlation was done to analyze the degree or closeness of the relationship between climate factors including air temperature, humidity, and rainfall with diarrhea cases in Makassar City and find out the relationship between two variables. Correlation test was done to determine the correlation coefficient (r), while the correlation requirements are interval/ratio data scale and normally distributed data. The correlation coefficient that has been produced is the first step to explain the degree of linear relationship between two variables. Then test the hypothesis to find out whether the relationship between the two variables is significant.

Result and Discussion

Normality Test: One of the correlation test requirements is that the data must be normal. Based on the table below for data on air temperature, humidity, and prevalence of diarrhea having normal data because p value> $\alpha = 0.05$. While for rainfall data has abnormal data so that the spearman correlation test is used. This can be seen in the following Table 1.

Table 1: Data Normality Test

Variable	p value
Air temperature	0.200
Humidity	0.76
Rain Fall	0.00
Diarrhea prevalence	0.61

Relationship between air temperature and diarrhea incidence rate: The correlation test results between the air temperature and the incidence of diarrhea in Makassar City in 2011 – 2015is shown in Table 2. Thus results shows that the average monthly temperature with the incidence of diarrhea cases shows a weak relationship (r = -0,196) with a negative pattern that can be interpreted as higher average In fact, fewer cases of diarrhea occur. The results of further statistical tests also explain that the insignificant relationship between temperature and incidence of diarrhea cases with (p = 0.113) is greater than $\alpha = 0.05$. This means that there is no significant relationship between air temperature and the incidence of diarrhea in Makassar City in 2011 - 2015. Thus the outcome of this work is inline with the work done by Levy et al.[15] which reported that temperature has minimal influences on the occurrence of diarrhea.

Table 2: Relationship between Average Temperature and Diarrhea Incidence Rate

Variable	r	p value
Temperature	-0.196	0.113

Relationship between humidity with the incidence of diarrhea: The correlation between humidity and diarrhea incidence in Makassar City in 2011 - 2015 is shown in Table 3. Results shows that the average monthly humidity with diarrhea cases shows a moderate relationship (r = 0.501) with a positive pattern that can mean greater humidity, the greater also the number of cases of diarrhea. The results of further statistical tests also show that the relationship between humidity has a significant relationship (p = 0,000) greater than $\alpha = 0.005$ for the incidence of diarrhea cases in Makassar City. Thus the outcome of this work is inline with the works done by Kolstad et al.[13], Phung et al.[14] and Levy et al.[15] which reported that humidity has influences on the occurrence of diarrhea. This is because, in the rainy season, humidity increases so that places that contain a lot of wet waste have sufficiently high humidity to cause diarrhea germs can develop well and quickly. This condition can also make animals as vectors for diarrhea such as mice, cockroaches or flies can multiply so that the population increases and indirectly increases transmission of diarrhea.

Table 3: Average humidity relationship with diarrhea incidence rates

Variable	r	p value
humidity	0.501	0.000

Relationship between rainfall with the incidence of diarrhea: The correlation test results between rainfall and diarrhea incidence in Makassar City in 2011 – 2015is shown in Table 4. Results shows that the average rainfall

in the case of diarrhea cases shows a moderate relationship (r = 0.429) with a positive pattern that can be interpreted as greater rainfall, then the greater the number of diarrhea cases. The results of further statistical tests also show that the relationship between rainfall and diarrhea has a significant relationship (p = 0.001) greater than α = 0.05 for the incidence of diarrhea cases in Makassar City. Thus the outcome of this work is inline with the works done by Wu et al.[17] and Bhandari et al.[18] which reported that rainfall has significant influences on the occurrence of diarrhea. This is because Scarcity of clean water and extreme rainfall that can cause flooding have shown a connection with the incidence of diarrheal diseases in several regions of the earth. In recorded cases, in some areas that are often flooded, the incidence of diarrhea cases including cholera has increased after floods.

Table 4: Relationship to Average Rainfall with Numbers Diarrhea

Variable	r	p value
Rain fall	0.429	0.001

Conclusion

Based on the results of research and statistical tests, the following can be concluded. Air temperature with the incidence of diarrhea in the city of Makassar in 2011 - 2015 has no relationship, the higher the air temperature, the lower the case of diarrhea in the city of Makassar. Climate factor in the form of air humidity has a relationship with the incidence of diarrhea in the city of Makassar in 2011 - 2015. The higher the humidity the greater the risk of transmission of diarrheal disease through vectors. Higher rainfall increases diarrhea sufferers and vice versa. So that there is a relationship between rainfall and the incidence of diarrhea in Makassar City in 2011–2015.

Acknowledgment

The author would like to thank the Faculty of Community Health, Hasanuddin University for unconditionally support and funding. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Campbell B. Human evolution: an introduction to man's adaptations. Routledge; 2017 Sep 4.
2. Coumou D, Rahmstorf S. A decade of weather extremes. Nature climate change. 2012 Jul;2(7):491.
3. Urry J. Climate change and society. InWhy the social sciences matter. Palgrave Macmillan, London. 2015;45-59.
4. Lindner M, Fitzgerald JB, Zimmermann NE, Reyer C, Delzon S, van der Maaten E, Schelhaas MJ, Lasch P, Eggers J, van der Maaten-Theunissen M, Suckow F. Climate change and European forests: what do we know, what are the uncertainties, and what are the implications for forest management?. Journal of environmental management. 2014 Dec 15;146:69-83.
5. Gupta D, Singh SK. Greenhouse gas emissions from wastewater treatment plants: a case study of Noida. Journal of Water Sustainability. 2012 Jun;2(2):131-9.
6. Gerber PJ, Steinfeld H, Henderson B, Mottet A, Opio C, Dijkman J, Falcucci A, Tempio G. Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO). 2013.
7. Ripple WJ, Smith P, Haberl H, Montzka SA, McAlpine C, Boucher DH. Ruminants, climate change and climate policy. Nature Climate Change. 2013 Dec 20;4(1):2.
8. Cann KF, Thomas DR, Salmon RL, Wyn-Jones AP, Kay D. Extreme water-related weather events and waterborne disease. Epidemiology & Infection. 2013 Apr;141(4):671-86.
9. Clarke R. Water: the international crisis. Routledge. 2013 Dec 16.
10. Chou WC, Wu JL, Wang YC, Huang H, Sung FC, Chuang CY. Modeling the impact of climate variability on diarrhea-associated diseases in Taiwan (1996–2007). Science of the Total Environment. 2010 Dec 1;409(1):43-51.
11. Moors E, Singh T, Siderius C, Balakrishnan S, Mishra A. Climate change and waterborne

diarrhoea in northern India: Impacts and adaptation strategies. Science of the Total Environment. 2013 Dec 1;468:S139-51.

12. Alexander K, Carzolio M, Goodin D, Vance E. Climate change is likely to worsen the public health threat of diarrheal disease in Botswana. International journal of environmental research and public health. 2013 Mar 26;10(4):1202-30.
13. Kolstad EW, Johansson KA. Uncertainties associated with quantifying climate change impacts on human health: a case study for diarrhea. Environmental health perspectives. 2010 Oct 6;119(3):299-305.
14. Phung D, Huang C, Rutherford S, Chu C, Wang X, Nguyen M, Nguyen NH, Do Manh C, Nguyen TH. Association between climate factors and diarrhoea in a Mekong Delta area. International journal of biometeorology. 2015 Sep 1;59(9):1321-31.
15. Levy K, Woster AP, Goldstein RS, Carlton EJ. Untangling the impacts of climate change on waterborne diseases: a systematic review of relationships between diarrheal diseases and temperature, rainfall, flooding, and drought. Environmental science & technology. 2016 Apr 25;50(10):4905-22.
16. Xu Z, Liu Y, Ma Z, Toloo GS, Hu W, Tong S. Assessment of the temperature effect on childhood diarrhea using satellite imagery. Scientific reports. 2014 Jun 23;4:5389.
17. Wu X, Lu Y, Zhou S, Chen L, Xu B. Impact of climate change on human infectious diseases: Empirical evidence and human adaptation. Environment international. 2016 Jan 1;86:14-23.
18. Bhandari GP, Gurung S, Dhimal M, Bhusal CL. Climate change and occurrence of diarrheal diseases: Evolving facts from Nepal. Journal of Nepal Health Research Council. 2013 Jan 3.

Analysis of Health Service Quality on Patient Satisfaction in Malimongan

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ABSTRACT

The creation of quality will certainly create user satisfaction with the service. The purpose of this study to determine the relationship of the quality of health care to patient satisfaction in Malimongan health center. This type of research uses descriptive survey method. Location of the study conducted in Malimongan Health Center in February 2015. The sampling technique accidental sampling. The primary data obtained through interviews to using questionnaires to 81 National Health Insurance (NHI) patients. Secondary data were obtained from the clinic a profile of community health centers. The results showed that there was a relationship between the five variables with NHI patient satisfaction with the results obtained chi square test p=0.018 for the variable reliability, responsiveness, assurance the values were p=0.028, p=0.000, p=0.002, respectively. Furthermore for empathy, and tangibility, p value was p=0.002.

Keywords: *quality; satisfaction; patient; health center*

Introduction

Administration quality is one of the imperative components in administration associations. This is brought about by the nature of administration is one of the apparatuses used to gauge the execution of administration associations[1]. Nature of administration is a push to satisfy the necessities and wants of buyers and the precision of conveyance in adjusting purchaser desires[2]. Administration quality is the means by which far the contrast between the desires and truth of the clients for the administrations they get. Administration quality is the primary concern that is genuinely considered by the organization, which includes every one of the assets claimed by the organization[3].

In the medicinal services industry, hospitals give similar sorts of administration, however they don't give a similar nature of administration[4]. Moreover, customers today are increasingly mindful of choices on offer and rising guidelines of administration have expanded their desires. They are additionally ending up progressively disparaging of the nature of administration they encounter[5].

Service quality can in this way be utilized as a vital separation weapon to construct an unmistakable preferred standpoint which contenders would discover hard to duplicate. To accomplish benefit magnificence, hospitals must serve each client that the organization can gainfully serve[6]. This will require consistent endeavors to enhance the nature of the administration conveyance framework. Besides, quality does not enhance except if it is estimated. In any case, not at all like made products quality, medical clinic benefit quality is a slippery and unmistakable build[7].

As patient don't actually explain hospitals quality, the beneficiary of the administration can just truly evaluate it, along these lines making its estimation more abstract than correct[8].Patient satisfaction has turned into a key standard by which the nature of health service is assessed[9]. Thus, various health center routinely gather and screen patient fulfillment information for inward evaluations of their own execution.

Several studies has been reported on analyzing patients satisfaction on hospitals service. Aiken et al.[10] analyzed if medical clinics with a decent association of consideration can influence understanding consideration and attendant workforce solidness in European nations. Al-Borie et al.[11] investigation featured benefit quality impact in the plan of more extensive human services techniques for Saudi Arabian open and private clinics. It requests that administration scientists and experts must distinguish provincial administration quality textures and related inpatient statistic markers. You et al.[12] work gave an extensive assessment of medical attendant assets in Chinese emergency clinics and the connection

between medical caretaker assets and medical attendant and patient results. Sack et al.[13] analyzed the relationship between medical clinic accreditation and patient fulfillment with emergency clinic care and found that hospital accreditation may speak to a stage towards absolute quality administration, however may not be a key factor to nature of consideration estimated by the patient's readiness to prescribe. Boulding et al.[14] reported a studyon hopitals where patients stated higher fulfillment with their cooperations among the medical clinic and staff, with their involvement with the release procedure of the patients Schoenfelder et al.[15]investigation distinguished key determinants that ought to be changed first so as to enhance worldwide patient fulfillment. The outcomes additionally show that a few parts of the clinic remain are not seen as important by patients and accordingly are inconsequential to fulfillment appraisals. Ramez et al.[16] assessesed the dimension of administration nature of social insurance suppliers in Bahrain with the end goal of revealing, fundamentally; the connection between administration quality measurements and the general patients' fulfillment and examining conduct expectation of patients. Amin et al.[17] explored clinic benefit quality and its impact on patient fulfillment and conduct aim and found that that management should utilize the apparent administration quality and consumer loyalty as instruments to build the fulfillment of patients. Nabbuye-Sekandi et al.[18] recognized factors related with general fulfillment among customers going to outpatient centers in a referral emergency clinic in Uganda.

Health service is one of the rights possessed by every human being and is recognized by all nations in the world, including Indonesia. Thus, this work will investigate about the quality of health center services at MalimoganHealth Center, Makassar City, where satisfaction or dissatisfaction of patients with national health insurance (NHI) was analyzed.

Methodology

Types of Research: The type of research used is descriptive survey method, namely research that takes samples from a population and uses a questionnaire as an instrument of data collection. The independent variable of this study is tangibility reliability, responsiveness, assurance and empathy. The dependent variable is patients satisfaction

Research Location: The location of the study was carried out at the MalimonganHealth Center, Makassar City.

Population and Samples: The population in this study were all NHI patients received health services at MalimonganHealth Center in Makassar City. The number of samples in this study were 81 NHI patients.

Data Collection: Primary data was obtained through direct interviews with respondents at the time of the study using a research questionnaire. Secondary data obtained from the Malimonganhealth center is in the form of a Community Health Profile and other data related to the research.

Data Analysis: The data analysis was done using SPSS software. In bivariate analysis, a cross tabulation (Crosstab) analysis was performed on each independent variable and the dependent variable to find meaningful relationships. This analysis process can use Chi Square test to find out the correlation between the independent variable and the dependent variable.

Result and Discussion

Variable Relationship Test for NHI Patients: Table 1 shows the relationship between reliability with NHI Patient Satisfaction. Based on Table 1, it is observed that 44 NHI patients who felt reliability services were not very good, 50.0% felt they were not satisfied with the services at the health center and from 37 NHI patients who felt reliability services were very good at 24.3% who felt less satisfied with services at the health center. The value of p obtained is 0.018 where the value is smaller than the value of α which is equal to 0.05 so that Ho is rejected, which means that reliability is related to the satisfaction of NHI patients in the MalimonganHealth Center, Makassar City.

Table 1: Reliability Relationship with NHI Patient Satisfaction

Reliability	Satisfaction				Total		P value
	No		Yes				
	n	%	n	%	n	%	
Not Good	22	50.0	22	50.0	44	100	0.018
Good	9	24.3	28	75.7	37	100	
Total	31	38.3	50	61.7	81	100	

Table 2 shows the relationship between responsiveness with NHI patient satisfaction. Based on Table 2, the value of p shows a significant number of 0.028 which means responsiveness is related to patient satisfaction at Malimongan Health Center Makassar City.

Table 2: Responsiveness Relationship with NHI Patient Satisfaction

Responsiveness	Satisfaction				Total		P value
	No		Yes				
	n	%	n	%	n	%	
Not Good	14	56.0	11	44	25	100	0.028
Good	17	30.4	39	69.6	56	100	
Total	31	38.3	50	61.7	81	100	

Table 3 shows the relationship between assurance with NHI patient satisfaction. From Table 3, the value of p obtained is 0.000 where the value is smaller than the value of α which is equal to 0.05 so that Ho is rejected, which means that assurance is related to the satisfaction of NHI patients in MalimonganHealth Center, Makassar City.

Table 3: Assurance Relationship with NHI Patient Satisfaction

Assurance	Satisfaction				Total		P value
	No		Yes				
	n	%	n	%	n	%	
Not Good	21	60.0	14	40	35	100	0.000
Good	10	21.7	36	78.3	46	100	
Total	31	38.3	50	61.7	81	100	

Table 4 shows the relationship between empathy with NHI patient satisfaction. Based on Table 4, results showed that NHI patients who felt very good empathy service was 23.9%. The p value showed a significant number of 0.002 which means empathy was related to patient satisfaction at the New Malimongan Health Center Makassar city.

Table 4: Empathy Relationship with NHI Patient Satisfaction

Empathy	Satisfaction				Total		P value
	No		Yes				
	n	%	n	%	n	%	
Not Good	20	57.1	15	42.9	35	100	0.002
Good	11	23.9	35	76.1	46	100	
Total	31	38.3	50	61.7	81	100	

Table 5 shows the relationship between tangibility with NHI patient satisfaction. Based on Table 5, the p value was obtained at 0.002 where the value was smaller than the α value of 0.05 so Ho rejected, which means tangibility is related to satisfaction of NHI patients in Malimongan Health Center, Makassar City.

Table 5: Tangibility Relationship with NHI Patient Satisfaction

Tangibility	Satisfaction				Total		P value
	No		Yes				
	n	%	n	%	n	%	
Not Good	29	48.3	31	51.7	60	100	0.002
Good	2	9.5	19	90.5	21	100	
Total	31	38.3	50	61.7	81	100	

Conclusion

Based on the results of the analysis that has been done, it can be concluded as follows. Reliability relates significantly to the satisfaction of NHI patients. Responsiveness is significantly related to NHI patient satisfaction while it not related or not significant to the satisfaction of general patients at the Malimongan Health Center. Assurance is significantly associated with satisfaction of NHI patients. Empathy was significantly associated with NHI patient satisfaction. Tangibility is significantly associated with satisfaction of NHI patients at the Malimongan Health Center. Thus, although all variables in NHI patients have a relationship to patient satisfaction, the Malimongan Health Center must maintain or even improve the quality of these five variables, so that the welfare of the patients are taken care.

Acknowledgment

The author would like to thank the Faculty Of Community Health, Hasanuddin University for unconditionally support and funding. The ethical clearance was attained from Malimongan Health Center. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

1. Angelova B, Zekiri J. Measuring customer satisfaction with service quality using American Customer Satisfaction Model (ACSI Model). International Journal of Academic Research in Business and Social Sciences. 2011 Oct 1;1(3):232.
2. Goetsch DL, Davis SB. Quality management for organizational excellence. Upper Saddle River, NJ: pearson; 2014.
3. Hartnell CA, Ou AY, Kinicki A. Organizational culture and organizational effectiveness: A meta-analytic investigation of the competing values framework's theoretical suppositions. Journal of applied psychology. 2011 Jul;96(4):677.
4. Bowling A. Research methods in health: investigating health and health services. McGraw-hill education (UK); 2014 Jul 1.
5. Kanamori S, Sow S, Castro MC, Matsuno R, Tsuru A, Jimba M. Implementation of 5S management method for lean healthcare at a health center in Senegal: a qualitative study of staff perception. Global health action. 2015 Dec 1;8(1):27256.
6. Manulik S, Rosińczuk J, Karniej P. Evaluation of health care service quality in Poland with the use of SERVQUAL method at the specialist ambulatory health care center. Patient preference and adherence. 2016;10:1435.
7. Büyüközkan G, Çifçi G, Güleryüz S. Strategic analysis of healthcare service quality using fuzzy AHP methodology. Expert systems with applications. 2011 Aug 1;38(8):9407-24.
8. Batalden M, Batalden P, Margolis P, Seid M, Armstrong G, Opipari-Arrigan L, Hartung H. Coproduction of healthcare service. BMJ QualSaf. 2016 Jul 1;25(7):509-17.
9. Guise JM, Chang C, Viswanathan M, Glick S, Treadwell J, Umscheid CA, Whitlock E, Fu R, Berliner E, Paynter R, Anderson J. Agency for Healthcare Research and Quality Evidence-based Practice Center methods for systematically reviewing complex multicomponent health care interventions. Journal of clinical epidemiology. 2014 Nov 1;67(11):1181-91.
10. Aiken LH, Sermeus W, Van den Heede K, Sloane DM, Busse R, McKee M, Bruyneel L, Rafferty AM, Griffiths P, Moreno-Casbas MT, Tishelman C. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. Bmj. 2012 Mar 20;344:e1717.
11. Al-Borie HM, Sheikh Damanhouri AM. Patients' satisfaction of service quality in Saudi hospitals: a SERVQUAL analysis. International journal of health care quality assurance. 2013 Jan 4;26(1):20-30.
12. You LM, Aiken LH, Sloane DM, Liu K, He GP, Hu Y, Jiang XL, Li XH, Li XM, Liu HP, Shang SM. Hospital nursing, care quality, and patient satisfaction: cross-sectional surveys of nurses and patients in hospitals in China and Europe.

International journal of nursing studies. 2013 Feb 1;50(2):154-61.

13. Sack C, Scherag A, Lütkes P, Günther W, Jöckel KH, Holtmann G. Is there an association between hospital accreditation and patient satisfaction with hospital care? A survey of 37 000 patients treated by 73 hospitals. International Journal for Quality in Health Care. 2011 Apr 22;23(3):278-83.
14. Boulding W, Glickman SW, Manary MP, Schulman KA, Staelin R. Relationship between patient satisfaction with inpatient care and hospital readmission within 30 days. The American journal of managed care. 2011 Jan;17(1):41-8.
15. Schoenfelder T, Klewer J, Kugler J. Determinants of patient satisfaction: a study among 39 hospitals in an in-patient setting in Germany. International journal for quality in health care. 2011 Jun 29;23(5):503-9.
16. Ramez WS. Patients' perception of health care quality, satisfaction and behavioral intention: an empirical study in Bahrain. International Journal of Business and Social Science. 2012 Sep 1;3(18).
17. Amin M, ZahoraNasharuddin S. Hospital service quality and its effects on patient satisfaction and behavioural intention. Clinical Governance: An International Journal. 2013 Jul 19;18(3):238-54.
18. Nabbuye-Sekandi J, Makumbi FE, Kasangaki A, Kizza IB, Tugumisirize J, Nshimye E, Mbabali S, Peters DH. Patient satisfaction with services in outpatient clinics at Mulago hospital, Uganda. International Journal for Quality in Health Care. 2011 Jul 19;23(5):516-23.

Work Fatigue Overview in Female Workers in PT Manakarra Unggul Lestari

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ABSTRACT

Women's entry into Indonesia's workplace is not an unusual fact. The decision to work in the public sector required women to be responsible with work performance. However, the division of tasks inappropriately adjusted to the working capacity resulted in many women experiencing exhaustion. This research was conducted in PT ManakarraUnggul Lestari (Persero), Mamuju, West Sulawesi, with the aim to determine the relationship of the workload, estimated time work, nutritional status, and hemoglobin levels with the fatigue in female workers applying a type of *analytic survey* research with *cross sectional* method. The instruments used in this study were reaction timer, weight scales, stopwatch, digital Hb measurement, and microtoise. Samples used were all female workers for 38 people (exhaustive sampling) and tested using *Fisher's Exact Test*. The results of this study indicate that there is a relationship between workload variables ($p = 0.001$), nutritional status ($p = 0.021$) and hemoglobin levels ($p = 0.018$) with work fatigue and work duration variables ($p = 0.076$) not related to work fatigue.

Keywords: *Women Labors; Work Exhaustion; Workload*

Introduction

Current technological developments greatly assist industrial processes in producing a product of the highest quality and quality. To produce products of the highest quality and quality, of course, they are not released from the role of labor as human resources in the workplace[1]. In order for the workforce to be more maximal and more productive in working, there needs to be a balance between workload factors, additional burdens due to the environment and work capacity[2].

Human resources at work have an important role in increasing the productivity of a workplace. Talking about male labor and female labor, of course they cannot be separated from their participation in the workplace as human resources[3]. Born with privileges and distinct advantages women have an important role not only to play a role in the family but women also play a role in building the community, organization and also the country[4]. The dual role of women in social life results in an increase in the burden of women and increased fulfillment of needs including health.

Increased burden borne, coupled with the generally different physiological conditions of women that make women more at risk for various health problems. Women's physiological conditions concerning the size and strength of muscles that are affected by the hormonal system[5]. Biologically women also experience menstrual cycles, pregnancy, childbirth and menopause. This situation if it is not addressed with special treatment, it will have an impact on labor productivity in terms of fatigue[6].

Fatigue is a condition that must be given attention. All types of work both formal and informal create work fatigue. Women who work face greater psychological problem, thus making them more vulnerable to fatigue[6]. Workload is the body's ability to work when receiving work. Every workload received by a person must be in accordance with the physical abilities, mental abilities and limitations of the person who receives the burden[7]. Workloads that are not in accordance with physical and psychological abilities will have an impact on fatigue. Nutritional status is one of the causes of fatigue[8]. A worker with good nutritional status will have a better body resistance and work capacity, while a worker with a poor nutritional status will have a good body resistance and work capacity. The condition of anemia is generally more common in women. Besides being a workload, consuming less nutrients and natural conditions for

women who experience menstrual cycles each month, it is a reason why women are more likely to suffer from anemia[9]. Women workers with anemic status will experience fatigue and have a lower level of productivity than workers without anemic status.

Studies has been done previously to analyzed the factor that causes fatigue among women workers. Wong et al.[10] inspected the danger of work fatigue among shift workers in Canada and found that rotating shift and night shiftworkers have exhibited higher fatigue, especially among the women workers. Nag et al.[11] inspected the commonness of musculoskeletal agony and inconvenience (MSD) among fish preparation workers and found that cold condition and standing work act for extend periods of time caused fatigue in ladies laborers. Cobankara et al.[12] analyzed the occurrence of fatigue among material laborers in Turkey and found that fatigue caused restorative condition and it seems higher among female workers. Bültmann et al.[13] analyzed whether lack of sleep influences and exhaustion are autonomously related among ladies laborers and found that the two variables has connection that leads to fatigue.

Hanklang et al.[14] investigatedthe commonness of musculoskeletal issue side effects and its hazard factors among ladies rebar specialists and expressed that that a proper ergonomic workstation configuration will enhance the working condition. Caruso et al.[15] examined the women shift worker pattern in US and found that these work routines can likewise strain individual connections, inferable from exhaustion and poor disposition from lack of sleep and decreased quality time to go through with family and companions. Smith-Miller et al.[16] examined the fatigue among nurses and found that long working shift has contributed to work related fatigue. Sundstrup et al.[17] reported a randomized study on fatigue analysis in women workers and found that the fatigue level in woman can be improved through strength training. Palupi et al.[18] analyzed occurrence of tiredness among vagrant women worker and found that the danger of exhaustion is expanded when they display burdensome indications and their cooking method is broiling.

Therefore, this work was done to examine factors related to work fatigue in female workers at PT ManakarraUnggul Lestari (Persero) Mamuju West Sulawesi. The work fatigue is analyzed interms of workload, length of work, nutritional status and hemoglobin levels in female workers.

Methodology

Types of Research: The type of research used is analytic survey research using a cross sectional study design to determine whether there is a relationship between the dependent variables on the independent variables. The independent variables in this study include workload, length of work, nutritional status and hemoglobin level (Hb) while the dependent variable is work fatigue.

Location and Time of Research: This research was conducted at PT ManakarraUnggul Lestari (Persero) Mamuju West Sulawesi in December 2016 until January 2017.

Population and Samples: The population in this study were all female workers in the division of nurseries, harvesters and fertilizers at PT ManakarraUnggul Lestari (Persero) Mamuju West Sulawesi as many as 38 female workers. The sampling technique was carried out by Exhaustive Sampling with a total sample of 38 people.

Data Collection: Data on the characteristics of respondents, years of service, and length of work, obtained by conducting direct interviews with respondents using a questionnaire. Data on fatigue is measured using reaction time. Data on workload is measured using the work pulse method. Data on body mass index is measured using scales and microtoise. Data on hemoglobin (Hb) was measured using FamalyDr MHD-1 Test Meter.

Data Analysis: Data processing is done using a SPSS 22 software program. Bivariate analysis is an analysis carried out to see related variables. Data analysis was performed to see the relationship of workload, length of work, body mass index (BMI) and hemoglobin (Hb) levels with work fatigue in female workers at PT ManakarraUnggul Lestari (MUL) Mamuju West Sulawesi using Chi Square equation formula.

Result and Discussion

Relationship Workload between and Fatigue: Based on Table 1 shows that 25 respondents with a heavy workload category all experienced fatigue while from 13 respondents with a light workload category 7 respondents (36.8%) experienced fatigue while 6 other respondents (46.2%) did not experience fatigue. The results of the significance test between workload variables and work fatigue variables using the Fisher Exact Test obtained a value of $p = 0.001$

where the value of p <0.05 then Ho is rejected and Ha is accepted which means that there is a relationship between workload and work fatigue. The outcome of this work is line with the work reported by Nag et al.[11] as workload influences the fatigue rate of the worker.

Table 1: Relationship between Workload and Work Fatigue for Female Workers

Work load	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Heavy	25	100	0	0	25	100	0.001
Light	7	53.8	6	46.2	13	100	
Total	32	84.2	6	15.8	38	100	

Relationship Length of Work with Work Fatigue: Table 2 shows that respondents who experience work fatigue are respondents whose length of work does not meet the requirements (> 8 hours/day) as many as 13 people and all experience fatigue while workers who have long working hours are eligible (≤8 hours/day) too experiencing fatigue 19 respondents (76.0%) were in the fatigued category and 6 other respondents (24.0%) did not experience fatigue. Based on the results of data analysis using the Fisher's Exact Test the value of p = 0.076 (p> 0.05) means that Ho is accepted and Ha is rejected, so that it can be interpreted that there is no relationship between the length of work and the occurrence of fatigue in female workers at PT ManakarraUnggul Lestari Mamuju West Sulawesi

Table 2: Relationship between Length of Work and Fatigue for Female Workers

Length of work	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Not fulfilled	13	100	0	0	13	100	0.076
Fulfilled	19	76.0	6	24.0	25	100	
Total	32	84.2	6	15.8	38	100	

Relationship between Nutritional Status and Fatigue: Based on the data presented in Table 3, results showed that of the 20 respondents who had normal nutritional status as many as 14 respondents (70.0%) experienced fatigue and 6 other respondents (30.0%) did not experience fatigue. While 18 respondents who had abnormal nutritional status all experienced fatigue. The Fisher Exact Test results showed that the value of p = 0.021, because the value of p <0.05, Ho was rejected and Ha was accepted. The interpretation is that there is a relationship between nutritional status and work fatigue in female workers at PT ManakarraUnggul Lestari Mamuju West Sulawesi. The outcome of this work is inline with the work reported by Palupi et al. [18] as it was stated that nutrition plays a significant role bad nutrition will caused the workers to be easily fatigued.

Table 3: Relationship between Nutritional Status and Fatigue for Female Workers

Nutritional status	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Not normal	18	100	0	0	18	100	0.021
Normal	14	70.0	6	30.0	20	100	
Total	32	84.2	6	15.8	38	100	

Relationship between Hemoglobin Levels and Fatigue: Based on the data presented in Table 4, results showed that of the 14 respondents who had normal hemoglobin levels, from it 9 respondents (64.3%) experienced fatigue and 5 other respondents (35.7%) did not experience fatigue while those who had abnormal/ anemia hemoglobin level, 23 respondents (95.8%) experienced fatigue and 1 respondent (4.2%) did not experience fatigue. The Fisher Exact Test results show that the value of p = 0.018, because the value of p <0.05, Ho is rejected and Ha is accepted. The interpretation is that there is a relationship between hemoglobin levels and work fatigue in female workers at PT ManakarraUnggul Lestari Mamuju West Sulawesi. The results of interviews conducted with workers, physical complaints that are more often felt by most workers are often dizzy, possibly due to low levels of Hb[19].

Table 4: Relationship between Hemoglobin Levels and Fatigue

Hemoglobin Levels	Work Fatigue				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Not normal	23	95.8	1	4.2	24	100	0.018
Normal	9	70.0	5	35.7	14	100	
Total	32	84.2	6	15.8	38	100	

Conclusion

Based on the results this work which analyzed the factors related to work fatigue in women at PT ManakarraUnggul Lestari (Persero) Mamuju West Sulawesi, the following can be concluded. There is a relationship between workload, nutrition status, hemoglobin level and work fatigue in female workers at PT ManakarraUnggul Lestari (Persero) Mamuju West Sulawesi in 2016. However, there is no relationship between the length of work and work fatigue in female workers. This study found that there was a relationship between workload and work fatigue, so it was recommended that the company should improve company policies related to standard operating procedures (SOP) so that workers have standards in carrying out their work.

Acknowledgment

The author would like to thank the Faculty of Community Health, Hasanuddin University for unconditionally support and funding. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Nica E, Manole C, Potcovaru AM. Competition in the worldwide workplace: economic globalization and labor rights. Journal of Self-Governance and Management Economics. 2016;4(3):73.
2. Nica E. Will technological unemployment and workplace automation generate greater capital–labor income imbalances?. Economics, Management, and Financial Markets. 2016;11(4):68-74.
3. Bulut E. Can the intern resist? Precarity of blue-collar labor and the fragmented resistance of the white-collar intern in Laurent Cantet's Human Resources. Journal of Communication Inquiry. 2017 Jan;41(1):42-59.
4. Viotti S, Guidetti G, Loera B, Martini M, Sottimano I, Converso D. Stress, work ability, and an aging workforce: A study among women aged 50 and over. International journal of stress management. 2017;24(S1):98.
5. Vashum KP, McEvoy M, Shi Z, Milton AH, Islam MR, Sibbritt D, Patterson A, Byles J, Loxton D, Attia J. Is dietary zinc protective for type 2 diabetes? Results from the Australian longitudinal study on women's health. BMC endocrine disorders. 2013 Dec;13(1):40.
6. Merchant KM, Kurz KM. Women's nutrition through the life cycle: social and biological vulnerabilities. InThe Health Of Women. Routledge. 2018 May 8;63-90.
7. Panel BB. Guidelines for safe work practices in human and animal medical diagnostic laboratories. Morbidity and Mortality Weekly Report. 2012 Jan 6;61.
8. Fereshtehnejad SM, Ghazi L, Shafieesabet M, Shahidi GA, Delbari A, Lökk J. Motor, psychiatric and fatigue features associated with nutritional status and its effects on quality of life in Parkinson's disease patients. PLoSOne. 2014 Mar 7;9(3):e91153.
9. Friedman AJ, Chen Z, Ford P, Johnson CA, Lopez AM, Shander A, Waters JH, Van Wyck D. Iron deficiency anemia in women across the life span. Journal of women's health. 2012 Dec 1;21(12):1282-9.
10. Wong IS, McLeod CB, Demers PA. Shift work trends and risk of work injury among Canadian workers. Scandinavian journal of work, environment & health. 2011 Jan 1:54-61.
11. Nag A, Vyas H, Shah P, Nag PK. Risk factors and musculoskeletal disorders among women workers performing fish processing. American journal of industrial medicine. 2012 Sep;55(9):833-43.
12. Cobankara V, Unal UO, Kaya A, Bozkurt AI, Ozturk MA. The prevalence of fibromyalgia among textile workers in the city of Denizli in Turkey. International journal of rheumatic diseases. 2011 Oct;14(4):390-4.
13. Bültmann U, Nielsen MB, Madsen IE, Burr H, Rugulies R. Sleep disturbances and fatigue: independent predictors of sickness absence? A prospective study among 6538 employees. The

European Journal of Public Health. 2012 Feb 29;23(1):123-8.

14. Hanklang S, Kaewboonchoo O, Silpasuwan P, Mungarndee SS. Musculoskeletal disorders among Thai women in construction-related work. Asia Pacific Journal of Public Health. 2014 Mar;26(2):196-202.
15. Caruso CC. Reducing risks to women linked to shift work, long work hours, and related workplace sleep and fatigue issues. Journal of women's health. 2015 Oct 1;24(10):789-94.
16. Smith-Miller CA, Shaw-Kokot J, Curro B, Jones CB. An integrative review: fatigue among nurses in acute care settings. Journal of Nursing Administration. 2014 Sep 1;44(9):487-94.
17. Sundstrup E, Jakobsen MD, Brandt M, Jay K, Aagaard P, Andersen LL. Strength training improves fatigue resistance and self-rated health in workers with chronic pain: a randomized controlled trial. BioMed research international. 2016;2016.
18. Palupi KC, Shih CK, Chang JS. Cooking methods and depressive symptoms are joint risk factors for fatigue among migrant Indonesian women working domestically in Taiwan. Asia Pacific journal of clinical nutrition. 2017;26(Supplement):S61.
19. Merchant KM, Kurz KM. Women's nutrition through the life cycle: social and biological vulnerabilities. InThe Health Of Women. Routledge. 2018 May 8;63-90.

Factors Related to the Satisfaction of Patients in Pelamonia Hospital

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ABSTRACT

Patient satisfaction depends on the quality of service. New patients will be satisfied if the performance of health services gained equal or exceed expectations and conversely, dissatisfaction or feeling disappointed patient will appear when the performance of health services obtained it not in accordance with expectations. The purpose of this study was to determine the factors associated with patient satisfaction in hospitals Pelamonia of Makassar in 2016. The factors analyzed were human relationships, timeliness, convenience and access. This type of research is observational research with cross sectional study design. Total population in this study were 17 802 patients in the inpatient units Pelamonia Hospital in Makassar City and took a sample of 100 patients. The data collection was done by interview with using a questionnaire and the collection of documents such as reports of patient visits, hospital profiles, hospital structure, journals and books. The results showed that, there is a relationship between the variables human relationship (p = 0.040), punctuality (p = 0.020), comfort (p = 0.005), and access (p = 0.002) on service satisfaction of inpatients at Hospital Pelamonia Makassar. The conclusion of this study indicate that there is a relationship between human relationships, timeliness, convenience and access to patient satisfaction.

Keywords: *Satisfaction; relationships; punctuality; convenience; access*

Introduction

The development of the health sector is one of the important elements in people's lives which continues to increase from time to time[1]. Community needs for health services continue to develop. Along with this, health service providers continue to make improvements to win the competition and provide quality services for the community[2].

One definition states that the quality of health services usually refers to the ability of hospitals to provide services that are in accordance with health professional standards and acceptable to patients[3]. In this case, certainly need to consider the use of resources as efficiently as possible. In addition, it is also necessary to avoid the possibility of iatrogenic problems due to hospital care

Consumer assessment of the quality of hospital services is an important matter as a reference in improving services so that customer satisfaction is created[4]. Customers generally expect products in the form of goods or services consumed to be accepted and enjoyed by good or satisfying services. Customer satisfaction can shape perceptions and can further promote the company's products in the eyes of its customers[4].

The hospital was declared successful not only in the complementary facilities seeded, but also in the attitudes and services of human resources, which significantly affected the services produced and perceived by patients[5]. If these elements are ignored, in a short time, the hospital will lose many patients and be shunned by prospective patients. Patients will switch to other hospitals that meet patient expectations, because patients are a valuable asset in developing the hospital industry[5].

Patient satisfaction depends on the quality of service. New patients will feel satisfied if the performance of health services obtained is the same or exceeds their expectations and vice versa, dissatisfaction or feelings of patient disappointment will arise if the performance of health services obtained is not in line with expectations[6]. Patient satisfaction is a level of patient feelings that arises as a result of the performance of health services obtained after the patient compares it with what he expected[6].

Community complaints often occur due to unsatisfactory health services. Along with the advancement of science, medical and health technology requires quality improvement and health services to the community[7]. Quality of service and customer or patient satisfaction is one of the important strategies that cannot be ignored by policy makers in the health sector[7].

Patient dissatisfaction is interpreted the same as complaints against hospitals, along with services performed by health personnel (doctors, nurses, pharmacists, psychologists and others) and health care system structures (costs, insurance systems, capabilities and infrastructure of health centers and others)[8]. The patient expects good, polite, friendly, comfortable interaction with health workers, so that the competence, qualifications and good personality of the health care worker. The main factors in influencing patient satisfaction are complete medical equipment, buildings and adequate hospital facilities, complete supporting facilities in the service[9].

Several studies has been reported in analyzing patients satisfaction on the service provided by hospitals. Hamilton et al.[10] examined the variables which impact tolerant fulfillment with careful administrations and to investigated the connection between overall patients satisfaction. Tsai et al.[11] analyzed if clinics with high patient fulfillment have bring down dimensions of execution on acknowledged proportions of the quality and effectiveness of careful consideration. Al-Abriet al.[12] discussed about the relationship of reliant and free in uential properties towards in general patient fulfillment notwithstanding its effect on the quality enhancement procedure of medicinal services associations. Khamis et al.[13] analyzed patients' dimension of fulfillment on the nature of medicinal services conveyed at an emergency clinic at Tanzania. Lyu et al.[14] resolved if patient fulfillment is free from careful process measures and emergency clinic wellbeing by contrasting information from thirty-one US medical clinics. Bowling et al.[15] studied the capacity of the framework to live up to patients' desires in regard of the passionate consulation, and the clinical results, that matters the most to the patients. AsifRaza et al.[16] contemplated drug store benefit affect on patient fulfillment and to figure out what factors strikingly connect with pharmaceutical administration execution at Hamad General Hospital.Merkouris et al.[17] evaluated medicinal and careful patient fulfillment with nursing care in the general population emergency clinics of Cyprus and investigate its conceivable connection with foundation factors. Joon Choi et al.[18] inspected the job of recognition as a directing variable, finding that result quality impacts consumer loyalty just when patients know about administrations given by a medical clinic.

In this work, the factors associated with patient satisfaction in Pelamonia Hospital of Makassar, Indonesia were analyzed. The factors that was accessed were human relationships, timeliness, convenience and access.

Methodology

Types of Research: This research is a quantitative study with a cross sectional study approach, which aims to see the relationship of inpatient satisfaction at Pelamonia Hospital Makassar. The independent variables of this work were Human relationship, Punctuality, Convenience, and Access. The dependent variable of this work is patient satisfaction.

Location of Research: This research was conducted at the Inpatient Installation of PelamoniaHospital which is one of the hospitals located in Makassar City.

Population and Sample: The populations in this study were all patients in the inpatient unit at Pelamonia Hospital based on data on 2015 patient visits of 17802 people. The sampling technique used in this study is the Accidental Sampling Technique. The number of samples used for this work is 100.

Data Collection: Primary data in this study was conducted by conducting interviews directly with respondents using the prepared research questionnaire. Secondary data was obtained from document collection such as reports of patient visits.

Data Analysis: Data obtained from the results of interviews were processed using SPSS program. Bivariate analysis was used to find the effect and prove the two-variable hypothesis. Ho will be tested with a significance level of 0.05. The statistical test used is chi-square Test

Result and Discussion

The relationship between human relationships with patient satisfaction: Table 1 shows that patients' perceptions of human relations with the satisfaction of patients receiving health services at inpatient care at

the Pelamonia Hospital, Makassar City. Where as many as 59 (73.8%) people stated well and that 21 (26.2%) people stated that they were not good. The results of the analysis using Chi-Square obtained p = 0.040 because p <0.05, H_o is rejected and H_a is accepted, meaning that there is a relationship between human relationships with patient satisfaction at the inpatient care. Thus, the outcome of this work is inline with the work done by Khamis et al.[13] as it was stated that human relation is significant element for patients satisfaction.

Table 1: Distribution of Relationships Between Human Relationship and Patient Satisfaction

Human Relationship	Patient Satisfaction				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	59	73.8	21	26.2	80	100	0.040
Not Good	10	50.0	10	50.0	20	100	
Total	69	69.0	31	31.0	100	100	

The relationship between punctuality and patient satisfaction: Table 2 shows that patients' perceptions of the relationship of timeliness with patient satisfaction stated that they were 34 (59.6%) people and those who stated were not good, was 23 (40.4%) people. The results of the analysis using Chi-Square obtained p = 0.020 because p <0.05, H_o was rejected and H_a was accepted, meaning there was a relationship between punctuality with patient satisfaction at the inpatient installation of Pelamonia Hospital, Makassar City. The outcome of this work is inline with the work reported by Tsai et al.[11] where it was said that punctuality is important as patient expect the service to be done at the proper and promised timing.

Table 2: Distribution of Relationships Between Punctuality and Patient Satisfaction

Punctuality	Patient Satisfaction				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	34	59.6	23	40.4	57	100	0.020
Not Good	35	81.4	8	18.6	43	100	
Total	69	69.0	31	31.0	100	100	

The relationship between convenience and patient satisfaction: Table 3 shows that the patient's perception of the relationship of convenience with patient satisfaction states that it is 26 (55.3%) people and who states that it is less good is 21 (44.7%) people. While respondents who were not satisfied with comfort but satisfied with service were 43 (81.1%) people and those who expressed dissatisfaction with comfort and service were 10 (18.9%) people. Perceptions about the comfort of health services at Pelamonia Hospital in Makassar City tend to be satisfied with the services obtained by patients, namely 26 (55.3%) people. While patients with perceptions of dissatisfaction are 10 (18.9%) people. The results of the analysis using Chi-Square obtained p = 0.005 because p <0.05, H_o is rejected and H_a is accepted, meaning there is a relationship between convenience with patient satisfaction at the inpatient installation of Pelamonia Hospital, Makassar City. The outcome of this work is inline with the work done by Al-Abri et al.[12] as patient value the conveniences in the service provided by health care. This will determine the quality of the service provided.

Table 3: Distribution of Relationships Between Convenience and Patient Satisfaction

Convenience	Patient Satisfaction				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	26	55.3	21	44.7	47	100	0.005
Not Good	43	81.1	10	18.9	53	100	
Total	69	69.0	31	31.0	100	100	

The relationship between access and patient satisfaction: Table 4 shows that the patient's perceptions of the access relationship with patient satisfaction stated that they were 33 (56.9%) people and those who stated that they were not good were 25 (43.1%) people. While respondents who expressed dissatisfaction with access but were satisfied with service were 36 (85.7%) people and those who expressed dissatisfaction with access and service were 6 (14.3%) people. Perceptions about access to health services at Pelamonia Hospital in Makassar City tend to be satisfied with the services obtained by patients, namely 33 (56.9%) people. While patients with perceptions of dissatisfaction are 6 (14.3%) people. The results of the analysis using Chi-Square were obtained p = 0.002 because p <0.05, H_o was rejected and H_a was accepted, meaning there was a relationship between access with patient satisfaction at the inpatient installation of Pelamonia Hospital, Makassar City. The outcome of this work is inline with the work done by Merkouris et al.[17]where access to service is significant for patients and their fulfillment.

Table 4: Distribution of Relationships Between Access and Patient Satisfaction

Access	Patient Satisfaction				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Good	33	56.9	25	43.1	58	100	0.002
Not Good	36	85.7	6	14.3	42	100	
Total	69	69.0	31	31.0	100	100	

Conclusion

Based on the overall outcome of this work, the following can be concluded. There is a relationship between human relationships, punctuality, convenience and access with the satisfaction of inpatients at the Pelamonia Hospital in Makassar City. In addition, the authors recommend the Pelamonia Hospital of Makassar City (administration, nurses, doctors and drug officers) to be more friendly and considerate to patients in responding or advising and listening to complaints and requests from patients and maintaining the quality of services provided to patients.

Acknowledgment

The author would like to thank the Faculty of Community Health, Hasanuddin University for unconditionally support and funding. The ethical clearance was attained from Pelamonia Hospital Makassar. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Bowling A. Research methods in health: investigating health and health services. McGraw-hill education (UK). 2014 Jul 1.
2. Meara JG, Leather AJ, Hagander L, Alkire BC, Alonso N, Ameh EA, Bickler SW, Conteh L, Dare AJ, Davies J, Mérisier ED. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. The Lancet. 2015 Aug 8;386(9993):569-624.
3. World Health Organization. World health statistics 2016: monitoring health for the SDGs sustainable development goals. World Health Organization. 2016 Jun 8.
4. Abuosi AA, Atinga RA. Service quality in healthcare institutions: establishing the gaps for policy action. International journal of health care quality assurance. 2013 Jun 7;26(5):481-92
5. Purcărea VL, Gheorghe IR, Petrescu CM. The assessment of perceived service quality of public health care services in Romania using the SERVQUAL scale. Procedia Economics and Finance. 2013 Jan 1;6:573-85.
6. Murti A, Deshpande A, Srivastava N. Service quality, customer (patient) satisfaction and behavioural intention in health care services: exploring the Indian perspective. Journal of Health Management. 2013 Mar;15(1):29-44.
7. Wu Z, Robson S, Hollis B. The application of hospitality elements in hospitals. Journal of Healthcare Management. 2013 Jan 1;58(1):47-62.
8. Maccoby M, Norman CL, Norman CJ, Margolies R. Transforming health care leadership: A systems guide to improve patient care, decrease costs, and improve population health. John Wiley & Sons. 2013 Aug 5.
9. Beirão G, Patrício L, Fisk RP. Value cocreation in service ecosystems: Investigating health care at the micro, meso, and macro levels. Journal of Service Management. 2017 Apr 18;28(2):227-49.
10. Hamilton DF, Lane JV, Gaston P, Patton JT, Macdonald D, Simpson AH, Howie CR. What determines patient satisfaction with surgery? A prospective cohort study of 4709 patients following total joint replacement. BMJ open. 2013 Jan 1;3(4):e002525.
11. Tsai TC, Orav EJ, Jha AK. Patient satisfaction and quality of surgical care in US hospitals. Annals of surgery. 2015 Jan;261(1):2.
12. Al-Abri R, Al-Balushi A. Patient satisfaction survey as a tool towards quality improvement. Oman medical journal. 2014 Jan;29(1):3.
13. Khamis K, Njau B. Patients' level of satisfaction on quality of health care at Mwananyamala

hospital in Dar es Salaam, Tanzania. BMC health services research. 2014 Dec;14(1):400.

14. Lyu H, Wick EC, Housman M, Freischlag JA, Makary MA. Patient satisfaction as a possible indicator of quality surgical care. JAMA surgery. 2013 Apr 1;148(4):362-7.
15. Bowling A, Rowe G, McKee M. Patients' experiences of their healthcare in relation to their expectations and satisfaction: a population survey. Journal of the Royal Society of Medicine. 2013 Apr;106(4):143-9.
16. Khudair IF, Raza SA. Measuring patients' satisfaction with pharmaceutical services at a public hospital in Qatar. International journal of health care quality assurance. 2013 Jun 7;26(5):398-419.
17. Merkouris A, Athini E, Hatzimbalasi M, Rovithis M, Papastavrou E. Assessment of patient satisfaction in public hospitals in Cyprus: a descriptive study. Health Science Journal. 2013 Jan 1;7(1).
18. Joon Choi B, Sik Kim H. The impact of outcome quality, interaction quality, and peer-to-peer quality on customer satisfaction with a hospital service. Managing Service Quality: An International Journal. 2013 May 9;23(3):188-204.

Risk Factors of Pulmonary Tuberculosis Relapse in Working Population of Makassar City

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ABSTRACT

Pulmonary tuberculosis relapse is a common complications in tuberculosis patients and causing problems around the world, especially in Indonesia. In 2016, Makassar City overall was reported to have high incidence of tuberculosis relapse case detection rate about 4,9% of 1.850 total smear-positive pulmonary tuberculosis in working population. This present study aimed to investigate risk factors of pulmonary tuberculosis relapse in working age population in public health centers of PanakkukangSubdistrict and TalloSubdistrict of Makassar City. This present observational-analytical study using case-control study design. This study using exhaustive sampling method for case group and simple random sampling for control group. Data analysis performed with Risk Estimate test (odds ratio)e. This present study shows BCG immunization history (OR=0,619; 95% CI=0,197-1,941), disease comorbidity (OR=2,143; 95%CI=0,663-6,924), smoking (OR=1,272; 95%CI=0,317-5,111), regular medication intake history (OR=6,111; 95%CI=2,010-18,584), air ventilation (OR=0,706; 95%CI=0,191-2,603) and flooring type (OR=1,909; 95%CI=0,599-6,081). This present study concluded that regular medication intake was significant risk factor in pulmonary tuberculosis relapse in working population.

Keywords: *Risk factors; TB relapse; age*

Introduction

Tuberculosis (TB) is an infectious disease caused by infection with the bacterium Mycobacterium tuberculosis basil and is a disease that is of global concern. This infection is the most common in the world, with an estimated one third of the population infected and 2.5 million deaths every year. In addition, various control measures were taken to reduce the incidence and mortality from tuberculosis, but tuberculosis is still estimated to attack 9.6 million people and cause 1.2 million deaths in 2014[1].

This disease is one of the top five causes of death in women aged 15-44 years and the deadliest in HIV positive patients[2]. For distribution based on location, India, China, and Indonesia are the countries with the most tuberculosis sufferers, namely 23%, 10% and 10% of all sufferers in the world[3].

Factors that influence the likelihood of someone becoming a tuberculosis patient are low endurance, including HIV and AIDS infections and malnutrition[4]. HIV infection causes extensive damage to the cellular immune system and is the strongest risk factor for those infected with tuberculosis to become tuberculosis[5].

Global progress depends on progress in control of prevention of tuberculosis and treatment in countries in the world. WHO states that tuberculosis control relies on disease identification and treatment for each case scheduled for 6 months[6]. One of the problems with tuberculosis control is the occurrence of recurrence and the need for a second treatment[7]. Relapse pulmonary tuberculosis or relapsing pulmonary tuberculosis were tuberculosis patients who had previously received tuberculosis treatment, and who had been declared cured or had complete treatment, were diagnosed with positive smear tuberculosis based on swab examination or culture[8].

The incidence of pulmonary tuberculosis recurrence is a fairly common occurrence in tuberculosis patients and causes various problems[9]. The occurrence of this recurrence can increase the source of tuberculosis transmission in the community, so that it can inhibit the achievement of the goals of tuberculosis treatment and control[10].

Few studies has been reported on analyzing the existence of Tuberculosis among world population. Millet et al.[11] recognized the likelihood of death and its prescient factors of effectively treated TB patients and found that the death rate among TB patients who finished treatment is related with elderly population, HIV-contaminated IDU and alcohol drinkers. Millet et al.[12]distinguished the repeat rate of TB in Barcelona, the related hazard factors and found that relapses takes place in the initial three years, with patients at higher danger of repeat TB are those with HIV. Liao et al.[13] recognized the patterns and indicators of tuberculosis in Taiwan and found that easonality, natives, sexual orientation, and age had a steady and prevailing job in developing TB rate designs in Taiwan. Choi et al.[14] distinguished the indicators of aspiratory tuberculosis treatment results in South Korea and found that it was impacted by patient variables (diabetes status, age, BMI) and illness factors. Sanchez-Padilla et al.[15] reported a high pervasiveness of MDR TB in Swaziland, which at present seems to have the most noteworthy commonness in Africa, and demonstrates a quick increment in the predominance of MDR TB in the space of marginally over 10 years. Stuckler et al.[16] assessed the connection among mining and tuberculosis (TB) among nations in sub-Saharan Africa and found that mining is a huge determinant of countrywide variety in TB. Azhar et al.[17] evaluated recurrence instances of TB in India and found that hazard factors for recurrence included medication inconsistency, initial medication obstruction, smoking and liquor abuse. Moosazadeh et al.[18] analyzed the rate of repeat of TB in Iran and found that impressive level of smear-positive aspiratory TB patients encounter repeat and that a few patients are at a higher danger of repeat. Chen et al.[19] analyzed TB frequency and relative hazard factors in country regions of China and found that diabetes mellitus, smoking and liquor, history of TB were the distinguished risk factors.

It has been reported that in Indonesia, The highest cases of pulmonary tuberculosis recurrence occurred in productive age (15-64 years) in 2015 and increased by 18.3% in 2016[20]. Based on the highest recurrence area, it occurred in the PanakkukangSubdistrict area and Tallo Sub-District working areas in Makassar City. Thus, this work has aimed to analyze analyze the risk factors for recurrence of pulmonary tuberculosis in productive age in the working area of the health center in Panakkukang District and Tallo District, Makassar City.

Methodology

Type and Design of Research: This type of research is an observational analytic study with a case-control study. The independent factors associated with TB relapse that will be analyzed is BCG immunization history, history of co-morbidities, smoking habit, history consuming medication regularly, house ventilation, and types of house floors,. The dependent variable is recurrence of pulmonary tuberculosis

Location and Time of Research: This type of research is an observational analytic study with a case-control. This research was conducted in Panakkukang and Tallo Sub-Districts, Makassar City, South Sulawesi. The research was conducted on February 19 to March 27, 2017.

Population and Sample: The population case for this work were all pulmonary tuberculosis patients. The number of samples for this study were 80.

Data Collection: Primary data was obtained through interviews with pulmonary tuberculosis patients who had relapsed and patients recovered from tuberculosis as the study sample. Secondary data can be obtained from patient reports tuberculosis in the form of data on the number of tuberculosis cases.

Data Analysis: Data processing was analyzed using the SPSS program. Bivariate analysis was carried out on two variables suspected of being risk factors using the risk estimate test.

Result and Discussion

History of BCG Immunization against Recurrence of Lung Tuberculosis: Table 1 shows the result of Risk Factors for History of BCG Immunization against Recurrence of Lung tuberculosis. Based on the analysis, it was found that for the case group and control group the highest percentage was respondents who had a low risk (75.0% cases and 65.0% controls) and the lowest high risk (25.0% cases and 35.0% controls) who experienced recurrence of pulmonary tuberculosis. With the results of the risk estimate test, OR = 0.619 (OR <1) with intervals of 0.197-1.941 are obtained.

Table 1: Risk Factors for History of BCG Immunization against Recurrence Lung tuberculosis

BCG immunization	Recurrence of pulmonary TB				Total		P value
	Cases		Control				
	n	%	n	%	n	%	
High Risk	5	25.0	21	35.0	26	32.5	0.619 (0.197-1.941)
Low Risk	15	75.0	39	65.0	54	67.5	
Total	20	100.0	80	100.0	80	100	

History of Co-morbidity against Recurrence of Lung Tuberculosis: Table 2 shows the result of Risk Factors for History co-morbidityagainst Recurrence of Lung tuberculosis. The result showed that for the case group and control group the highest percentage was respondents who had a low risk (70.0% cases and 83.3% controls) while the lowest was high risk (30.0 % of cases and 16.7% of controls) experienced recurrence of pulmonary tuberculosis. With the results of the risk estimate test the OR value is obtained = 2.143 (OR> 1) with an interval of 0.663-6.924.

Table 2: Risk Factors for History of Co-morbidity against Recurrence Lung tuberculosis

Co-morbidity	Recurrence of pulmonary TB				Total		P value
	Cases		Control				
	n	%	n	%	n	%	
High Risk	6	30.0	10	16.7	16	20	2.143 (0.663-6.924)
Low Risk	14	70.0	50	83.3	64	80	
Total	20	100.0	60	100.0	80	100	

Smoking Habit against Recurrence of Lung Tuberculosis: Table 3 shows the result of Risk Factors for Smoking Habit against Recurrence of Lung TB. Results showed that for the case group and the control group the highest percentage was respondents who had a high risk (85.0% cases and 81.7% controls), while the lowest was low risk (15.0% cases and 18.3 % of controls) who experience recurrence of pulmonary tuberculosis. With the results of the risk estimate test the OR = 1,272 (OR> 1) with an interval of 0.317-5.111is obtained.

Table 3: Risk Factors for Smoking Habit against Recurrence Lung tuberculosis

Smoking	Recurrence of pulmonary TB				Total		P value
	Cases		Control				
	n	%	n	%	n	%	
High Risk	17	85.0	49	81.7	66	82.5	1.272 (0.317-5.111)
Low Risk	3	15.0	11	18.3	14	17.5	
Total	20	100.0	60	100.0	80	100	

History of taking regular medicine against Recurrence of Lung Tuberculosis: Table 4 shows the result of Risk Factors for History of taking regular medicine against recurrence of Lung TB. Results showed that for the case group the highest percentage was respondents who had high risk (55.0%) and the lowest low risk (45.0%), while for the control group the highest percentage was low risk respondents (83, 3%) and the lowest high risk (16.7%) experienced recurrence of pulmonary tuberculosis. With the results of the risk estimate test the OR = 6.111 (OR> 1) with an interval of 2.010-18.584 is obtained.

Table 4: Risk Factors for History of taking regular medicine against Recurrence Lung tuberculosis

Medicine	Recurrence of pulmonary TB				Total		P value
	Cases		Control				
	n	%	n	%	n	%	
High Risk	11	55.0	10	16.7	21	26.25	6.111 (2010-18.584)
Low Risk	9	45.0	50	83.3	59	73.75	
Total	20	100.0	60	100.0	80	100	

House Ventilation against Recurrence of Lung Tuberculosis: Table 5 shows the result of Risk Factors for House ventilation against recurrence of Lung TB. Results showed it was found that for the case group and the control group the highest percentage was respondents who had a high risk (80.0% cases and 85.0% controls), while the lowest were respondents who had low risk (20.0% of cases and 15.0% of controls) experienced recurrence of pulmonary tuberculosis. With the results of the risk estimate analysis obtained OR = 0.706 (OR <1) with an interval of 0.191-2.603

Table 5: Risk Factors for House Ventilation against Recurrence Lung tuberculosis

Ventilation	Recurrence of pulmonary TB				Total		P value
	Cases		Control				
	n	%	n	%	n	%	
High Risk	16	80.0	51	85.0	67	83.75	0.706 (0.191-2.603)
Low Risk	4	20.0	9	15.0	13	16.25	
Total	20	100.0	60	100.0	80	100	

Types of House Floors against Recurrence of Lung Tuberculosis: Table 6 shows the result of Risk Factors for Types of House Floorsagainst recurrence of Lung TB. Result showed that for the case group and control group the highest percentage was respondents who had a low risk (70.0% cases and 81.7% controls), while the lowest were respondents who had high risk (30.0% cases and 18, 3% of controls) who experienced recurrence of pulmonary tuberculosis. With the results of the risk estimate test, OR = 1.909 (OR> 1) with an interval of 0.599-6.081 is obtained.

Table 6: Risk Factors for House Floor against Recurrence Lung tuberculosis

Floor	Recurrence of pulmonary TB				Total		P value
	Cases		Control				
	n	%	n	%	n	%	
High Risk	6	35.3	11	18.3	17	21.25	1.909 (0.599-6081)
Low Risk	14	22.2	49	81.7	63	78.75	
Total	20	100.0	60	100.0	80	100	

Conclusion

Based on the results of research on risk factors for events Recurrence of Pulmonary Tuberculosis in productive age in the working area of Panakkukang District Health Center and Tallo District of Makassar City, the following was summarized. History of BCG immunization, history of co-morbidities, smoking habits, ventilation of the house, type of floor of the house, occupancy density and home contact with patients with pulmonary tuberculosis is not risk factors for recurrence of pulmonary tuberculosis in productive age. Nevertheless, history of taking regular medication is a risk factor for recurrence of pulmonary tuberculosis in productive age in the working area of Panakkukang District Health Center and Tallo District of Makassar City. Thus, It is expected that patients with pulmonary tuberculosis will regularly take medication, seek treatment in accordance with the schedule, and find out information regarding the stages and duration of treatment for pulmonary tuberculosis so as not to discontinue treatment.

Acknowledgment

The author would like to thank the Faculty Of Community Health, Hasanuddin University for unconditionally support and funding. The author(s) declare that there is no conflict of interest in publishing this article.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. World Health Organization. World health statistics 2015. World Health Organization; 2015 May 14.
2. Marais BJ, Loennroth K, Lawn SD, Migliori GB, Mwaba P, Glaziou P, Bates M, Colagiuri R, Zijenah L, Swaminathan S, Memish ZA. Tuberculosis comorbidity with communicable and non-communicable diseases: integrating health services and control efforts. The Lancet infectious diseases. 2013 May 1;13(5):436-48.
3. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, Baugh V, Bekedam H, Billo N, Casswell S, Cecchini M. Priority actions for the non-communicable disease crisis. The Lancet. 2011 Apr 23;377(9775):1438-47.
4. Rose AM, Hall CS, Martinez-Alier N. Aetiology and management of malnutrition in HIV-positive children. Archives of disease in childhood. 2014 Jun 1;99(6):546-51.
5. Howard AA, El-Sadr WM. Integration of tuberculosis and HIV services in sub-Saharan Africa: lessons learned. Clinical Infectious Diseases. 2010 May 15;50(Supplement_3):S238-44.
6. Esposito S, D'Ambrosio L, Tadolini M, Schaaf HS, Luna JC, Marais B, Centis R, Dara M, Matteelli

A, Blasi F, Migliori GB. ERS/WHO Tuberculosis Consilium assistance with extensively drug-resistant tuberculosis management in a child: case study of compassionate delamanid use. European Respiratory Journal. 2014 Sep 1;44(3):811-5.

7. Narayanan S, Swaminathan S, Supply P, Shanmugam S, Narendran G, Hari L, Ramachandran R, Locht C, Jawahar MS, Narayanan PR. Impact of HIV infection on the recurrence of tuberculosis in South India. The Journal of infectious diseases. 2010 Mar 1;201(5):691-703.
8. Glynn JR, Murray J, Bester A, Nelson G, Shearer S, Sonnenberg P. High rates of recurrence in HIV-infected and HIV-uninfected patients with tuberculosis. The Journal of infectious diseases. 2010 Mar 1;201(5):704-11.
9. Baker MA, Harries AD, Jeon CY, Hart JE, Kapur A, Lönnroth K, Ottmani SE, Goonesekera SD, Murray MB. The impact of diabetes on tuberculosis treatment outcomes: a systematic review. BMC medicine. 2011 Dec;9(1):81.
10. Guerra-Assunção JA, Houben RM, Crampin AC, Mzembe T, Mallard K, Coll F, Khan P, Banda L, Chiwaya A, Pereira RP, McNerney R. Recurrence due to relapse or reinfection with Mycobacterium tuberculosis: a whole-genome sequencing approach in a large, population-based cohort with a high HIV infection prevalence and active follow-up. The Journal of infectious diseases. 2014 Oct 21;211(7):1154-63.
11. Millet JP, Orcau A, Rius C, Casals M, de Olalla PG, Moreno A, Nelson JL, Caylà JA, Barcelona Tuberculosis Working Group. Predictors of death among patients who completed tuberculosis treatment: a population-based cohort study. PLoSOne. 2011 Sep 28;6(9):e25315.
12. Millet JP, Shaw E, Orcau À, Casals M, Miró JM, Caylà JA, Barcelona Tuberculosis Recurrence Working Group. Tuberculosis recurrence after completion treatment in a European city: reinfection or relapse?.PloSone. 2013 Jun 11;8(6):e64898.
13. Liao CM, Hsieh NH, Huang TL, Cheng YH, Lin YJ, Chio CP, Chen SC, Ling MP. Assessing trends and predictors of tuberculosis in Taiwan. BMC public health. 2012 Dec;12(1):29.
14. Choi H, Lee M, Chen RY, Kim Y, Yoon S, Joh JS, Park SK, Dodd LE, Lee J, Song T, Cai Y. Predictors of pulmonary tuberculosis treatment outcomes in South Korea: a prospective cohort study, 2005-2012. BMC infectious diseases. 2014 Dec;14(1):360.
15. Sanchez-Padilla E, Dlamini T, Ascorra A, Rüsch-Gerdes S, Tefera ZD, Calain P, de la Tour R, Jochims F, Richter E, Bonnet M. High prevalence of multidrug-resistant tuberculosis, Swaziland, 2009–2010. Emerging infectious diseases. 2012 Jan;18(1):29.
16. Stuckler D, Basu S, McKee M, Lurie M. Mining and risk of tuberculosis in sub-Saharan Africa. American journal of public health. 2011 Mar;101(3):524-30.
17. Azhar GS. DOTS for TB relapse in India: A systematic review. Lung India: official organ of Indian Chest Society. 2012 Apr;29(2):147.
18. Moosazadeh M, Bahrampour A, Nasehi M, Khanjani N. The incidence of recurrence of tuberculosis and its related factors in smear-positive pulmonary tuberculosis patients in Iran: A retrospective cohort study. Lung India: official organ of Indian Chest Society. 2015 Nov;32(6):557.
19. Chen W, Shu W, Wang M, Hou Y, Xia Y, Xu W, Bai L, Nie S, Cheng S, Xu Y. Pulmonary tuberculosis incidence and risk factors in rural areas of China: a cohort study. PLoSOne. 2013 Mar 12;8(3):e58171.
20. Idrus M, Mallongi A, Ibrahim J. Surveillance System Model for Pulmonary Tuberculosis Suspected in Pangkep Region, Indonesia. Current Research in Tuberculosis. 2017;9:1-7.

Health Belief Model and Its Association with Cervical Cancer Screening Among Malaysian Women

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ABSTRACT

In Malaysia, the most common cancer that suffered by women is cervical cancer. The rate of death among the patients are mostly can be prevented since there are many screening test offered for early diagnosis. This study aims to explore about the association of cervical cancer among the Malaysian and Health Belief Model (HBM). The study also investigates demographic factors associated with cervical cancer screening and HBM constructs. A set of questionnaires containing the demographics of the respondents and THREE constructs of HBM including *Perceived Risk*, *Perceived Severity* and *Perceived Benefits* were distributed among the Malaysian women in the selected hospitals. The study indicates that the most likely age structure that has undertaken Pap Smear Test are those whose age is more than 60 years old, women from Indian race, they are the smallest group receiving a pap smear test and also the smallest group that do not know the importance of being screened. In addition, Malay women are the second less group to receive Pap smear test compared to Chinese women. In terms of individual income and educational background, the women under these two aspects are less likely to report screening. Although limited in terms of scope, the information from this study has provided insight into the association between demographics, *Perceived Risk, Perceived Severity* as well as *Perceived Benefits* with regard to cervical cancer screening. For those who are interested with the intervention project to enhance the participation of this cancer screening this kind of information will be very useful.

Keyword: *Health Belief Model, Cervical Cancer Screening, Malaysian Women*

Introduction

In Malaysia, the most common cancer that suffered by women is cervical cancer. The rate of death among the patients are mostly can be prevented since there are many screening test offered for early diagnosis. The mortality caused by cervical cancer is having a sharp decline since it has been introduced in 50's. There are just a few of women all over the world are having cervical cancer proper screening even though the Pap smear testing is well established for years (Community Health Assessment, 2012).

The cases of cervical cancer that have been recorded in developing countries are as high as it counts to more than 80% of the total half a million cervical cancer cases worldwide (WHO, 2010). According to the Second Report of the National Cancer Registry in 2003, Malaysia has 19.7 cases per 100,000 per populations that being reported (Lim, Chye&Yahaya, 2003). Approximately, about less than two thousands of new cases of cervical cancer are diagnosed in Malaysia and about 3,000, cases are being treated in public hospitals. The incidence is highest between the ages of 50 and 69, about 50% of the cases were diagnosed between the ages of 35 and 55, which are the most economically productive years for women. The Women Health Organization (WHO) projects more than 250,000 women die annually from cervical cancer, 99% caused by HPV and it will rise to 320,000 in 2015 and 435,000 in 2030. Similar to the other types of cancer, cervical cancer may not cause any symptoms until the cancer is spreading and is already on its advanced stage.

Health Belief Model: The Health Belief Model (HBM) was developed by Hochbaum, Leventhal, Kegeles and Rosenstock in 1950 to explain the widespread failure of people to participate in programs to prevent and detect disease. HBM is one of the oldest templates that has been extended to study peoples' responses to symptoms

and their behaviors in response to diagnose illness, in particular an adherence to medical regimens (Glanz et al., 2008). It also aims to explain preventive behaviors(Ben-Natan&Adir, 2009). The HBM has been used extensively to determine the relationship between health beliefs and health behaviors as well as to inform interventions. For a behavior change to succeed, individuals must have the incentive to change, feel threatened by their current behavior, feel that a change will be beneficial and be at acceptable cost. They must also feel competent to implement that change (Bush, 2009). In other words, HBM is a comprehensive model which is primarily related to prevention and is based on the individual's motivation for action (Karimy, Heidarnia&Ghofranipour, 2009). Research using a theory-based assessment approach to study women's behavior with regard to Pap smear testing is limited and there is an immediate need to understand the Pap smear practices that would allow healthcare professionals to develop more effective and cost-effective programs (Wong et al., 2008). Inherently, there are challenges to working with patients to change their behavior (Masoudiyekta et al., 2015) to reduce the likelihood of experiencing a condition of suffering from a disease (Sundstrom et al., 2018), and that some of the challenges are highlighted in the dimension of the HBM.

Basically, HBM comprises four constructs: *Perceived Susceptibilty or Perceived Risk*, *Perceived Severity,* Perceived *Benefits,* and Perceived *Barriers,* each of which can be used to explain health behaviors. More recently, other constructs such as *Self-efficacy* and *Cues to Action* have been added to the HBM (Wayne, 2014). However, in this paper, only three constructs will be presented which are: *Perceived Risk*, *Perceived Severity* and *Perceived Benefits. Perceived Susceptibility* refers to beliefs about the likelihood of getting a disease or condition This is one of the strongest perception in urging people to adopt healthy behaviors(Tavafian, 2012). The more a person perceived the risk, the more likely that the person engages the behavior to decrease the risk. In other words, when a woman believes that she is at risk for a disease, she will definitely do something to prevent from happening. *Perceived Severity or Risk* construct refers to the severity of a health problem as assessed by the individual (Tavafian, 2012)by specifying the consequences of the risk and the condition. *Perceived Benefits* refer to a person's opinion of the value or usefulness of a new behavior in decreasing the risk of developing a disease (Wayne, 2014). It plays an important role in the adoption of secondary prevention behaviors such as screening.

Cervical cancer mortality is largely preventable, given the availability of internationally accepted screening tests for early diagnosis. However, screening policies and practices vary by country, along with attendance rates. This study aims to explore about the association of Health Belief Model (HBM) with cervical cancer screening among Malaysian women. The study also investigates demographic factors associated with cervical cancer screening and HBM constructs.

Method

For this study, a total of 1000 pamphlets has been distributed throughout the region around the study region. However, a total of 300 who met the criteria for inclusion and agreed to participate in the study. The women were recruited in person, using information pamphlets and flyers.

Data Collection Procedure: Prior to project implementation, the research assistants are trained how to administer the research instrument as well delivering the right information to the respondents, data collection, accuracy and confidentiality. The measures were translated from English to Malay to ensure the appropriateness for the community.

Measures: The measures included in the study are (1) socio-demographics and(2) perception related to HBM constructs. Socio-demographic characteristics includes age, marital status, education and employment status. This study aims to explore about the association of HBM with cervical cancer screening among Malaysian women. As mentioned earlier, the THREE constructs of HBM include *Perceived Risk*, *Perceived Severity* and *Perceived Benefits*. The study also investigates demographic factors associated with cervical cancer screening and HBM constructs. Items for HBM constructs were adapted from Grace et al. (2013) and in this paper, only THREE constructs are presented. Other results are reported elsewhere.

Cronbach's alpha is the most common measure of internal consistency when using multiple Likert questions in a survey. The Cronbach's alpha coefficients ranging from 0.929 to 0.964. The factor loading for

factor analysis is 0.935 to 0.967 for Perceived Risk, 0.916 to 0.962 for Perceived Severity and 0.920 to 0.973 for Perceived Benefits. The alpha coefficient for the three constructs suggesting that the items in each construct has relatively high internal consistency.

A univariate logistic regression was used to examine the association between the pap smear test and the HBM constructs. In addition, the logistic regression was also used in conjunction with the demographic variables to determine the confounding effect between HBM that associated with ever having the Pap Smear Test. To assess whether these factors contribute significantly to a model, the likelihood ratio test (LRT) is reported since it is a much preferred as suggested byHilbe (2009).

Results and Discussion

A total of 171 of 300 respondents (57%) reported having undertaken a Pap Smear test. Among these respondents, the highest percentage of age structure is more than 60 years old (32% or 55 out of 171) and the least is from the group of 17-40 years old (17.5% or 30/171). On the contrary, the highest percentage of group structure that has not taken a pap smear test is from the age of 17-40 years old (31.8%), followed by 24 % of the age structure of 51-60 years old, 23.2%% of them were above 60 years, and 20.9% of the respondents whose age is in the range of 41-50 years (Table 1). Among the respondents, nearly 50% (142 out of 300) were married women, followed by widowed (20%), never married (18.7%) and divorced (14%).

Table 1: The distribution of respondents based on age, marriage status based on Pap Smear test

	Pap Smear				**Total**
Age	**No**	**%**	**Yes**	**%**	
17-40 years	41	57.7	30	42.3	71
41-50 years	27	42.2	37	52.1	64
51-60 years	31	38.8	49	69.0	80
>60 years	30	35.3	55	77.5	85
Total	**129**		171		300
Marriage Status	No	%	Yes	%	
Widowed	8	13.3	52	86.7	60
Divorced	7	16.7	35	83.3	42
Never Married	23	41.1	33	58.9	56
Married	91	64.1	51	35.9	142

Indian women are the least likely to have had a pap smear test and also the least likely to know the reasons why they have been screened. In addition, Malay women are less likely than Chinese women to have received Pap Smear Test. The analysis also indicates that 60% of Muslim women participated in the study, followed by the Buddhist (17%), Christian (13%) and Hindu (10%). The analysis also indicates that the higher the education the women have, the higher the percentage of cervical screening among women. The participation of cancer screening was higher among the employed women compared to the others (Table 2).

Table 2: The distribution of respondents based on age, marriage status based on the Pap Smear test

	Pap Smear				
Education level	**No**	**%**	**Yes**	**%**	**Total**
Below high school	67	58.8	47	41.2	114
High school	56	49.1	111	66.5	167
Higher education	6	5.3	13	68.4	19
Total	129		171		300

Conted…

Employment	No	%	Yes	%	Total
Housewife	35	39.8	53	60.2	88
Retired	6	15	34	85	40
Unemployed	41	67.2	20	32.8	61
Employed	47	42.3	64	57.7	111

Perceived Risk: Fig. 1 provides a visualization of Perceived Susceptibility (*at risk) of getting cervical cancer*. Among those who have taken the Pap Smear test (171 in total), higher percentage of the respondents perceived that they are not at risk (41.5%) of getting cervical cancer, some are unsure (48.5%) and some think they are at risk (10%). Among those who have not taken the test, about 42.6% perceived that they are not at risk of getting cancer. Comparing these two cohorts, it is obvious that respondents either they had undertaken the test or not believe that they are not at risk of getting cervical cancer. This may be due to the fact that the respondents do not have an access to the information about the cervical cancer and its consequences. However, those who have taken the test show a higher percentage of perceived at risk than those who have not (9.9% versus 1.6%).

Another question on perceived risks is "Are you more likely than average women to get the cervical cancer?". The respondents who had Pap Smear Test perceived that they are not likely than average women to get cancer (52%). The figure also reveals that the same distribution of patterns for those who did not take the pap smear test. The percentage of those who perceived that they are more likely than average women to get cervical cancer for the YES group is higher than from the NO group. The logistic regression analysis of the demographic variables and the Perceived Risk with respect to screening, the Likelihood Ratio Tests indicate that age ($p<0.001$), employment ($p<0.001$) and marriage status ($p<0.023$) are significant to cervical cancer screening. However, the item "Perceived at risk of getting cancer" is only significant at 10% level ($p<0.07$).

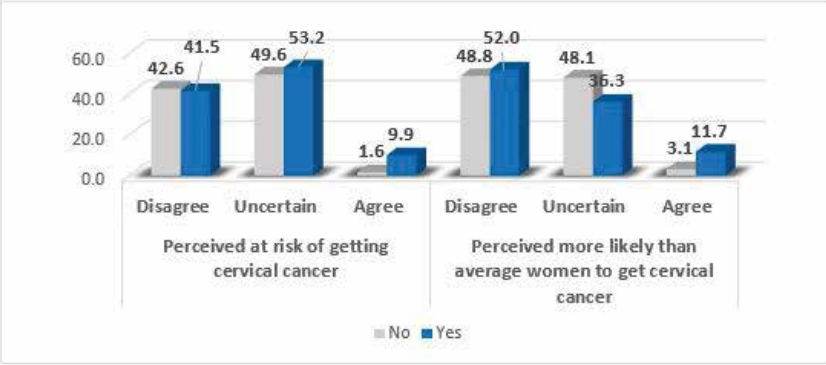


Figure 1: Perceived at risk of getting cervical cancer Based on Pap Smear Test

For completeness, the analysis within each answer scale is also presented. Among the respondent who Agree, about 83% of the respondents that have taken Pap Smear Test perceived that they are more likely than average women to get cervical cancer (Fig. 2). However, the percentage of those who have not taken the pap smear test is increasing by 14.9%.



Figure 2: Perceived more likely than average women to get cervical cancer

Perceived Severity: With respect to perceived severity, the graphical representation is shown in Fig. 3. The percentage of respondents agree with the three statements ranging from 31% to 50.9%, in particular, they perceived that "Having cervical cancer changes their life" (50,9%) and "threaten the relationship with their partner" (46.2%). Among the Perceived Severity items, the item "Women having cervical cancer will die from it" and "Having cervical cancer changes life" are significantly associated with cervical cancer screening (both $p<0.001$). The items become insignificant when demographic variables are included in the model. However, age ($p<0.12$) and Marriage Status ($p<0.001$) remain significant to the cervical cancer screening.

Perceived Benefits: Another constructs of HBM explored in this study is Perceived Benefits. In terms of Perceived Benefits of Pap Smear Test, about 54% of those who had undertaken the test believe that Pap Smear test is the best way to detect cervical cancer (Fig. 4) and also an important test for staying healthy (60.2%). They also believe that it is easier to treat cervical cancer if detected early (64.3%), the chances of dying due to cervical cancer decreases if the test is taken annually (58.5%) and having a test so as not to worry about the cancer (52.6%). In addition, those who did not take the test also agree that Pap Smear Test is the best way to detect cervical cancer (46.5%).

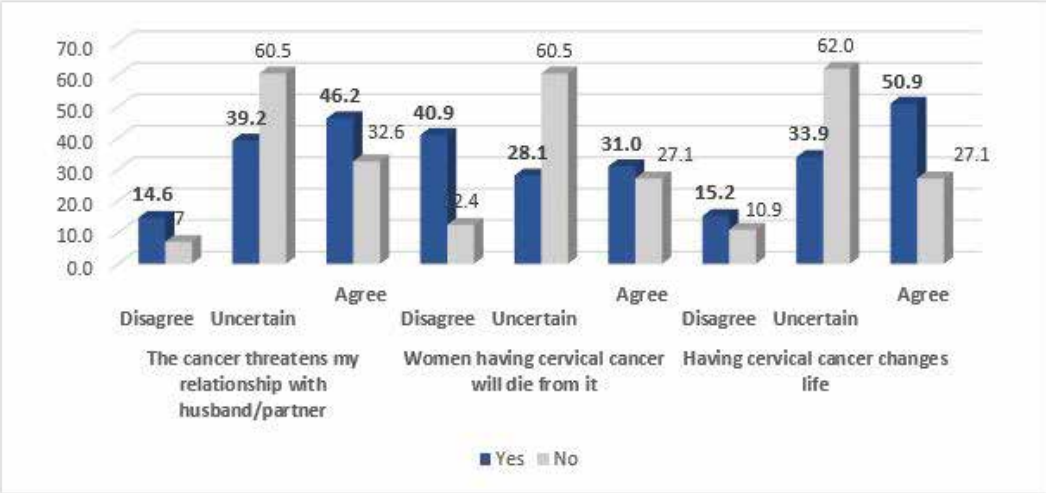


Figure 3: Perceived more likely than average women to get cervical cancer

Based on the Likelihood Ratio Test, all items for Perceived Benefits are significant at 5% level ($p \leq 0.001$). The adjusted model with demographic variables reveals that Age ($p < 0.001$), Marriage Status ($p < 0.001$), item "Easier to treat cervical cancer due to early detection ($p < 0.02$).

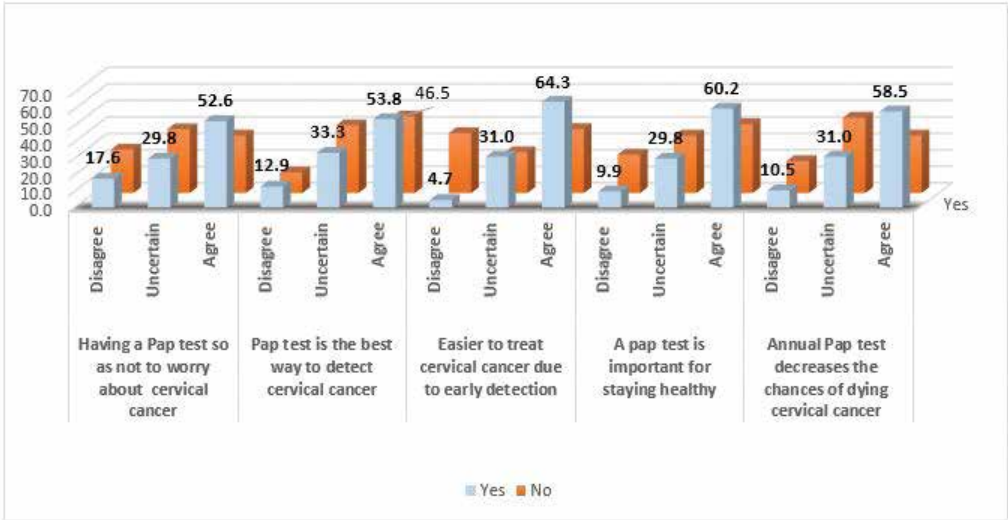


Figure 4: Perceived benefits of cervical cancer screening

Conclusion

The HBM Scale for Cervical Cancer Screening was found to be valid and reliable tool in assessing the women's health beliefs as agreed by GuvenenAkyuz and Acikel (2011). In conjunction with the Perceived Susceptibility, demographics variables such as *Age, Employment* and *Marriage Status* are significant ($p < 0.001$) to Cervical Cancer screening. However, for *Perceived Severity*, only *Age* and *Marriage Status* are significant. Similarly, for *Perceived Benefits* these two factors from demographic are significant to Cervical Cancer Screening. As a conclusion, *Age* and *Marriage Status* are significant factors for the three HBM constructs explored in this study.

Although the study is limited to selected hospitals, an insight to what extend the HBM influences the cervical cancer screening has been presented. Consequently, the information can be used as a reference towards enhancing cervical cancer uptake in the future. The study also could be directed to the aimed specific groups of women besides establishing its dependability in other selected locations. Nevertheless, understanding the beliefs of women with respect to Cervical Cancer Screening that inevitably helps healthcare professionals to develop more effective cervical cancer screening programs.

Acknowledgements

This research is supported by the Fundamental Research Grant under the Ministry of Higher Education Malaysia: Grant No. 12379.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Ben-Natan M, Adir O. Screening for cervical cancer among Israelilesbian women. International Nursing Review. 2009 Dec;56(4):433-41.
2. Bush book: Health Promotion Strategies. Available at http://www.nt.gov.au/health/healthdev/health_promotion/bushbook/volume1/about3.html//what accessed 23 Jan 2009.
3. Community Health Assessment- final 11-12. Cancer quest: Cervical cancer. 2012.Available at http://www.cdc.gov/std/HPV/hpv.pdf Accessed 27/10/09.
4. Glanz K, Rimer B.K, Viswanath, K. Health Behavior and Health Education: Theory, Research, and Practice, 4th Edition. 2008.
5. Grace X. M,Wanzhen G, Carolyn Y. F, Yin T, Ziding F, Shaokui G, Joseph A.N. Health Beliefs Associated with Cervical Cancer Sscreening Among Vietnmese Americans. Journal of Women Health. 2013;22(3):276 – 288.
6. Guvenem G, Akyuz A, Açikel C. H. Health belief model scale for cervical cancer and pap smear test:psychometric testing. J AdvNurs. 2011;67(2):428-37.
7. Hilbe J. M. *Logistic Regression Methods*, CRC Press. 2009;81-82
8. Karimy M, Gallali M, Niknami S, Aminshokravi F, Tavafian S. S. The effect of health education program based on Health Belief Model on the performance of Pap smear test among women referring to health care centers in Zarandieh. *Journal of Jahrom University of Medical Sciences*. 2012;10(1).
9. Lim G.C.C, Yahaya H. Second Report of the National Cancer Registry Cancer Incidence in Malaysia. National Cancer Registry. Ministry of Health Malaysia. 2003.
10. Masoudiyekta L, Dashtbozorgi B, Gheibizadeh M, Malehi A.S, Moradi M. Applying the Health Belief Model in Predicting Breast Cancer Screening Behavior of Women. *Jundishapur J ChronicDis Care*. 2015;4(4):25-29.
11. Tavafian S. S. Predictors of Cervical Cancer Screening: An Application of Health Belief Model, *Topics on Cervical Cancer With an Advocacy for Prevention*, Dr. R. Rajamanickam (Ed.), ISBN: 978953-51-0183-3, InTech. 2012.Available from: http://www.intechopen.com/books/topics-on-cervical-cancer-with-anadvocacy-for-prevention/predictors-of-cervical-cancer-screening-an-application-of-health-belief-model
12. Sundstrom B, Brandt. H. M, Gray L, Pierce J. Y. It's My Time: applying the health belief model to prevent cervical cancer among college-age women. *Journal of Communication Management*. 2018;22(2):161-178.

13. Wayne W. LaMorte. The Health Belief Model. Boston University School of Public Health. 2016. Available from http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories2.html

14. World Health Organization (WHO). World Health Statistics. 2010. Available at http://www.who.int/whosis/whostat/EN_WHS10_Full.pdf?ua=1

15. Wong L.P, Wong Y.L, Low W.Y, Khoo E. M, Shuib R. Cervical Cancer Screening Attitudes and Beliefs of Malaysian Women who have Never had a Pap Smear: A Qualitative Study. International Journal of Behavioral Medicine. 2008;15:289–292.

16. Ying C. Z, Shirley S. Y, Ching A. Y. L. Quality of Life in Cervical Cancer Survivors: A Review of the Literature and Directions for Future Research. *Oncology Nursing Forum*. 2011;38(2):107-117.

Level of Spiritual and Demographic Factors among People Living with HIV/AIDS

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ABSTRACT

Individuals infected with the HIV/AIDSfrequentlyreceive negative conjecture from the public in all aspects of life as well as in the aspects of spirituality. However, spirituality has been identified to contribute positive impact on people who are suffering hardship including individuals infected with HIV/AIDS. Spirituality is often used as asource of strength or coping strategy to deal with the challenges in life.The HIV/AIDS virus is commonly related to social problems and promiscuous activities. This research was conducted to identify the level of spirituality among people living with HIV/AIDS (PLWHA)in the state of Kelantan.The respondents consisted a total of 34 male and female HIV/AIDS patients. The data was gathered using a set of questionnaires from Spiritual Quotient Questionnaire (SQQ) which was developed by MySkills Profile. com (2006).The set consisted of 72 items which was translated and adapted by Zarina Mat Saad, Zulkarnain Ahmad Hatta and Noriah Mohamed (2010). The results showed that majority of the respondents have a moderatelevel of spirituality; other than that the result did not show any significant relationshipsamong the respondents' spiritual level and the selected demographic factors which are age, income, number of dependentsand duration of infection.This somehow shows that even though the respondents had involved withactivities that are against the norms of society, they still maintain a considerablelevel of spirituality. Therefore, the society should avoid casting their prejudice against people living with HIV/AIDS.

Keywords: *spiritual, HIV/AIDS, social problems, prejudice.*

Introduction

HIV continues to become one of the global health issues. In 2015, an estimated 36.7 million of the world population living with HIV including 1.8 million children.However, the percentage of adults with HIV is higher at 0.8% andmost of the HIV patients live in the low-income countries. It was also repoted that 1.1 million people died due to AIDS related deseases in 2015. Since the beginning of the epidemic, 78 million people have been infected with the deadly virus, and 35 million have perished as a result of AIDS complications Malaysia AIDS Council[13].

Psychosocial issues have played a major role in the life of people living with HIV/AIDS (PLWHA). According to Fabianova[11], people living with HIV/AIDS will experience emotional stress once they know their HIV/AIDS status. Based on the conducted researches, HIV victims will experiencefrustratation, fear, anger, anxiety, guiltand fear of losing something precious. Besides that, some victims have experienced denialsituation where they cannot accept the fact that they are infected with the terminal disease. This could lead to depression and severe emotional stress that may end in negative action such as suicide.In the emotional context, normally people living with HIV/AIDS are afraid and worry to face their family members, spouses and the community. The issues of discrimination and negatives stigma hurl at them are among the factors that contribute to their emotional stress. Apart from that, they are presumed to be deviated from healthy lifestyle as well as lacking the righteousness and proper religious practices.

Spirituality and religion are two interrelated terminologies but carry different meanings. Most researchers use the two terms in their studies as the concepts are complex in nature and intertwine with one another. These two concepts cover variousvariables such as cognitive, interpersonal, emotion, behavior and physiology dimensions Plante& Sherman[17]. Many experts concluded that there is an apparent different

between spirituality and religion. Religion is communal in nature and manifested in the context of formal religious institution. On the other hand, spirituality carries a larger concept that involve a belief system and values that an individual holds onto, in which also covers the concept of religion. However, the nature of spiritualityis more on the personal side of an individual and inclusive of one's inner self as compared to religion Mattis&Jagers[14]; Westgate[24].

Spirituality is often defined as non-material matters that assiststhe quests of finding the meaning of life and relationship more than the individual's self.It can increase one's knowledge (knowledge acquired through other ways than by normal means) and make a person live a compassionate life.This knowledge can be acquired through devotion on certain religion, belief system, culture, value and custom Zarina Mat Saad, Zulkarnain Ahmad Hatta &Noriah Mohamed[25]. Therefore, this research uses and measures the concept of spirituality based on the spiritual intelligence.

Spiritual intelligence is the basis of the search and usage of information in problem solving Emmons[6]. It contains several abilities and competencies for a person to deal with a problem or adaptation process. Thus, Emmons stated that spiritual intelligence is the most important intelligence compared to other forms of intelligence. It enables an individual to cater daily problems and achieve goals which will eventually improve the wellbeing and quality of life.

The Level of Spirituality Determining Factors of People Living with Hiv/Aids: The research on spirituality was conducted by Bernstein, D'Angelo andLyon[3] involving teenagers aged between 12 to 21 years old. The respondents, male and female, consisted of teenagers from various ethnicities; some were HIV/AIDS positive while others were not.The research found that majority of the respondents favored spiritual based activitiesespecially the ones with positive HIV/AIDS who had shown higher percentage of interest. This was due to their seriousness of mental stress, and they have high confidence that spiritual based activities will cure them of their disease. High level of spirituality/religiosity helps HIV/AIDS patients cope with the infection through bolstering and changing the attitude[7], reducing the anxiety and mental health problem which indirectly give a positive impact to their status Arrey, Bilson, Lacor&Descheppe[1].

The staff who are directly involve in providing humanitarian and health service should have the knowledge on how individuals who come from various ethnicities or religious backgrounds express their spirituality towards their illness Koenig & Cohen[9]. According to Koenig, there are six causes as to why spirituality aspect should be given a consideration among the patients.They are:

i. Most patients emphasize religion and spirituality, and want the two matters to be considered in their treatment.

ii. Religion/spirituality influence their ability to cope with their illness.

iii. In-patients receiving care in hospitals are isolated from their religious community.

iv. The belief of a religion/spirituality influence the patients' decision making regarding the treatment that they will receive.

v. Religion/spirituality influence the mental and physical health or vice versa.

vi. Religion/spirituality influence health care in the community.

Dalmida[5] found that women infected with HIV/AIDS have turn to faith or belief in religion were able to determine their wellbeing and quality of life including excellent health status. In her article, she explained about the relationship between stress or depression and spiritual level among persons living with HIV/AIDS. Without a strong faith in the respective religions, patients have the tendency to be affected with other mental problems. This statement showed that one's spirituality enable a person to determine a better quality of life. Spirituality has also been used as an individual's resource to cope with illness or psychological and emotional related issues Sowell et al[22], and to adapt to uncertain situations especially in cases where options to deal with common illnesshave ran out Simoni, Martone, &Kerwin[22]. For most women diagnosed withHIV positive, spirituality has played an important role to deal with emotional stress related to HIV infection McCormick, Holder, Wetsel, & Cawthon[15]; Powell, Shahabi, &Thoresen[18]; Sowell et al[22]).

Besides that, Rentala, Lau and Chan[19] conducted a study regarding the relationship between spirituality and emotional stress faced by people living with HIV/AIDS. The study involved 120 Hindu and Muslim patients in

a hospital in Karnataka, India. The result of the study showed that patients who were having high level of stress greatly require spiritual activities as compared to those who were less stress. The spiritual activities are hoped to assist the patients to share the meaning and purpose of life.

Spirituality Aspect That Affects the Life of People Living with Hiv/Aids: A study by Szaflarski, Ritchey, Leonard, Mrus, Peterman, Ellison, Tsevat[23] has found that spirituality/religion positively related with emotion, and the life has increasingly becomes better for HIV/AIDS patients after being diagnosed.Indirectly, their health status also improve once they comprehend the aspect of spirituality.Besides that, according to Cotton et al[4], the high level of spirituality also increases the satisfaction in life, health status and the quality of life. According to Arrey, Bilsen, LacordanDeschepper[1], spiritualityis an important element in establishing coping strategy, survival and ensuring the wellbeing of the community in Africa.The comprehension and practice in the aspect of spirituality and religion become more important once a person has been diagnosed with chronic diseases including HIV/AIDS. A study conducted on 44 respondents has found that religious practices like prayers, meditation and performing charity work in places of worship have made the patients accept their health conditions and consider it as fated by God. Besides that, they believe that certain religious activities will enable them to receive divine assistance.

The research of Mohammad Amin Wani[16] in the district of Jammu and Kashmir, India among the people living with HIV/Aids on the quality of life has found that 65% of the respondents have showed a low level of spirituality while only 35% of the respondents have high level of spirituality.Spiritual and religious elements has been the source of strength and has a direct connectionwith HIV patients especially those who are receiving palliative care.However the direct connection differs from male to female patients.The research of Hutson, Darlington, Hall, Heideland Gaskins[8] further explained that spiritual wellbeing moderately differs between the male and female respondents. However, the researchers reported that religious wellbeing were high among the female respondents as compared to the male's moderate level.

Specifically, among the female HIV patients, engagement in spiritual activities such as praying relieve emotional stress, depression, promote optimistic attitude and be more adaptable with the psychological change that has happened. Laveena, Govindraju, & Monterio[10]. The belief in God and higher power among the HIV patients in Malaysia have become a strong foundation to face the challenges as a person living with HIV/Aids Shaw, Cornwell, Lim, Saifi, Lik, & Kamarulzaman[20]. Shaw's study also explained that believing in God gives an impact to the HIV patients' spiritual strength while facing the stigma in the community.

Systematic referral research by Doolittle, Justice and Fiellin[6] supported the 15 researches that were conducted in the period from 1980 to 2016 for topic concerning HIV/AIDS and spirituality showed that there was a positive relationship between religious aspect and the conducted HIV clinical study.All of the researches showed that involvement in religious/spiritual activities were related to the count increase of the CD4 cell, lower the viral loads which refers to the total HIV in the blood vessels and decrease the number of death among the HIV patients.

To summarise, based on the previous literature, spirituality seems to be crucial to the people living with HIV/AIDS. It acts as the source of strength to cope with the disease, help to make better decision and parallel with the faith of the patients. It is also said to increase the physical and mental wellbeing of the people living with HIV/AIDS to live peacefully after being diagnosed with the virus.

Methodology

This research utilized the quantitative approach and the data was gathered using the survey method through a packet of questionnaire. For the purpose of questionnaire distribution, several NGOs providing care service to people living with HIV/AIDS in the state of Kelantan were contacted.

The respondents involved in this study were people who are infected with the HIV/AIDS virus. The main constraint of this study was to get respondents who were willing to be involved in the study. This was due to self disclosure issue. Therefore, only 37 persons had agreed to fill in the questionnaire with assistance. However, only 34 questionnaire were completed and can be analysed.

The spirituality level was measured using the Spiritual Quotient Questionnaire (SQQ) that was developed by MySkills Profile.com (2006) and were

translated and adapted to the Malay language by Zarina Mat Saad, Zulkarnain Ahmad Hatta and Noriah Mohamed[25]. The instrument's internal reliability is acceptable with a Cronbach's Alpha value of 0.91. The instrument uses the 5 points likert scale from 1 = very disagree to 5= very agree. The spiritual intelligence are divided into 3 levels which are low (score of 72-168), moderate (169-264) and high (265-360).

The quantitative data was analized using Statistical Package for Social Science(SPSS-PC). Descriptive statistics analysis method which involved percentage and mean were used.

Result and Disscussion

Demography: All of the respondents involved in this research were Muslims of the Malay origin.Genderwise, 29 (85.3%) respondents were male and the remaining 5 (14.7%) were females. They aged between 17 to 57 years old with the majority of the respondents aged between 31-40 years old (52.9%). The profiles of each respondents were almost similar to the study conducted by the Malaysia AIDS Council which showed that majority of people living with HIV/AIDS are Malays aged between 30-39 years old.

Majority respondents had a moderate level of education and earned income between RM500 – RM1000. Only one respondent earned an income of RM3000 while ten respondents (29.4%) do not earn any income.Most of them are HIV positive and only one respondent were diagnosed with AIDS. The main source of infection was needle sharing due to the habits of drug abuse injection.Most of the respondents were infected in less than 5 years (Refer Table 1)

Table 1: Socio-Demographic Profile

Respondent Information		**Illness Information**	
Gender		**Infection Status**	
Male	29 (85.3%)	HIV	33 (97.1%)
Female	5 (14.7%)	AIDS	1 (2.9%)
Age (years old)		**Source of Infection**	
<30	6 (17.6%)	Needle Sharing	25 (73.5%)
31–40	18 (52.9%)	Sexual Relation	7 (20.6%)
41–50	9 (26.5%)	Needle Sharing & Sex	1 (2.9%)
>51	1 (2.9%)	Infected	1 (2.9%)
Averag e = 37.18; Min = 17; Max = 57			
Marital Status		**Risky Activities**	
Single	21 (61.8%)	Drug Abuse	23 (67.6%)
Married	5 (14.7%)	Sexual Relation	8 (23.5%)
Widow/ Widower	8 (23.5%)	Both	1(2.9%)
Level of Education		**Duration of Infection (years)**	
Rendah	9 (26.5%)	< 5	20 (58.8%)
SRP/PMR	14 (41.2%)	6–10	4 (11.8%)
SPM/STPM	10 (29.4%)	11–15	3 (8.8%)
Diploma	1 (2.9%)	16–20	4 (11.8%)
		>21	2 (5.9 %)
		not reported	1 (2.9%)
Income(RM)			
None	10 (29.4%)		
Indefinite	1 (2.9%)		
<500	4 (11.8%)		
501–1000	12 (35.3%)		
1001-1500	3 (8.8%)		
2500-3000	1 (2.9%)		
Unreported	3 (8.8%)		
Min = 100; Max = 3000; Average = 916.50			

Level of Spirituality: The study shows that majority of respondents have a moderate level of spirituality (18; 53%) and high 15; 44%). This depicts that even though the people living with HIV/AIDS were involved in social misbehaviors they still possess a good level of spirituality (average255.82) (refer table 2)

Table 2: Respondents' Spirituality Level

Spirituality Level	Score	N (%)
High	265–360	15 (44%)
Moderate	169–264	18 (53%)
Low	72– 168	1 (3%)

The Relationship between Level of Spirituality and Selected Demographic Profiles: Next, Pearson Correlation was run to test the relationship among demographic factors and the respondents' spirituality.

Age: To determine the relationship of age and level of spirituality amongpeople living with HIV/AIDS. The result is shown in Table 3.

H_1: No significant relationship between age and level of spirituality.

Based on Table 3, failed to be rejected because of the probability value (significant) > 0.05 for spirituality level of people living with HIV/AIDS.At the significant level 5%, there is no significant difference in age based on the level of spirituality. This shows that age difference does not affect the spirituality level of HIV/AIDS patients. The Pearson correlation analysis showed that age and spirituality level have a weak positive relationship.

Table 3: Correlation Analysis Result between Age and Level of Spirituality

		Level of Spirituality
Age	Pearson Correlation	0.252
	Significant (p-value)	0.133

Income: Conducting correlation analysis to test the relationship between income and spirituality level of people living with HIV/AIDS, the result is shown in Table 4.

H_2: No significant relationship between income and level of spirituality.

In table 4, failed to be rejected because the value ofprobability (significant) > 0.05 for spirituality level of HIV/AIDS patients.At significant level of 5%, there is no significant difference between income and spirituality level. It can be deduced that difference in income does not affect the spirituality level of the HIV/AIDS patients. The Pearson correlation analysis showed that income and spirituality level have a weak posiiverelationship.

Table 4: Correlation Analysis Result between Income and Spirituality Level

		Spirituality Level
Income	Pearson Correlation	0.288
	Significant (p-value)	0.083

Number of Dependents: Analysis was conducted to test the relationship between the numbers of dependents and spirituality level of people living with HIV/AIDS using the Pearson correlation.The results is recorded in Table 5.

H_3: No significant relationship between the numbers of dependents and spirituality level.

Based on the result in Table 5, failed to be rejected because the value of probability (significant) > 0.05 for spirituality level of HIV/AIDS patients.At significant level of 5%, there is no significant difference between the number of dependents and spirituality level. The difference in the number of dependents does not affect the spirituality level of the HIV/AIDS patients. The Pearson correlation analysis showed that the number of dependents and spirituality level have a weak negative relationship.

Table 5: Correlation Analysis Result between Numbers of Dependents and Spirituality Level

		Level of Spirituality
Number of Dependents	Pearson Correlation	-0.208
	Significant (p-value)	0.218

Duration of Infection: To study the relationship between factor of duration of infection and spirituality level of people living with HIV/AIDS, correlation analysis was conducted.The result is shown in Table 6

H_4: No significant relationship between the duration of infection and spirituality level

The result in Table 6, failed to be rejected because the value of p probability (significant) > 0.05 for spirituality level of HIV/AIDS patients. At significant level of 5%, there is no significant difference between the duration of infection and spirituality level. It can be said that the difference in the duration of infection does not affect the spirituality level of the HIV/AIDS patients. The Pearson correlation analysis showed that the duration of infection and spirituality level have a moderate positive relationship

Table 6: Correlation Analysis Result between Duration of Infection and Spirituality Level

		Level of Spirituality
Duration of Infection	Pearson Correlation	0.339
	Significant (p-value)	0.043

The results of this research suggested that all of the analyzed variables (age, income, number of dependents and duration of infection) do not establish any relationship with the level of spirituality of the respondents. The

findings of this research do not support the previous literature's findings which shown relationship or influence between demographic factors and the faith, belief, religious practices as well as spirituality among person infected with the HIV[12]. The probable cause may due to the respondents' way of life that still attach to the local culture as well as living with family. Family acceptance and support play vital roles in a person's spirituality including people living with HIV/AIDS.

Conclusion

In short, the findings showed that all people living with HIV/AIDS (PLWHA) as the respondents of this research have moderate and high level of spirituality. Most probable, through prayers or other forms of coping strategy offerrespondents with positive psychological impacts which then affects their physical being. Apparently, even though they are the social perpetrators, they have excellent level of spiritualityHowever, the researchers are unable to determine whether the level of their spirituality has increased or otherwise after their regular health diagnosis. The findings of this research have proven that people living with HIV/AIDS should not be discriminated, instead their family members and the community need to provide the necessary supports in their effort to further improve the quality of life.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFFERENCE

1. Arrey A. E, Bilsen J, Lacor P, Deschepper R. Spirituality/Religiosity: A cultural and psychological resource among Sub-Saharan African migrant women with HIV/AIDS in Belgium. Plos One. 2016;11(7):1–23. http://doi.org/10.1371/journal.pone.0159488
2. Bernstein K, D'Angelo L. J, Lyon M. E. An Exploratory Study of HIV+ Adolescents' Spirituality: Will You Pray with Me? Journal of Religion and Health. 2013;52(4):1253–1266. http://doi.org/10.1007/s10943-012-9565-1
3. Cotton S, Puchalski C. M, Sherman, S. N, Mrus J. M, Peterson A. H, Feinberg J, Tsevat J. Erratum: Spirituality and religion in patients with HIV/AIDS (Journal of General Internal Medicine 24:8 (994)). Journal of General Internal Medicine. 2009;24(8):994.http://doi.org/10.1111/j.1525-1497.2006.00642.x
4. Dalmida S.G. Spirituality, mental health, physical health, and health-related quality of life among women with HIV/AIDS: Integrating spirituality into mental health care. Issues in Mental Health Nursing. 2006;27:185–198
5. Doolittle B. R, Justice A.C, Fiellin D. A. Religion, Spirituality, and HIV Clinical Outcomes: A Systematic Review of the Literature. AIDS and Behaviour. 2018;22(6):1792-1801. DOI: 10.1007/s10461-016-1651-z.
6. Emmons R.A. Spirituality and intelligence: problems and prospects. The international journal for the psychology of religion. 2000;10(1):57 – 64.
7. Hussain A. The issues of religiosity in mental health: Are we forgetting the missing link? 2006. Retrieved December 6, 2006, from http://www.crescentlife.com/articles/islamic%20psych/religiosity_in_mental_health.htm
8. Hutson S.P, Darlington C.K, Hall J.M, Heidel R. E, Gaskins S. Stigma and Spiritual Well-being among People Living with HIV/AIDS in Southern Appalachia, Issues in Mental Health Nursing. 2018;39(6):482-489. DOI: 10.1080/01612840.2017.1423426
9. Koenig H. G. The spiritual history.Southern Medical Journal. 2006;99(10):1159-1160.
10. Laveena D.M, Govindraju B.M, Monterio M. Influence of religion and spirituality on HIV positive people. International Journal of Management, Technology and Social Sciences. 2017;1(2):1-5. DOI: 10.5281/zenodo.807059. Retrieved from http://srinivaspublication.com/wp-content/uploads/2017/06/1.Religion_FullPaper.pdf
11. FabianovaLenka. Psychosocial Aspects of People Living with HIV/AIDS, social and psychological aspects of HIV/AIDS and their Ramifications, Prof. GobopamangLetamo (Ed.). 2011. From (Retrieved on 2 April 2017).

12. Lorenz K. A, Hays R. D, Shapiro M. F, Cleary P. D, Asch S. M, Menger N. S. Religiousness and Spirituality among HIV-Infected Americans. Journal of Palliative Medicine. 2005;8(4):774–781.

13. Malaysia AIDS Council. Malaysia statistics: overview of HIV/AIDS in Malaysia. 2010. Diaksesdarihttp://www.mac.org.my/v2/hidden/malaysian-statistics/

14. Mattis J.S, Jagers R.J. A relational framework for the study of religiosity and spirituality in the lives of African Americans. Journal of community psuchology. 2001;29(5):519 - 539

15. McCormick D.P, Holder B, Wetsel M.A, Cawthon T.A. Spirituality and HIV disease: An integrated perspective. Journal of the Association of Nurses in AIDS Care. 2001;12(3):58–65

16. Mohammad Amin Wani. Quality of life among people living with HIV/AIDS in Jammu & Kashmir, India, Journal of HIV/AIDS Research and Therapy. 2018. DOI: http://doi.org/04.2018/1.10002.

17. Plante T. G, Sherman A. C. Research on faith and health: New approaches to old questions. In Faith and health: Psychological perspectives. New York: The Gulford Press. 2001.

18. Powell LH, Shahabi L, Thoresen CE. Religion and spirituality: Linkages to physical health. American Psychologist. 2003;58(1):36–52.

19. Rentala S, Lau B. H. P, Chan C. L. W. Association Between Spirituality and Depression among Depressive Disorder Patients in India. Journal of Spirituality in Mental Health. 00(00). 2017;1–13. http://doi.org/10.1080/19349637.2017.1286962

20. Shaw S. A, Cornwell O, Lim S.H, Saifi R, Lik T. U, Kamarulzaman A. "Allah will decide my life and death": Religion and spirituality among populations at risk for HIV in Malaysia. Journal of Religion & Spirituality in Social Work: Social Thought. 2018;37(2):128-145. DOI: 10.1080/15426432.2018.1447419

21. Simoni J.M, Martone M.G, Kerwin J.F, Spirituality and psychosocial adaptation among women with HIV/AIDS: Implications for counseling. Journal of Counseling Psychology. 2002;49:139–147.

22. Sowell R, Moneyham L, Hennessy M, Guillory J, Demi A, Seals B. Spiritual activities as a resistance resource for women with human immunodeficiency virus.Nurs Res. 2000;49(2):73-82.

23. Szaflarski M, Ritchey P. N, Leonard A. C, Mrus J. M, Peterman A. H, Ellison C. G, Tsevat J. Modeling the Effects of Spirituality/Religion on Patients' Perceptions of Living with HIV/AIDS. Journal of General Internal Medicine. 2006;21(Suppl 5): 28–38. http://doi.org/10.1111/j.1525-1497.2006.00306.x

24. Westgate C.E. Spiritual Wellness and Depression. JournalofCounseling&Development.1996;75:26-35. http://dx.doi.org/10.1002/j.1556-6676.1996.tb02311.x

25. Zarina Mat Saad, Zulkarnain Ahmad Hatta danNoriah Mohamed. Influence of intellectuality of spiritual intelligence into a salesforce in Perlis, Malaysia.Thesis PhD. UniversitiSains Malaysia. 2010.

26. Zarina Mat Saad, Zulkarnain Ahmad Hatta danNoriah Mohamed. Addressing elders' spiritual needs: Implications in social work practice. Paper presented at the 19th Asia Pacific Social Work Conference: Social Work: A catalyst for development, Hotel Equatorial, Penang. 2007.

Description on the Quality of Life among Elderly Affected by Dental and Oral Health in Jagir Health Centre Surabaya

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ABSTRACT

Macroscopically, teeth experience changes in shape and color along with increasing age. In Indonesia around 24% of elderly people aged 65 years or older experience tooth loss. This condition was a threat to quality living elderly in living everyday life. Taking this into consideration, this study is intended to investigate the factors such as education level, frequency of brushing teeth, frequency of dental visit and illnesses (hypertension, diabetes mellitus and coronary heart disease) affected the caries severity and the quality of life among the elderly of Puskesmas Jagir. The findings from this study proved that lack of awareness of maintained a healthy oral health and lack of awareness of the side-effects of medication taken to the oral health as well as low interest in visiting dental clinics are three of the major problems that deteriorate the oral health of the elderlies since the DMF-T scores (> 13) for these factors were high. Thus, the elderly need to acquire the necessary knowledge by attending counselling classes and visiting the dentist in order to apply this knowledge for a better quality of life.

Keywords: *Dental Caries, Elderly, Oral Health, Quality of Life*

Introduction

Oral hygiene among the elderly must be maintained in view of various changes that happen such as thinning of the oral mucosa, decreased in salivary production, and tooth loss[1]. The number of teeth in the elderly is also affected by dental and oral hygiene. Poor oral hygiene can result in irritation and health problems of the gums and surface of the teeth. These teeth disorders eventually decreased the appetite and weight loss, and teeth become infectious. In addition, the decreased in health and endurance of the body of the elderly will facilitate the occurrence of mucosal infections in the cavity and periodontal tissue[2].

Caries is a destruction process that causes decalcification of enamel and dentin and formation of holes in the teeth. The caries process is characterized by the occurrence that causes bacterial invasion and damage to the pulp tissue and the spread of infection to the periapical tissues and caused pain. The decayed, missing, filled tooth (DMFT) index is a number shows dental caries status and can also be used to measure degrees of caries severity. The examination includes all teeth except for third molars which rarely grow. Indonesian DMF-T index in 2013 is 4.6% which means tooth decay of the Indonesian population of 460 teeth for every 100 people. It is known that the average DMF-T index in East Java is as large as 5.5 with hole tooth details (D) of 1.6; missing teeth (M) of 3.8; and patched teeth of 0.08[3].

In May 2017, there were 170 cases of pulpitis amongst the elderly at the Puskesmas Jagir clinic. Whereas in 2016 total cases of pulpitis in the elderly amounted to 1961 with details of 498 in the first quarter, 446 in the second quarter, 446 in the third quarter, and 571 in the fourth quarter. Based on that, this research focused on investigating the effects of lifestyle on the development of dental caries of the elderly at Puskesmas Jagir.

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Methodology

This study was conducted at Puskesmas Jagir in the month of June 2017. 91 elderly (aged 45 and above)

were randomly selected as the test subjects. The factors which were investigated are education level, frequency of brushing teeth, frequency of dental visits, and the level of stress experience by these elderlies.

The information needed for this research is gathered using WHO Quality of Life Questionnaire as well as dental and oral health examinations. All questions is based on a five-point Likert scale (1-5) that focused on intensity, capacity, frequency and evaluation. The intensity response scale refers to the degree to which the status or situation is experienced by the individual. Capacity response scale referred to the capacity of feeling, situation or behavior. The frequency response scale referred to the number, frequency, or speed of the situation or behavior. The evaluation scale referred to the estimated situation of the situation, capacity or behavior.

Result and Discussion

In this study, the DMF-T index was used to measure dental caries in the study subjects. Based on the results obtained, DMF-T population index had a median value of 13. If the number of teeth subject to caries is ≤13, it can be categorized as good whereas if the number of teeth subject to caries > 13, then it was categorized as bad. This information was further broken down into three other groups (D-T, M-T and F-T). The D-T population index had a median value of 3. If the number of teeth subject to caries ≤ 3, it can be categorized as good while if the number of teeth subject to caries > 3, then categorized as bad. As for the M-T population index had a median value of 7. The number of teeth is ≤7, falls under the good group. However, if the score for loss of tooth is more than 7, then it is bad. The F-T population index had an average value of 0. If the number of subject teeth has caries patch of 0, it can be categorized as good. Whereas if the number of teeth of subjects who have fillings > 0, then categorized as bad.

Table 1 showed the cross tabulation between DMF index in population with frequency of brushing teeth routine. There was no significant difference between the DMF indexes of the population with irregular brushing teeth frequency compared to the population with routine brushing teeth frequency. Nonetheless, those who brushed their teeth routinely had a lower caries severity than those who did not.

Table 1: Cross tabulation between DMF index with frequency of brushing teeth

Frequency of brushing teeth	DMF-T index		Total
	>13	≤13	
Non-routine	8 (17.39%)	9 (20%)	17 (18.68%)
Routine	38 (82.61%)	36 (80%)	74 (81.31%)
Total	46 (100%)	45 (100%)	91 (100%)

Cross tabulation between DMF Index in population with frequency routine dental visits is presented in Table 2. Those respondents who did not have a routine visit to the dental had DMF-T index > 13 by 1.39 times higher than those who went to dental frequently. This result were justified by Pratiwi et al[4] who stated that regular visits to dentist increased public awareness through counselling which can help in early diagnosis. Thus, one of the preventative actions which can be taken to improve the level of oral health is by attending dentist's counselling session conducted during the routine visit at the dental at least once every 6 months[5].

Table 2: Cross tabulation between DMF index with frequency of dental visit

Frequency of dental visit	DMF-T index		Total
	>13	≤13	
Non- routine	39 (84.78%)	36 (80%)	75 (82.42%)
Routine	7 (15.22%)	9 (20%)	16 (17.58%)
Total	46 (100%)	45 (100%)	91 (100%)

Table 3 is the results of cross tabulation between DMF Index in population and education level of the elderly respondents. The education level is divided into two distinguish category which is till junior high school and those who continued studying after junior high school. Results indicated that despite having a better education level (higher than junior high), these respondents still had a poor oral health (severe caries) compared to those who studied up to junior high only. According to Budiman A. R. [6] found level of education is related to the level of knowledge someone against disease and behavior to deal with it. The higher the level education, it is easier for someone to receive information on the importance of preserving a good and healthy oral hygiene.

Table 3: Cross tabulation between DMF index with education level

Education level	DMF-T index		Total
	>13	≤13	
Till junior high	13 (28.26%)	26 (56.53%)	39 (42.85%)
Higher than junior high	33(71.74%)	19 (43.47%)	52 (57.15%)
Total	46 (100%)	45 (100%)	91 (100%)

Cross tabulation between DMF-T index with DM is shown in Table 4. It is identified that those with DM were at 1.143 times risk to develop caries compared to those without DM. diabetes mellitus with poor oral hygiene and presence diabetic angiopathy caused a reduced in oxygen supply, thence Anaerobe bacteria to develop easily. Dental caries occurs due to bacteria certain that have acid-forming properties, so low pH can cause progressive dissolution of enamel minerals to slow down and form perforation. However, those in-controlled diabetes patients have almost insignificant dental caries compared to normal healthy people.

Table 4: Cross tabulation between DMF index with diabetes mellitus (DM)

Has Diabetes mellitus (DM)	DMF-T index		Total
	>13	≤13	
Yes	8 (53.33%)	7 (46.67%)	15 (100 %)
No	38 (50%)	38 (50%)	76 (100 %)
Total	46 (50.55%)	45 (49.45%)	91 (100%)

Table 5 presented the cross tabulation between DMF index with hypertension. Based on the table, it proven that hypertension patients were at 1.946 times more likely to suffer from severe dental caries (DMF-T > 13). The usage of antihypertensive drugs could cause several things to occur including reduced salivary production which lead to increased chewing activity till the stimulation of salivary production in some active salivary glands increases and this eventually leads to exacerbations and decreased speech ability due to reduced lubrication function. Thus, decreased salivary production has a high risk of dental caries[7]. Furthermore, Bradley P.J. et al.[8] found antihypertensive drugs can affect salivary flow directly by mimicking the action of the autonomic or nervous systems by directly acting on cellular processes needed by saliva, while indirectly affect the flow of saliva to the gland or alter the fluid and electrolytes balance. The consumption anti-hypertension drugs are also proven to rise xerostomia, hypo-salivation, and increase in the number of oral microbiota, including Angiotensin Converting Enzyme (ACE-inhibitors) and beta blockers.

Table 5: Cross tabulation between DMF index with hypertension

Has hypertension	DMF-T index		Total
	>13	≤13	
Yes	9 (64.28%)	5 (35.72%)	14 (100 %)
No	37 (48.05%)	40 (51.95%)	77 (100 %)
Total	46 (50.55%)	45 (49.45%)	91 (100%)

Table 6 is the outcome of the cross tabulation between DMF index with coronary heart disease. Those with DMF index > 13 had a 3.07 chance of having coronary heart disease compared to the respondents with DMF index ≤ 13.

Table 6: Cross tabulation between DMF index with coronary heart disease

Has coronary heart disease	DMF-T index		Total
	>13	≤13	
Yes	3 (75%)	1 (25%)	4 (100 %)
No	43 (49.42%)	44 (50.57%)	87 (100 %)
Total	46 (50.55%)	45 (49.45%)	91 (100%)

Untreated dental caries can result in periapical infection. Chronic periapical infections can cause the formation of granulomas, abscesses, or cysts. Caries in the form of residual roots that are not revoked can also cause periapical infection. This periapical infection can be focal infections that cause various diseases included coronary heart disease. Focal infection itself is the process of spreading from germs or toxins (toxic germ products) from the focus of infection to other places far away from infection and in this place can cause tissue damage or form new infections or new disorders. Dental plaque and calculus are strong risk factors for coronary heart disease. Strong indicators of death in addition to coronary heart disease are periodontal disease and poor oral hygiene[9].

Conclusion

In conclusions, several risk factors such as frequency of brushing teeth, knowledge on brushing

teeth and awareness of dental visits influenced the high level of elderly dental caries. The high level of dental caries also affected the condition of systemic diseases such as diabetes mellitus, hypertension, and coronary heart disease.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. R.P. Wicaksono. "Related Factors With the Occurrence of Type 2 Diabetes Mellitus (Case Study at the Disease Polyclinic in Dr. Kariadi Hospital". Thesis, Airlangga University. 2011.
2. R.A. Latifah, A. Subekti, S. Suwarsono, B. Sutomo. "Determinant factors of tooth pulp caries in Rowosari, Semarang, Indonesia". In Proceedings of the International Conference on Applied Science and Health. 2017;2:103-108.
3. Basic Health Research, Health Ministry Republic Indonesia, Jakarta. 2013.
4. R.A. Pratiwi, R. Adhani, K. Ramadhani. "The level of knowledge of the community is on the participation of counselors in the Hulu Sungai Utara District Health Center". Dentistry Journal. 2017;II(1).
5. I. Tjahti, L. Ghani. "Individual factors of dental and oral health status among visitor of promery health care in DKI Jakarta 2007". Bulletin of Health Research. 2010;38(2).
6. A.R. Budiman, Knowledge and Attitudes in Health Research (Salemba Medika, Jakarta). 2013.
7. K.H. Basavaraj, M.A. Navya and R. Rashmi, "Stress and quality of life in psoriasis: an update," International Journal of Dermatology. 2011;50(7):783-792.
8. P.J. Bradley et al. "Salivary gland disorders and diseases:diagnosis and management". 2001.
9. R. Larasati. "Relationship between oral hygiene and systemic disease and age of life expectancy" Skala Husada Journal. 2012;9(1):97-104.

Genetic Diversity of Anopheles sp as Malaria Vectors Who Carries Plasmodium Falciparum and Plasmodiumvivax Which Can Infect Human in Jayapura Municipal, Papua Province, Indonesia

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ABSTRACT

Background. Jayapura municipal are region which are rainfall not erratically down will affect the development larvae of *Anopheles* mosquito which are can be threat of outbreak still remains due to the high prevalence and abundance on malaria vectors. Aim. The aim of this study to analyze species of *Anopheles* mosquito and genetic diversity species of *Plasmodium* which are found into *Anopheles sp* as malaria vector which are cause malaria in Jayapura Municipal. Methods. This type of research is a descriptive study using a cross sectional design. Adult of mosquito Anopheles were collected from four study sites located in in two district using human landing catch and aspirators. Representative samples of each species which are morphologically confirmed were selected of each locality in generally was found there is higher areas and low areas. Results. A total of 38 samples from *Anopheles sp* which are found by determination key shown that *An. punctulatus* as mush as 23(60.5%), *An. koliensis* 13 (34.2%) and *An. farauti* 2(5.3%) respectively with Pv < 0.05, and analyze through DNA extracted by PCR product, we did not found DNA bands from *P. falciparum* and *P.* vivax. Conclusions. The result of this study shown which are Pv < 0.05, there were significant correlation between located with Anopheles sp. Genetic diversity of *Anopheles* sp based on PCR product, overall not found DNA bands of *P. falciparum and P.vivax* because probably *Anopheles* mosquito species which such the blood of the captured person has not been infected by the both *Plasmodium* above in Hamadi rawah areas.

Keywords: *Genetic diversity, Anopheles sp, P. falciparum, P. vivax, Malaria.*

Introduction

Malaria is still remain a major public health of morbidity and mortality with a concerning issue of increase in cases that reported in the 2017.According to thereport there were 212 million new cases of malaria worldwide in 2015. The incidence become 148-304 million clinical cases of malaria each year, and most them are caused by *P. falciparum* and *P. vivax*[1,2]. The report draws on data from 91 countries and regions with ongoing malaria transmission in 2016[3].

Malaria is an infectious disease caused by protozoan parasites from the Plasmodium family which can be transmitted by bitten of the *Anopheles* mosquito. Falciparum malaria is the most deadly type. The symptoms of malaria include cycles of chills, fever, sweats, muscle aches and headache that recur every few days. There can also be vomiting, diarrhea, coughing, and yellowing (jaundice) of the skin and eyes. Persons with severe falciparum malaria can develop bleeding problems, shock, kidney and liver failure, central nervous system problems, coma, and die[4].

Its epidemiology is determined by three components; the human host, the *Plasmodium* malaria parasite, and

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the environment, The latter includes both the psysical and biological environment is female mosquito Anopheles as malaria vectors[5]. The majority of mosquito in Papua Province are *An. farauti*, *An. Punctulatus* and *An bancrofti* whereas *An,koliensis* and *An. Kowari* are secondary vectors[4,6.]

In Indonesia, the populations were living in endemic areas of malaria, local transmission is still at risk of malaria. By 2014 there are 74% of the population living in malaria without risk areas and 3% living in high risk areas. In the last 4 years most of the population lives in free Malaria areas whereas the population shows an increasingly. While people in high endemic areas have the lowest pretentage and level to fall from 4.7% in 2012 to 2.2% in 2015[5].

In Papua Province of Indonesia, malaria is a major health problem because this area is one of malaria endemic areas with hyper-endemic category in Indonesia.. Regency Health office reported in Jayapura that the annual parasite incidence (API) of malaria cases in 2014 was 90 per 1000 populations and Annual Malaria Incidence (AMI) is still 122 per 1000 populations[7].

Clinical Manifestation of malaria is influenced by several factors in the human host, *Anopheles* sp, parasite and enviroment. In human, age, immunity, pregnancy and genetic factors have been shown to determine the malaria cilinical outcome whereas in the malarial parasite, drug resistance, multiplication rate, invansion pathway, cytoadherence and rosetting, antigenic variation and polymorphisms, and malaria toxin are among other factors that have been identified[8].The mosquito species as malaria vectors mainly in Indonesia, expecially in Papua are *An, punctulatus, An. farauti,*and *An koliensis, respectively* which can be cause falciparum malaria, vivax malaria, and malariae malaria however ovale malaria rarely found in Papua, Indonesia[4,6.]

Genetic diversity of *Anopheles* sp has the effect of the capacity value occurrence transmission and the vector's ability to transmit malaria[9.10]. Understanding the biology and behavior of *Anopheles* sp could be help understood how malaria is transmitted and can aid designing appropriate control strategies. Factors that effect a mosquito's ability to transmit malaria include it's innate susceptibility to *Plasmodium*, its host choice and its longevity[11], and difference in habitat conditions and community environment will be also affect the distribution of *Anopheles* in one area.

Material and Method

Description Study Site: This study was conducted in September to November 2017.Mosquito samples are obtained from different locations in Jayapura Municipal namely, Hamadi rawah, Skyline and Organda villages. In the microscopic examination, we were conducted at Laboratory of polytechnic of Health, Ministry of Health Jayapura and Eijkman Institute laboratory in Jakarta. Jayapura Municipal its wide territory covering 442,540 km^2.Jayapura Municipal is divided into mainland, swamp (146,576 ha), river areas and large heading to the Pacific Ocean. The Municipal is bordered in the North through Pacific Ocean and in the east with Papua New Guinea. The populations of Jayapura Municipality is mainly Papuan, migrants Java, Sulawesi, Moluccas and the other parts of Indonesia.

Hamadi rawah village, this place is a lot of *Mangrove* trees which are a breeding ground for larvae of *Anopheles* sp. People were living in these areas from Papuan and non-Papuans tribes with a high population density the same with skyline and Organda villages[12,13]

The climate is typically tropical with average temperature between 25-35^oC. The difference between rainy season and dry season as because of wind effect. May to November, the wind is blowing from South east with less amount of water vapor whereas in December to April the westerly wind is blowing sea and causes rainfall. The range of rainfall is between 1,500-6000 mm per year[6].

Mosquito collection and identification: There are several sites in Jayapura Municipal which we were collected sample of mosquitoes. The technic for obtain sample we use human landing catch method. The mosquitoes that select reside around the resident's house by using aspirator. After sample we collect and inserted into the paper cup and then covered with gauze, on top of which was placed cotton which had been fed mosquitoes to keep the mosquitoes alive until identified process in the laboratory. Collecting malaria vectors we start from 06.00 pm to 06.00 am with long catch for 15 minutes with an interval of 1 hour[12,13]. For identification we were using determination key in Polytechnic Health Laboratory in Jayapura and molecular laboratory of Malaria Eijkman Institute in Jakarta.

Mosquito DNA Extraction: Individual mosquitoes were crushed in 1.5 mL micro-centrifuge tubes (Eppendorf, Hamburg, Germany) containing 100 µL of

lysis buffer (0.2 M NaCl, 10 mM Tris HCl pH 8,25 mM EDTA, 0.5% sodium dodecyl sulfate) containing1.0 mg/ml of proteinase K and then incubated at 55°C for 2 hour prior to being extracted twice with 50 µL of chloroform: iso-amyl alcohol (24:1). The upper aqueous layer was transferred to a new tube and the DNA was precipitated by adding 50 µL of 7.5 M ammonium acetate and 300 µL of ice cold absolute ethanol. The tubes were then placed at -70 °C. for 15 min, microfuge at 4°C for 15 min, and then washed in 500 µl of ice cold 70% ethanol. The pellet was dried and reconstituted in 50 µl of TE buffer (10 mM Tris-HCl, 1 mM EDTA, pH 8.0) containing RNase (100 µg/ml) [14,15,16].

Primer Selection and Design: The primer designed ITS2A was designed as a 19-mer from the 5.8S rDNA of Drosophila melanogaster (5'TGTGAACT GCAGGAC A CAT) and the primer ITS2B was designed from common invertebrate sequences at the 5' end of the 28S rDNA (5' TATGCTTAA ATT CAGG GGGT). The oligonucleotide primers were constructed on an applied. Biosystems (Foster City, CA) 394 DNA/RNA Synthesizer[14,15,16].

Amplication of ITS2: All PCRs were carried out in 0.5ml microfuge tubes in a 25 µl volume using a Minicycler PTC-150 (MJ Research Inc. Watertown, MA). The final PCR mixture contained 50 mM KCl, 10 mM Tris HCl pH 9.0.1.5% Triton X-100,1.0 mM $MgCl_2$, 0.2 mM of each deoxynucleotide triphosphate, 50µM of each primer, 10% Dimethylsulfoxide (DMSO),and 2.5 units of *Taq polymerase*. The template was either purified DNA (1-10 ng), 1µl of allozyme triturate (reconstituted in 20 µl of double distilled water) or from a single leg placed in the PCR. Cycling involved an initial denaturation at 94°C for 5 min prior to the addition of *Taq enzyme* and an oil overlay and then 35 cycles at 94°C for 1 min, 51°C for 1 min, and 72°C for 2 min using minimum transition times[16,17].

Product digestion and visualization: A 5µl aliquot of the PCR mixture was added to water, 2.5µl of 10 x *msp1* buffer and 10 x bovine serum albumin (10 mg/ml) and 1µl of *msp1* restriction endonuclease (20 units: New England Bio labs, Beverly, MA) to give a total volume of 20µl, and the sample was incubate at 37°C for 2 hr. Ten microliters of the digested product was run on a 3% agarose gel (NuSieve GTG; FMCBI products, Rockland, ME) containing 0.5µg/ml of ethidium bromide and visualized at 312 nm on an ultraviolet trans-illuminator (International Biotechnologies, Inc, New Haven, CT)[14,15,16].

Result

The result of this study indicate that mosquitoes were collected from three sites in Jayapura Municipal. Total a sample 100 were collected. There were 38 materials samples which are positive *Anopheles* from three *Anopheles sp* was identified such as *An. punctulatus* (23), *An. koliensis* (13) and *An. farauti* (2) respectively. See in table 1.

Diversity and dominance of *Anopheles* sp in Jayapura Municipal was found in this study; *An.punctulatus* more higher than *An. koliencis* and *An. farauti*.

Table 1: Species of Anopheles mosquito identified from among those collected in three villages in Jayapura Municipal

Anopheles sp	Located			Frequency	P value
	Hamadi Rawah (%)	Sky Line	Organda		
An.puntulatus	23 (60.5)	0	0	23	0.000
An.koliensis	13 (32.2)	0	0	13	
An.farauti	2 (5.3)	0	0	2	
The others species and male *Anopheles*	0	37	25	62	
Total	38 (100)	37	25	100	

The result shown that the species of *A.punctulatus* as much as 23 (60.5%) were found more higher than *A. koliensis* as much as 13(34.2%) and *A.farauti* 2(5.3%) and others species and male *Anopheles* which exclude of this research as mush as 100 samples.P<0.05.

Based on PCR product shown that genetic diversity from species of *Anopheles* mosquito after giving restriction enzyme ALL1 for cutting of DNA length target band ladder (λ =432bp) for *P. falciparum* and *P. vivax* with band ladder 342bp and108 bp.See in Fig 1 and Fig 2

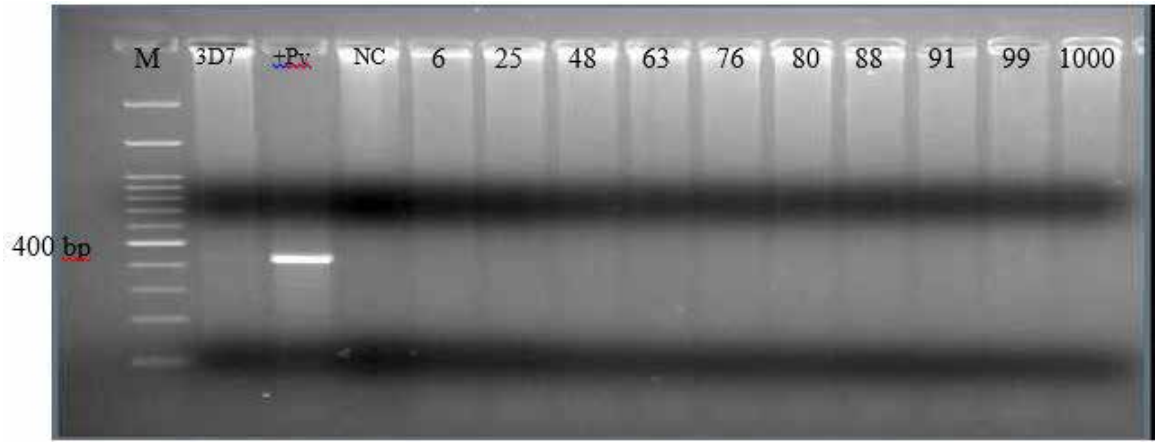


Figure 1: Electrophoregram result show which are PCR product from *Anopheles sp* there were of number 6,48 and 63 are *An.koliensis*, and then number 25,76,80,88,91 and 100 are *An.punctulatus*. M is ladder marker with 100bp, 3D7 was strain of *P. falciparum* (3D7 *strain*) as positive control and *+PV (P. vivax)*, positive control from hospital sample. NC is negative control. Based on PCR result of above was not founded there is DNA band of *P. falciparum* and *P. vivax*.

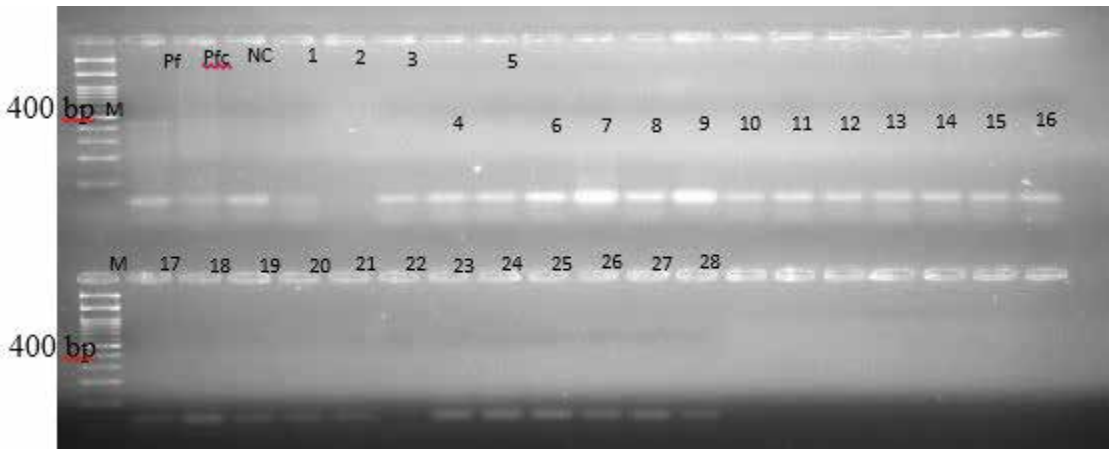


Figure 2: Electrophoregram result show which are PCR produce from species of *Anopheles* mosquitothere were of (number 1,2 are *An. farauti}*, (number 3,4,5,6, 7,8,9.10,11. 12,13,14, 15,16 and 17 are *An. punctulatus*) and (number 18,19,20, 21,22,23, 24,25,26,27, 28 are *An.koliensis*). Pf 1/10 = *P. falciparum*-1 (*Pf/Pfc* is positive control) and *Pfv* 1/10 : mixture between *P. falciparum* and *P. vivax*, negative control (NC). Legend : M: 100 bp ladder marker. Based on PCR product of above was not founded there were DNA band of *P. falciparum* and *P.vivax*

Discussion

Diversity of *Anopheles* sp was found in this study with high dominance in Jayapura Municipal is *An. punctulatus* than *An. koliensis* and *An. farauti*. The high dominance *An. punctulatus* in Hamadi rawah shown that genetic diversity of *An. punctulatus* have the effect of capacity of numbers were indicated the occurrence of transmission and nature of the ability of vector in transmitted malaria[12,13].

The result of DNA Extraction are using a PCR product with direct PCR phusion kit (thermo) and with using the Mito F370 and Mito F5904 primers and there were 38 samples that have been DNA isolated but did not found *Plasmodium* as cause of probably samples without containing *Plasmodium*. It must be fresh or stored frozen to prevent protein degradation; moreover, difficulties in storage arise when working in the field and according[14] species of *An.punctulatus* complex were readily distinguished using a PCR-RFLP analysis based on the ITS2 region of the rDNA. The mosquito samples did not require a particular storage condition because air dried samples contain ample template to generate a PCR product whether the DNA was extracted or a segment of the mosquito was used[14,15,16].

Conclusions

Dominance of *Anopheles* sp in Jayapura Municipal was found in this study; *An.punctulatus* more highly than *An. koliensis* and *An. farauti* because of *An.punctulatus* is a primary of malaria vector and habitat of *An. puntulatus* is in the open pool with clear of pool water or murky the absence of aquatic vegetation, puddles former or human[12,13].

Genetic diversity of *Anopheles* mosquito species based on PCR product of *Anopheles* overall we were not found DNA bands of *P. falciparum and P.vivax* because probably *Anopheles* which such the blood of the captured person has not been infected with *P. falciparum* and *P. vivax*[15,16,17.] The absence of DNA template bands or deletion and insertions at the primer attachment site[14]. DNA insertion can be lead to a change in the size of the DNA fragment, via simple base alterations or band to DNA fragment and the Anopheles sp are not founded more in Jayapura Municipal.

Acknowledgements

We gratefully thank the Director of Polytechnic of Health Jayapura, Chairman of Primary Health Center in Hamadi and Abepura, Jayapura Municipal. We grateful to Prof. dr. Din Syafruddin, Ph.D and Puji BSA, BSc, Ph.D also all assistant at Molecular Laboratory of Eijkman Institute (especially molecular malaria laboratory) in Jakarta.

Ethics Approval and Consent to Participate: Research approval was taken from Health Research Ethics Committee of polytechnic of health, ministry of health Jayapura. The formal permission was also obtained from Ministry of Health, Jakarta. Indonesia.

Source of Funding: The research is self funding.

Completing/Interest: The Authors declare that there is completing interest

REFERENCES

1. WHO. World Malaria report. Geneva. Switzerland.2017.
2. WHO. World Malaria Report. RBM WHO-UNICEP, Geneva. Switzerland.2015
3. WHO. Fact sheet : World Malaria report.http:// www.who. int/malaria/media/world-malaria report-2016/en/. 2016.
4. Sorontou Y, Puji BSA, Septelia IW, Wahuning R, Syafruddin D. Malaria in Jayapura District, Papua Province, Indonesia and resistance to Sulfadoxine-pyrimethamine. *Medical Journal of Indonesia*. Jan- march. 2007. (16) p. 32- 38.
5. Kemenkes RI. Indonesian epidemiology of malaria. Bulletin Data and Health Information. 2014.ISSN 2080 -270 X. p. 1-33.
6. St.Laurence B, Sukowati S, Puji BSA, Brestz D, Mueller J, Miller HC, Amirulla B, Shinta, Asik S, Ngai M, Laihad F, Syafrudin D, Hawley WA, Collins FH, Lobo NF. Behaviour and Molecular Identification of Anopheles malaria vectors in Jayapura District, Papua Province. Indonesia. *Malaria J*. 2016.p15-19.
7. Jayapura District Health Office. Annual report of Jayapura District Health Office, 2014.
8. Miller LH, Baruch DI, March K and Doumbo OK. The pathogenic basis of malaria. *Nature*.2002.415: p673-679.
9. Fahmi M, Fahri, Nurwidayati A, Swastika IN. Diversity Study of Anopheles sp Mosquito Species in Donggala Regency, Central Sulawesi Province. J Nat Sci. 2014.3 (2). p.95-108.
10. Ipad M, Astuti. *Anopheles* spp. Local Specific Malaria Vector. Fauna Anopheles spp. Surabaya: P2B2 Ciamis R & D Workshop. Health Advocacy Foundation for Community Health Empowerment.2013.
11. Cluster Diseases Center. Global health division of parasitic diseases and Malaria. Page last updated. October 21.USA. 2015
12. Connor CT dan Soepanto A. Lock with anopheles mosquito in Indonesia. Republic of Indonesia Ministry of Health. Directorate General of Eradication of Communicable Diseases and Environmental Health Settlements.1993.
13. WHO. Malaria Entomology and Vector Control Learner's Guide. World Health Organization. 2003.p.1-19.
14. Beebe NW ; Saul A. Discrimination of all Members of Anopheles punctuates complex by polymerase Chain Reaction, Restriction Fragment Length Polymorphism Analysis. *Am J. Trop Med. Hyg.* 1995.P. 478-481

15. Foley DH, Paru R, Dagoro H, Bryan JH. Allozyme analysis reveals six species within the *Anopheles punctulatus* complex of mosquitoes in Papua New Guinea. *Med Vet Entomol.* 1993.7: p.37 - 48.

16. Foleh DH, Cooper RD, Bryan J. Allozyme analysis reveals a new species within the *Anopheles punctulatus* complex in Western Province, Papua New Guinea. *J Am Mosg Control Assoc.* 1995.11: p122- 127.

17. Garcia AI, Corrasco HI, Scholfield CJ, Russell J, Frame IA, Valents AS, Mils M. Random Amplification of polymorphic DNA as a tool for taxonomic studies of triatomine bug (Hemiptera: Reduvidae). *J.Med. Entomol*.1998.35 (1), p 38-45.

The Use of Portable WSD Wound Models to Improve Student Clinical Lab Skills

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ABSTRACT

Innovative laboratory learning methods have been developed for students to be more independent and play an active role during the learning period. Students learn by using media such as modules and portable models. The study aimed to determine the effectiveness of portable WSD wound model to improve the wound care clinical skills. Research design: The study used quasi experiment pretest-post test with control group design, respondents were given module and WSD wound model made of synthetic rubber with the tube inserted to a bottle as if a patient were attached a WSD. Sample; A total sample of 90 using the stratified random sampling method, the respondent were divided in two groups by using 2.75 GPA as cut of point. Data analysis: Using independent and dependent t test with α= 0.05, data were gathered using two instruments with α cronbach 1 = 0.8331 and 2= 0.909 that were greater than α table = 0.632. The results: at P-value = 0,001 based on the pre-post test, the mean difference of student clinical lab skills using the portable model increased 0.31 higher than using the non portable model increased only 0.26. In conclution, using the portable model is more effective than the other one.

Keywords: *clinical skill lab, learning media, a portable wound care model*

Introduction

Nursing education generally has a goal to produce nursing graduates who are professional and have good knowledge, affective and psychomotor abilities and ready to work. To achieve the above, educational institutions develop various learning methods that can facilitate the improvement and development of nursing knowledge, affective and psychomotor abilities in students Notoatmojo[12]. Lab skill learning method is one of them. Through learning in the laboratory, students can get a learning experience similar to that in the clinic Jones & Barlett[10]. Thus, students will be better prepared to take part learning in the clinic. Baldwin, Hill & Hanson[1] believe that students who have studied in the laboratory have better preparation when studying in a clinical setting. With the implementation of the lab skill method, it is expected that psychomotor skills will improve that enable nursing graduates to work professionally and skilfully.

However some problems are often found in the practice fields related to lab skill learning, as stated by which concluded her research that nursing students do not have sufficient ability in applying nursing skills acquired during education, students have knowledge but lack of skills. In line with the above, Roni's research[8] concluded that the low motivation of students and improper lab skill learning methods and the selection of inappropriate learning media would greatly influence students' mastery of nursing psychomotor skills. According to the factors that influence the skills learning process (psychomotor) are divided into 4 major groups namely material, environment, instrumental and individual internal factors.

Instrumental factors in the learning process are emphasized on hardware and software learning Jones & Barlett[10]. Hardware learning include equipment and teaching aids (media) that are used in learning. While software in learning is the curriculum and learning methods. To obtain effective skills learning outcomes, these instrumental factors are designed in such a way

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that they are in accordance with the material and subject of learning. For example for learning skills (appropriate psychomotor, namely the lab skill, while the media or teaching aids used in learning are adjusted to the skills that will be learned or trained.

Psychomotor learning methods (lab skills) have been widely developed. One method that has been widely known and used is demonstration learning methods, redemption and supervision. With this learning method, educators will explain and demonstrate the expected psychomotor abilities, followed by redemption and training by students Buhat, Dorothy, & Mendoza[11]. During practicing, the teaching staff will supervise. This learning method is known as traditional learning methods Beeson & Kring[2]. Furthermore an innovative skill learning method has been developed where students are more independent and play an active role during the learning period Candy[13]. One method that has been developed is an independent learning method in which students learn with the help of modules, portable teaching aids, video recordings, and computer programs without the supervision of teaching staff. Using this method, the role of the teaching staff in one learning period is minimized. The teaching staff acts more as facilitators who prepare the material needed by students Bye[14].

Wound care is a nursing procedure that treats the wound with an aseptic technique that aims to cleanse the wound from debris to speed up the healing process of the wound. The wound care procedure is included in the competencies that must be mastered by students. This action is taught to students through skill lab learning that requires media or wound properties. Portable props are props used in learning that are effective in use and easy to carry (portable) Naismith, et all[15]. Portable teaching aids can create and gain more concrete experience for students so that it will make it easier to understand and play and train their skills. Portable WSD wound models developed by the teaching team on medical surgical subjects to help students get an effective and easy-to-carry lab skill learning experience so that whenever students will train or learn to demonstrate wsd wound care can be done independently.

From the description above it appears that teaching aids are important in the process of learning skills. Portable teaching aids provide opportunities for students to learn lab skills anywhere and anytime independently Kasatpibal, Sawasdisingha, & Whitney[19]. Based on the two factors above, this research was conducted. The purpose of this study is to compare the effectiveness of using portable wsd wound models with the use of wound models that have been used to improve wsd wound care skill.

Method

This is quasi experimental research using pre test-post test with control group design. The treatment for the intervention group, the students practiced the clinical skill lab by using practice model for wound care and a portable wsd wound model made from MBPC 1006 beige-colored synthetic rubber while the control group practiced using non portable WSD wound care and practice module of wound care. Respondents in this study were all 90 students of the Medical surgical course in the third and fifth semester of Academic Year 2013/2014. Stratified random sampling method was uses and respondents were grouped into two. All students are sorted according to the Grade Point Average (GPA) until the semester ended. Using a GPA of 2.75 as cut of point, 77 students' GPA were more than or equal to 2.75 and 13 others were less than 2.75. After this grouping, The groups whose GPA were above 2.75 and groups below 2.75 were included in both the control and the experimental group with equal numbers.

In this study each group underwent three phases, namely pre-test, intervention and post-test (evaluation). In the pre-test phase, students came to the practicum laboratory to be assessed for their basic knowledge of WSD wound care and the psychomotor ability (skill). Pre test was carried out using the prepared instruments consisted of: 1. Instrument related to the assesment of basic knowledge about wound care, 2. Instrument for assesing skills of wound care based on the operational standard procedures. The instruments previously had been for its reliability and validity, The Alpha Cronbach of instrument 1 was 0.831, whereas for instument 2 was 0.909. It means the value of both instruments was greater than the alpha table 0.632.

Next, at the intervention phase, both groups performed the skill lab at the same time. The control group practiced in the basic nursing laboratory while the experimental group practiced in the medical surgical nursing laboratory in a different building for 4 hours of duration time.

Post-tests are carried out immediately right after training on the same day, to avoid exchanging information between the control and experiment groups. The post-test was carried out by the same examiner at the pretest using the same evaluation sheet. The value of 2 was given for every step of the wound care procedure

performed correctly. The value of 1 was given for the steps that were done but incorrectly. And for the steps that were not done, the value was given 0. Then, the value was obtained by multiplying each item statement with the score then divided by the statement so that the maximum value for WSD wound care skills is 4.00. Referring to the the institutional rules, the passing grade is 69% of the maximum value, or 2.76 for laboratory practice skill.

Data were analyzed statistically using a computer program. The dependent t-test was carried out with a significance level of 0.05 to seek the value difference before and after training in each group. Furthermore, to compare the values of the two groups before and after the exercise, an independent t-test with a significance level of 0.05 was carried out. The value obtained by each respondent in each group was confidential. In addition, after the learning evaluation was carried out, to ensure the students achieved the expected learning outcomes, when the average score of one group was lower than the other group, then the group had the opportunity to exercise observed by the supervisor.

Results and Discussion

The mean value of clinical skill obtained before intervention between the experimental and control groups was almost the same. Fundamental changes occur after intervention. There was an increase in the achievement of the intervention group and the control group. Dependent t-test showed a significant difference between the wound care skill of students before and after intervention (table 1).

Table 1: Differences in pretest and posttest scores (T dependent test)

Ability	Group	Mean	SD	95% CI	T	p-value
Score WSD wound care practice	Intervention Pre test Post test Difference	 3.27 3.58 0.31	2.887	 -2.011 -0.145	-2.332	**0.001**
	Control Pre test Post test Difference	 3.31 3.57 0.26	1.330	 -1.063 -0.069	-1.170	**0.001**

n (Control Group) = 45

n (intervention Group) = 45

Furthermore, to find out the difference for the effectiveness between the use of old wsd wound models and the use of portable wsd wound models an independent t test was conducted. Table 2 shows that there was difference in the ability of knowledge and skills of students who used the old wound model (control group) to those studied using the portable wound models (experimental group).

Table 2: Comparison of WSD wound care practice (skill) between groups

Variable	Group	n	Mean	SD	95% CI	F	P value
WSD wound care practice	Intervention	45	-0.466	1.330	-1.716 – 0.716	5.649	**0.021**
	Control	45	-0.166	3.050			

The results of this study provide very important information about the use of portable in improving student skills in WSD wound care. Based on the results of the study it appears that both media (portable or non portable wound model) were proved to help students mastered the psychomotor skills. Both students in the control group and those in the experimental group were able to reach the passing grade determined in the WSD wound care procedure. In practice statistically the skill lab of the experimental group was better than the control group, but all students passed the specified passing grade score (Passing Grade Score= 2.76, mean control = 3.57, mean experiment = 3.58). Thus, the results of this study was supported by the research of Febriana et al[4] who

found significant differences in learning outcomes that use learning media in the form of body or phantom and audiovisual models.

Powell, Canterbury[7] stated that psychomotor skills can be developed through visualization, interaction in repetitive actions and practices. This is the basis of the success of the experimental group in carrying out wsd wound care procedures. Students in the experimental group were given the opportunity to focus on the simulation of the use of the portable models, then independently practised along with the modules provided. Students were also advised to look at the module and drilled the exercises during the training period.

Referring to the literature review, there is no single study which stated that the success of independent learning depends on the level of difficulty of the action Meyer et all[16]. The media used in this study were developed by the research team and firstly used. Based on the results of this study, although there was no difference in the effectiveness of the use of wound models, but both types of models provided significant improvement in both the ability of knowledge of wound care and a significant increase in the skills of performing WSD wound care procedures in both groups of students. Moreover students were able to reach the passing grade score for both abilities. In addition, the lab skill learning method was also more effective given the benefits generated Lassara[17]. First, during this study the autonomy and independence of students for laboratory practice learning increased. Students in the experimental group stated their readiness to be tested without first being asked by the examiner. This is consistent with what was stated by Beeson and Kriing[2] that independent learning methods increase student participation and autonomy. Furthermore, the number of guides needed is less so that efficiency can be increased WHO[18]. In addition to the above benefits, several things must also be considered in using the portable WSD wound model. First, before using this wound media, students were required to take part in the use simulation activities carried out by the instructor and used the use module as a guide when performing WSD wound care procedures. Interaction between students and supervisors was still carried out during training activities. The interaction between students and mentors was believed to be one of the factors that determine the success of students in taking up education programs. Furthermore, for the use of portable wsd wound models when lab skill learning can take place properly it is necessary to prepare a good lab skill learning planned by the supervisor.

Conclusions

Using a portable media (Portable WSD wound model) is more effective than the non portable wound model. Furthermore the portable model was proved in improving students clinical skills in WSD wound care. The portable wound model can help students during laboratory practice learning by learning independently and it can be an alternative in teaching psychomotor skills. This is very beneficial because the students autonomy learning in clinical learning can be improved, students can practice their skills with or without being accompanied by an instructor.

Recommendation

This study showed that the use of portable wound models independently and improved student clinical skills in WSD wound care. Therefore it is highly recommended to develop further studies on the use of more complex learning media. In addition, the respondents who are the current research tend to be homogeneous with relatively similar levels of academic ability so that the abilities achieved are relatively the same. Thus, it is necessary to conduct similar research on groups with more heterogeneous academic abilities so that the results obtained can be generalized. With these studies the existing psychomotor learning methods will be more developed.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Baldwin D, Hill P, Hanson G. Performance on psychomotor skills: A comparison of two teaching strategies. Journal of Nursing Education. 1991;30:367-370.
2. Beeson S.A, Kriing D.L. The effect of two teaching methods on nursing students' factual knowledge and performance of psychomotor skills. Journal of nursing education. 1999;38:357-369.

3. Burns N, Grove, S.K. The practice of nursing research: Conduct, crtitique, & utilization. (3rd edition). Philadelphia: W.B. Saunders Co. 1997.

4. Febriana FD, Didik Tamtomo, Nunuk Suryani. Effect of audio visual and Phantom media on palpation examination skills of pregnant women. Mitra Sehat Sidoarjo Academy of Midwifery. Thesis. 2014.

5. Hewit-Taylor J. Self-directed learning: Views of teachers and students. Journal of Advanced Nursing. 2001;36:496-500.

6. Lorenzo R.A.D, Abbott C.A. Effectiveness of an adult-learning, self-directed model compared with lecture-based teaching metods in out hospital training. Academic Medical surgical Medicine. 2004;11:33-37.

7. Powell S.S, Canterbury M.A, McCoy D. Medication administration: Does the teching method really matter?. Journal of Nursing Education. 1998;37:281-283.

8. Roni, Faishol. Analysis of Medical Nursing Lab's Surgical Skill at Akper Bahrul Ulum Jombang. Thesis. 2011.

9. White R, Ewan C. Clinical teaching in nursing. London: Chapman & Hall. 1991.

10/ Jones, Barlett. 2000. http://www.jblearning.com/samples/0763749109/49109_CH04_056_072.pdf

11. Buhat-Mendoza, Dorothy, Mendoza, James Neil, O. Ampaguey, Jocelyn. From Skills Laboratory to Hospital Duty: Nursing Students Efficacy in Vital Signs and Parenteral Drug Admin at Tobruk University. IOSR Journal of Nursing and Health Science. 2018;7:41-47. 10.9790/1959-0702034147.

12. Notoatmodjo S. Health Research Methodology. Jakarta: Rineka Cipta. 2010.

13. Candy P. Self-direction for lifelong learning: a comprehensive guide to theory and practice. San Francisco: Jossey Bass. 1991.

14. Bye, Robin. The Teacher as a Facilitator for Learning - Flipped Classroom in a Master's Course on Artificial Intelligence. 2017;184-195. 10.5220/0006378601840195.

15. Naismith et all. Literature Review in Mobiles and learning. Technology. 2006. https://www.nfer.ac.uk/publications/FUTL15/FUTL15.pdf diakses pada 25 September 2018

16. Mayer B et all. What is independent learning and what are the benefits for students?. London: Department for Children, Schools and Families Research Report 051. 2008.

17. Lassara, Nurun. Students Satisfaction on Practical Learning in Nursing Laboratory Health Polytechnic Ministry of Health Yogyakarta. Journal of Health Technology (Journal of Health Technology). 2018;14:26-31. 10.29238/jtk.v14i1.89.

18. WHO. Laboratory Quality Standards and Their Implementation. 2011. http://apps.who.int/medicinedocs/documents/s22409en/s22409en.pdf?ua=1

19. Kasatpibal N, Sawasdisingha P, Whitney J. Innovation Of Educational Wound Model For Nursing Student. Journal of Nursing Education and Practice. 2016;6(9).

The Role of SOD, Catalase, HSP-27, HSP-70, and TNF-α Expression in Apoptosis of Retinal Ganglion Cells After Intra Ocular Pressure Increase on Rattus Norvegicus

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ABSTRACT

The aim of this study is to investigate the involvement of Super Oxide Dismutase (SOD), Catalase, Heat Shock Protein 70 (HSP 70), Heat Shock Protein 27 (HSP 27) Retinal Ganglion Cells (RGCs) and Tumor Necrosis Factor α (TNF-α) microglia in apoptosis RGCs and RGCs survival after transient periode of pressure induced ischemia/reperfussion injury of rat retina.The study design was randomized post test only control groups. Thirty one Sprague Dawley (SPD) rats were divided into 4 groups. 1 control group and 3 experimental groups. Experimental groups were induced by transient elevation of intraocular pressure (IOP) 110-130 mmHg for 45 minutes (7 rats), 60 minutes (7 rats), 75 minutes (7 rats). 28 rats were terminated at day 7 and 3 rats were terminated at first day for histology and immunohistochemistry staining examination. Result from the Expression of SOD, HSP 70 GSRs and TNF-α microglia were significantly different. p=0,046 and B=0.380 for SOD; p=0.030 and B=0,411 for Hsp 70; p=0.007 and B=0,501 for TNF-α. Expression of catalase and HSP 27 GRCs were not significantly different. p=0.203 for catalase; p=0.083 for Hsp 27. The increased expression of HSP 70 indicated strong correlation with increased level of apoptosis RGCs, p=0.046 and B=0,473. In conclusion, the result demonstrated that RGCs apoptosis survival in glaucoma correlates strongly with transient elevated IOP and is significantly associated with IOP induced changes in expression HSP 70 RGCs.

Keywords: *Intraocular Pressure, IOP, HSP 70 RGCs, Apoptosis RGCs*

Introduction

Glaucoma, a progresive optic neuropathy disease, is characterized by loss of retinal ganglion cell and their axons. This condition leads to irreversible visual loss. Death of RGCs in glaucoma human eyes and experimental animal models of glaucoma induced by apoptosis RGCs are still unclear. The elevated intraocular pressure was considered the prime factor for glaucoma[1, 2] Current theraphy that is directed at lowering IOP cannot completely stop the progression of the disease. Blindness caused by glaucoma is an issue in Indonesia and all over the world.

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Increased intra ocular pressure 110-130 mmHg for 45 minutes, 60 minutes, and 75 minutes followed by reduction to normal TIO will cause reperfusion ischemia on the retina, in the area which contains cells of the retina and microglia[3]. Cells that undergo stress will promote changes in protein structure and function, so that the cells will be heading toward the death pathway or survival pathway. RGC which experience stress will produce ROS that is radical superoxide (O2-), hydrogen peroxide (H_2O_2) and hydroxyl radical (•OH). Increased ROS will be counterbalanced by an increase in endogenous anti oxidant namely superoxide dismutase (SOD) and catalase (CAT). RGCs which experience stress will also express Heat Shock Protein (HSP) 27 and 70. Microglias that undergo stress will express TNF-α[4,5].

The purpose of this study is to explain the mechanism of RGCs apoptosis in glaucoma following reduction of IOP to normal level.

Methodology

This study is a type of laboratory experimental research with randomized post-test only controls group design. The designs are as follows in Figure 1:

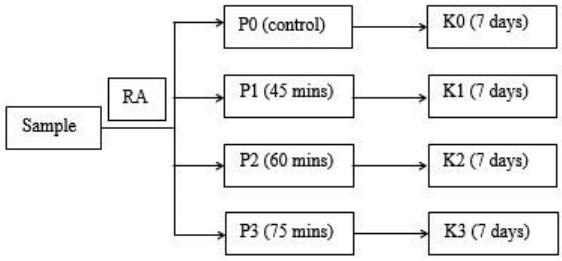


Figure 1: Research design approach

Where:

RA: Random Allocation

K0: Control group, without treatment an increase in IOP (P0), was sacrificed on day 7

K1: Treatment group with IOP increase for 45 minutes was then returned to normal IOP (P1), sacrificed on day 7

K2: Treatment group with IOP increase for 60 minutes was then returned to normal IOP (P2), sacrificed on day 7

K3: Treatment group with IOP increase for 75 minutes was then returned to normal IOP (P3), sacrificed on day 7

This research was conducted in a laboratory that is standard and has complete equipment and adequate experience in experimental animal maintenance, preparation of preparations as well as in immunohistochemical examination techniques under the guidance of doctoral quality consultants. For this reason, the research was carried out in a biochemical laboratory, immunohistochemical laboratory and electron microscope, Faculty of Medicine, Airlangga University. The time of the study was carried out for 6 months including the preparation, materials and tools, treatment, examination, data analysis and preparation of reports.

The sample of this study was male Sprague Dawley (SPD) type adult sex with a body weight of 250-300 grams, healthy condition and no abnormalities in the eye and general conditions.

After obtaining a homogeneous sample through screening with inclusion and exclusion criteria, a homogeneous sample group is divided by random allocation so that each sample member has the same opportunity to occupy its group.

In the process of carrying out the study, a dropout criterion was applied if the research subject experienced illness or death so that it could not fulfil the research procedure which took 7 days. Furthermore, rats were sacrificed and retinal tissue was collected around the optic nerve papillary to be made immunohistochemically preparations and staining. The collected data from histology and immunohistochemistry tests then carried out statistical analysis with the following details:

1. Descriptive analysis of data
2. Test for homogeneity
3. Multiple comparison test results of immunohistochemical examination (IHC) expression of SOD, Catalase, HSP70, HSP27, Apoptosis, Brn3b SGR and TNFα microglia.
4. Regression test to find out the causal relationship between the increase in intraocular pressure with variables SOD, Catalase, HSP70, HSP27, Apoptosis, Brn3b SGR and TNFα microglia.

Results and Discussion

Profile of Expression of Retinal Ganglion Cell Proteins and Microglia: Table 1 indicates that the standard deviation is 0.018 and the average SOD is 0.052, so the coefficient of variation is 0.3. Standard deviation of 0.015 and Catalase average of 0.036, so that the coefficient of variation is 2.4. Standard deviation of 0.017 and mean HSP70 0.031 so that the coefficient of variation is 0.5. Standard deviation of 0.011 and mean HSP27 0.041 so that the coefficient of variation is 0.3. The standard deviation is 0.007 and the average TNF-α is 0.008 so the coefficient of variation is 0.9. Standard deviation of 0.014 and mean apoptosis 0.008 so the coefficient of variation is 1.8. Standard deviation of 0.007 and Brn3b mean of 0.051 so that the coefficient of variation is 0.1 and there are homogeneous variables in the Brn3b variable.

Table 1: Mean and SD values for each variable in each group

	SOD	Catalase	HSP70	HSP27	TNF-α	Apoptosis	Brn3b
Mean	0.052	0.036	0.031	0.041	0.008	0.008	0.051
Standarddeviation (SD)	0.018	0.015	0.017	0.011	0.007	0.014	0.007
Minimum	0.039	0.020	0.021	0.028	0.000	0.000	0.044
Maximum	0.072	0.051	0.051	0.048	0.012	0.024	0.057

HSP70 expression in the treatment group was higher than the control group. HSP27 expression in the treatment group with duration of 45 minutes was higher than the control group, while the group duration of 60 and 75 minutes was lower than the control group. TNFα expression in the treatment group was higher than the control group. SGR apoptosis in the treatment group was higher than the control group. Living SGR in the treatment group with a duration of 45 minutes was higher than the control while the treatment group with duration of 60 and 75 minutes was lower than the control group.

Immunohistochemistry Expression of Retinal Ganglion Cell Proteins and Microglia: Figure 2 depicted the SOD1 Expression Retinal Ganglion cells with 400X magnification. This image shows an incision of retinal tissue with immunohistochemical staining. The red arrow shows a positive reaction to monoclonal antibodies (anti SOD1), while the green arrow does not react with monoclonal antibodies (anti SOD1). In this study there was an increase in SOD1 SGR expression, so as to neutralize the increase in free radicals, no oxidative stress and SGR apoptosis. While the expression of catalase SGR obtained a decrease in expression in the 75-minute group compared to the control group. These conditions indicate that catalase plays a major role in the detoxification of products from SOD, namely H2O2. This is consistent with the research of Goyal et al.[6], there was an increase in levels of SOD and glutathione peroxidase in the serum of patients with open-angle glaucoma compared to cataract patients, whereas the levels of catalase did not differ. In another study conducted by Yuki et al.[7], in experimental animals with SOD1 deficiency can result in SGR death. In other parts also found low SOD1 levels in the serum of normal pressure glaucoma sufferers compared to normal people.

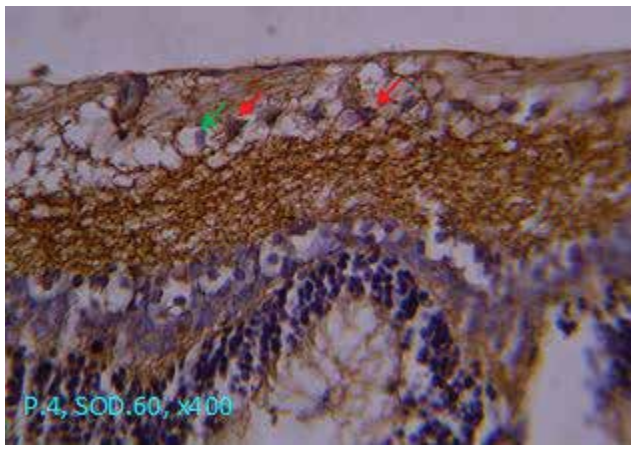


Figure 2: SOD Expression of Retinal Ganglion Cells at 400X magnification

Figure 3 presented the HSP expression 70 retinal Ganglion cells with 400X magnification. This image shows an incision of retinal tissue with immunohistochemical staining. The red arrow shows a positive reaction to monoclonal antibodies (anti HSP 70), while the green arrow does not react with monoclonal antibodies (anti HSP 70).Intracellular HSP 70 enhancement can act as anti-apoptosis by inhibiting the release of cytocrom C from mitochondria, HSP 70 can also inhibit the activation of AIF, APAF, and Caspase 3. Caspase 70 also plays an anti- apoptosis role at the pre mitochondrial level by binding to Bid and inhibiting P53. Intracellular HSP increases are followed by the increase of extracellular HSP which serves as an alarm for pro-inflammatory signals and immunomodulations such as IL 6 and TNF-α. eHSP 70 also acts as microglia activation and stimulates phagocytosis[8].

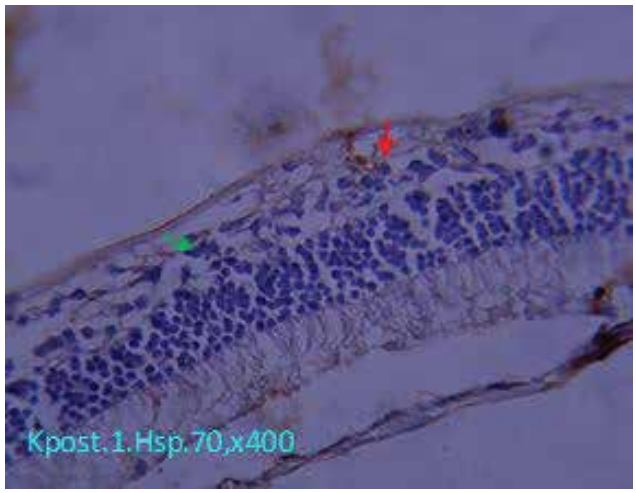


Figure 3: Expression of HSP 70 retinal Ganglion cells

HSP Expression 27 Retinal Ganglion cells with 400X magnification (refer Figure 4). This image shows an incision of retinal tissue with immunohistochemical staining. The red arrow shows a positive reaction to monoclonal antibodies (anti HSP 27), while the green arrow does not react with monoclonal antibodies (anti HSP 27).Schmitt et al.[8], HSP 27 is a protein that functions to maintain cells from stressors and acts as an anti-apoptosis either through intrinsic or extrinsic pathways. Intracellular HSP 70 also acts as an anti-aggregation, helping as transport, folding, and refolding as well as stabilizing filament and sito skeleton. On the other hand HSP 27 can activate the survival pathway through Phosphatidyl inositol 3 kinase (PI3-k). Akt/PKB and Nf-kB. Shields et al.[9], hypothesized that HSP 27 acts as RAMPs, acting as immunomodulation and activating

microglia membrane receptors to produce anti-inflammatory cytokines such as IL-10. From the research data, it can be seen that with the increase in stressors following a decrease in HSP 27 SGR expression, Hsp 27 cannot play a role in SGR protection in both intracellular and extracellular.

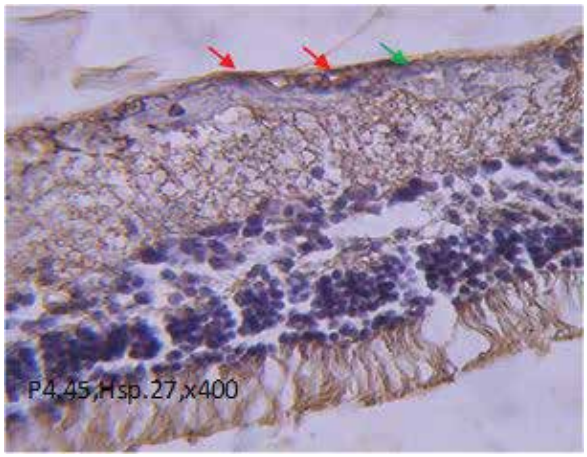


Figure 4: Expression of HSP 27 retinal Ganglion cells

Figure 5 shown the expression of TNF-α microglia with 400X magnification. This image shows an incision of retinal tissue with immunohistochemical staining. The red arrow shows a positive reaction to monoclonal antibodies (anti TNF-α), while the green arrow does not react with monoclonal antibodies (anti TNF-α).In the experimental animal model this study occurred similar to acute glaucoma in humans. At the biomolecular level of increase in TNF-α microglia there were differences in the duration of 75 minutes compared to the control group. TNF-α is known to have various functions as a proinflammatory cytokine, TNF-α can result in cell death through either the apoptosis or necroptosis process. SGR death at duration of 75 minutes may involve a process of necroptosis[10,11].

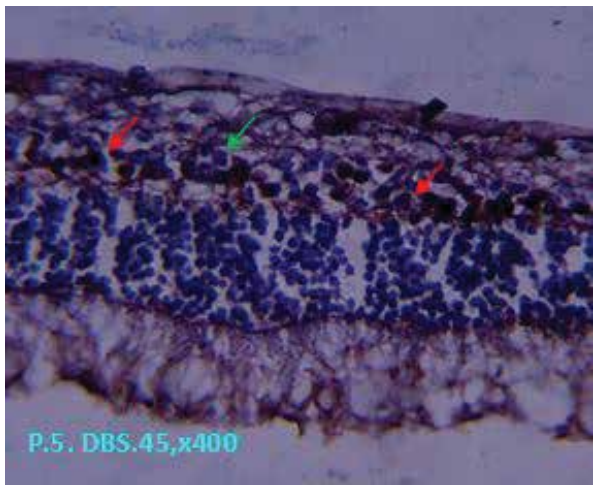


Figure 5: Expression of TNF-α microglia

Apoptosis expression retinal Ganglion cells with 400X magnification is depicted in Figure 6. This picture shows an incision of retinal tissue with immunohistochemical staining using the TUNEL method. Red arrows indicate retinal ganglion cells undergoing apoptosis. Poon et al.[11], in normal adult humans the process of apoptosis is very high, it is estimated that apoptosis of 1 million cells per second (physiological apoptosis) occurs. In this study, apoptosis occurred in the control group and increased in the treatment group. The increase in apoptosis occurred in the 60-minute duration group compared to the control group and the 45-minute treatment group, but there was no difference in SGR apoptosis in the 75-minute duration group compared to the control group.

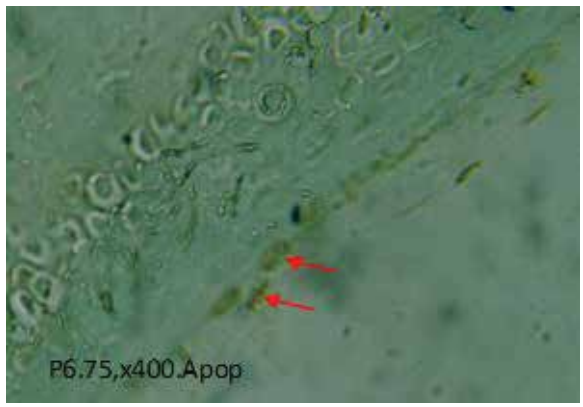


Figure 6: Expression of Apoptosis in retinal Ganglion cells

Figure 7 shown Brn3b expressions of retinal Ganglion cells with 400X magnification. This image shows an incision of retinal tissue with immunohistochemical staining. The red arrow shows a positive reaction to monoclonal antibodies (anti Brn3b), while the green arrow does not react with monoclonal antibodies (anti Brn3b). Brn3b is a marker used to identify SGR that survives. In this study, the lowest survival rate of SGR was 60 minutes compared to the control group (Figure 4.1). The survival decline in SGR occurred significantly at duration of 60 and 75 minutes compared to the control group.

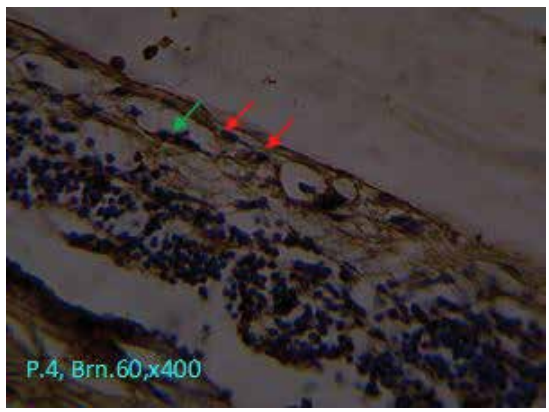


Figure 7: Expression of Brn3b retinal Ganglion cells

Conclusions

In conclusions, after the increase of IOP followed by decrease of IOP to normal level will result in increased expression of SOD, HSP70 RGC and TNF-α RGCs microglia. HSP 70 is the main apoptotic RGC biomarkers.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

1. S. Gupta, P. Agarwal, R. Saxena, S. Agrawal, R. Agarwal. Indian Journal of Ophthalmology.2009;57(257).
2. R.R. Allingham, M.B. Shields. Shields Textbook of Glaucoma (Wolters Kluwer/Lippincott Williams & Wilkins Health, Philadelphia, PA). 2011.
3. J.M.K. Kwong, J. Caprioli, Neuromethods Animal Models for Retinal Diseases. 2009;191.
4. M. Karlstetter. Innate Immunity and the Eye. 2013;12.
5. A. Sierra, M.-È. Tremblay. Microglia in Health and Disease.2014;3.
6. A. Goyal, A. Srivastava, R. Sihota, J. Kaur. Current Eye Research. 2014;39(823).
7. K.Yuki, T. Yoshida, S. Miyake, K. Tsubota, Y. Ozawa. Experimental Eye Research. 2013;115(230).
8. E. Schmitt, M. Gehrmann, M. Brunet, G. Multhoff, C. Garrido. Journal of Leukocyte Biology. 2006;81(15).
9. A.M. Shields, G.S. Panayi, V.M. Corrigall. Clinical & Experimental Immunology. 2011;165(292).
10. J.C. Reed, D.R. Green. Apoptosis: Physiology and Pathology (Cambridge University Press, New York).2011.
11. I.K.H. Poon, C.D. Lucas, A.G. Rossi, K.S. Ravichandran. Nature Reviews Immunology. 2014;14(166).

The Relationship Between Nurse Caring Behavior and Patient Satisfaction Level at Inpatient Wards of Bayangkara Hospital Jayapura

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ABSTRACT

Patient satisfaction can be influenced by the caring behavior of nurses. Nurses who have a concern in providing nursing care to patients in the hospital are caring nurses. The purpose of this study was to determine the relationship between caring behavior of nurses and the level of satisfaction of inpatients at Bhayangkara Hospital. This research used a descriptive correlation with a cross-sectional study design. The research was conducted at inpatients wards of Bhayangkara Hospital. The population was inpatients with the number of samples of 88 respondents included by accidental sampling technique. Data obtained by using a questionnaire and analyzed by using Chi-Square. The results showed that there were 27 people (30,7%) who had fewer nurses caring behavior in the inpatient ward of Bhayangkara Hospital while There were 61 people (69,3%) with the good category. Patient satisfaction at inpatient ward of Bhayangkara hospital which less satisfied were 12 people (13,6%). Meanwhile, there were 76 satisfied respondents (86,4%). There was a relation between the caring behavior of nurses and patient satisfaction level at inpatient wards of Bhayangkara Hospital (p-value = 0,041)

Keywords: *Caring behavior, nurse, patient satisfaction*

Introduction

Nurse *Caring* behavior is a behavior that underlies nurses' behavioral attitudes in providing nursing services to their patients. The behavior of nurses who are friendly, attention, care, giving explanations to patients and families when conducting examinations and actions, respecting patients, being in a hurry, being calm, gentle, loving and understanding the feelings of patients or families of patients is a caring nurse behavior. Potter & Perry[14].

Patient satisfaction can be influenced by nurse caring behavior. Nurses who care about providing nursing care to patients at the hospital are nurses who have a *Caring* attitude[3]. Patient satisfaction can be assessed from several dimensions which include: *tangibles, reliability, responsiveness, assurance,* and *empathy* Nursalam[12].

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Providing nursing services based on nurses' caring behavior can improve the quality of health services. The application of caring integrated with biophysical knowledge and knowledge of human behavior will be able to improve individual health and facilitate the delivery of services to patients[8]. Caring behavior that is carried out effectively can promote health and individual growth[9]. Caring behavior of nurses is not only able to increase patient satisfaction but also can generate benefits for the hospital Abdul et al[1,4,5].

Bhayangkara Jayapura Hospital is a police hospital that is structurally under the guidance of the Papua Police and Medical Sector. The number of nurses serving in the inpatient ward of Bhayangkara Jayapura Hospital is as many as 54 nurses, while the number of patients who get treatment in the inpatient ward of men, women's wards, and pediatric wards in February 2017, as many as 789 patients and the total number of beds 64 inpatients.

The results of a preliminary study conducted by researchers at Bhayangkara Jayapura Hospital in March 2017 concerning the level of patient satisfaction with

health services, obtained data from 10 questionnaires 20% of patients were very satisfied, 30% of patients were satisfied, and 50% of patients felt quite satisfied. While the results of interviews conducted by researchers on 6 inpatients, as many as 50% of patients said they were satisfied, and 50% of patients said that they were satisfied that nurses did not often check the patient's condition and only came when giving medical actions and nurses rarely communicated[17,18]. Based on this, the authors are interested in conducting a study on "Relationship between nurse caring behavior and the level of satisfaction of hospitalized patients at the Bhayangkara Jayapura Hospital[11]".

Aim Research

To determine the relationship of nurse caring behavior to the level of satisfaction of inpatients at Bhayangkara Hospital.

Research Method

This study was a descriptive correlation with a crossectional study design. Research location in the inpatient ward of Bhayangkara Jayapura Hospital. The population is in patients with a total sample of 88 respondents obtained by *accidental sampling*. Data were obtained using a questionnaire and analyzed using *chi square.*

Results and Discussion

Univariate Analysis

Nurse Caring Behavior

Table 1: Distribution of respondents based on Caring Behavior at Bhayangkara Hospital, May 2017 (n = 88)

Caring behavior	Frequency (n)	Percent (%)
Less	27	30,7
Well	61	69,3
Total	88	100

Source: Primary Data, 2017

Based on table 1, it shows that the patient's response to nurses' caring behavior in the less category is 27 people (30.7%) and good as many as 61 people (69.3%).

Patient Satisfaction

Table 2: Distribution of respondents based on Patient Satisfaction at Bhayangkara Hospital, May 2017 (n = 88)

Patient Satisfaction	Frequency (n)	Percent (%)
Quite satisfied	12	13,6
Satisfied	76	86,4
Total	88	100

Source: Primary Data, 2017

Based on table 2, it shows that patient satisfaction in the service category is quite satisfied as many as 12 people (13.6%) and both satisfied as many as 76 people (86.4%).

Bivariate Analysis

Table 3: Relationship between Nurse Caring Behavior and Patient Satisfaction Level in Inpatient Room at Bhayangkara Hospital, May 2017 (n = 88)

Caring behavior	Patient Satisfaction				Jumlah		p-value
	Quite satisfied		Satisfied				
	n	%	n	%	n	%	
Less	7	25,9	20	74,1	27	100	0,041
Well	5	8,2	56	91,8	61	100	
Total	12	13,6	76	86,4	88		

Source: Primary Data, 2017

Table 3, shows that of the 27 respondents who responded to less caring behavior with satisfaction patients were quite satisfied as many as 7 people (25.9%) and satisfied as many as 20 people (74.1%). Whereas 61 respondents who responded to good caring behavior with patient satisfaction were quite satisfied as many

as 5 people (8.2%) and satisfied as many as 56 people (91.8%)[10]. The results of the *chi square* statistical test obtained p-value = 0.041. This means that Ha is accepted which stated that there is a relationship between nurse caring behavior and the level of satisfaction of patients in the Inpatient Room of Bhayangkara Hospital.

Discussion

Caring Behavior: The results of the study showed that the patient's response to the caring behavior of nurses in the less category was 27 people (30.7%) and good as many as 61 people (69.3%). This shows that more than half of patients stated that caring behavior given by nurses was mostly good.

Caring is central to nursing practice because caring is a dynamic approach, where nurses work to improve their care for patients[16]. Caring is the science of humans, not only as a behavior, but a way so that something becomes meaningful and gives motivation to do[7]. Watson also defines curing as a medical term that means healing illness, so that differences can be drawn between nursing and doctors Burhannudin[2].

Most patients respond to good caring behavior, because the nurse listens to all what is conveyed by the patient patiently and gives a sense of comfort by fostering a relationship of trust and meeting all the needs of the patient by maintaining the patient's dignity and dignity. Although after being tested for validation from 88 respondents there were 27 people (30.7%) who still behaved less caring towards patients.

There are differences in the response of patients about nurses caring behavior in receiving a service that is different between each respondent. The factors that influence it are the understanding of respondent service users about the type of service they will receive. In this case communication plays an important role because health care carries the attitude shown by health workers[15].

Patient Satisfaction: The results showed that patient satisfaction in the service category was quite satisfied as many as 12 people (13.6%) and both satisfied as many as 76 people (86.4%).

Kotler in Nursalam[12] states that satisfaction is a feeling of pleasure or disappointment that someone appears after comparing between perceptions or impressions of the performance or results of a product and expectations. Nursalam[12,13] argues that customer satisfaction is an emotional response to experiences related to certain products or services purchased, retail outlets, or even behavioral patterns (such as shopping behavior and buyer behavior), as well as the overall market, customer satisfaction is the result (outcome) that is felt for the use of products and services, the same or exceeding the desired expectations. Whereas states that patient satisfaction is the level of the patient's feelings that arise as a result of the performance of the health service that is obtained, after the patient compares with what he expected.

Relationship between Caring Behavior and Patient Satisfaction: The results showed that there was a relationship between nurses' caring behavior with the level of satisfaction of patients in the Inpatient Room of Bhayangkara Hospital (p-value = 0.041). The results of this study are in line with the research conducted by Tiara[20] in Pringsewu General Hospital.

The results of the analysis showed that caring behavioral responses were lacking with satisfaction of satisfied patients (74.1%). While good caring behavior with satisfaction of satisfied patients (91.8%). This shows that with high caring behavior from the services provided by nurses, patients tend to feel satisfied. The better nurses caring behavior in providing nursing care services, patients or families are more happy in receiving services, meaning the therapeutic relationship of nurse-client is increasingly fostered.

Nurse caring behavior is not only able to increase patient satisfaction, but also can generate benefits for the hospital. Stated that caring behavior can bring financial benefits to the health service industry. Add that caring behavior of health staff has economic value for hospitals because this behavior has an impact on patient satisfaction.

Conclusions and Suggestions

Conclusion: Based on the results of the research and discussion it can be concluded as follows:

1. Caring behavior of nurses in the Inpatient Room of Bhayangkara Hospital in the poor category was 27 people (30.7%) and good as many as 61 people (69.3%).
2. The satisfaction of patients in the Inpatient Room of Bhayangkara Hospital in the category of quite

satisfied as many as 12 people (13.6%) and both satisfied as many as 76 people (86.4%).

3. There is a relationship between nurse caring behavior with the level of satisfaction of patients in the Inpatient Room of Bhayangkara Hospital (p-value = 0.041)

Suggestion

1. **For Hospital Institutions:** Providing service excellence training that aims to provide excellent service provided by nurses to patients so that patients are satisfied in using the services of the hospital in question.
2. **For Nurses, Bhayangkara Hospital:** For the nursing profession these results can be used as input for nursing staff to improve their performance in an effort to maintain the quality of health services related to nurse caring behavior.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Abdul, Ariyanti, S., Elly, L.S. Relationship between Nurse Caring Behavior and Hospital Patient Satisfaction Level. Journal. Baubau. 2013. Opened on the site: URL: http://pasca.unhas.ac.id/jurnal/files/e403ff6b6bf1791519e89042e6af03a2.pdf. Retrieved March 5, 2017
2. Burhannudin I.A.M. Application of Conceptual Caring Model from Jean Watson in Nursing Care. Nursing News ISSN 1979-2697. September 2008; (1)3: 147-150. Dibukapadasitus: URL: https://publikasiilmiah.ums.ac.id/bitstream/handle/11617/501/3i.pdf?sequence=1. Retrieved March 5, 2017
3. Dewi. N.M. Relationship between Nurses' Caring Attitudes and Class III Inpatient Satisfaction in PKU Muhammadiyah Hospital, Yogyakarta. Publication manuscript. College of Health Sciences 'Aishiyah. Yogyakarta. 2014. Opened on the site: URL: http://opac.unisayogya.ac.id/283/1/PUBLIKASI.pdf. Retrieved March 5, 2017
4. Habby. F.S.W. Relationship between Nurse Caring Behavior and Inpatient Patient Satisfaction Level Arjasa Health Center, Jember Regency. Journal Article. Muhammadiyah Jember University. Jember. 2015. Opened on the site: URL: http://digilib.unmuhjember.ac.id/download.php?id=3366. Retrieved March 5, 2017
5. Hamka F.D, Zuhriana K.Y, Andi M. Relationship between Caring Behavior of Nurses and Patient Satisfaction in Toto Kabila Public Hospital, Bone Bolango. Jurnal. Bone. 2014. Opened on the site: URL: http://kim.ung.ac.id/index.php/KIMFIKK/article/download/10448/10327. Accessed on March 5, 2017
6. Kotler. Marketing Management. Jakarta: Prenhalindo. 2006.
7. Kozier, Erb, Berman, Snyder. Fundamental of Nursing: Concepts, Processes, & Practices. 2010; 1: Edition 7. EGC: Jakarta
8. Lukluk, Zuyina. Health Psychology. Yogyakarta. Cendikia Partners. 2008.
9. Mubarak. Health Promotion. Salemba Medika, Jakarta. 2011.
10. Munawaroh, Siti. Analysis of the relationship of characteristics and patient satisfaction with patient loyalty in the two dr. sutomo ponorogo. 2011. http://www.stikesmuhmadiyah.co.id. accessed June 10, 2017.
11. Niken S. Relationship between Caring Nurses and Safety Fulfillment of Patients in the Inpatient Room of Sultan Agung Islamic Hospital, Semarang. THESIS. University of Indonesia. 2011. Opened on the site: URL: http://lib.ui.ac.id/file?file=digital/20281891-T%20Niken%20Sukesi.pdf. Accessed March 14, 2017
12. Nursalam. Nursing Management: Applications in Professional Nursing Practices. Edition 4. Salemba Medika: Jakarta. 2014.
13. Nursalam. Concept and Application of Research Methodology in Nursing. Jakarta: Salemba Medika. 2016.
14. Potter, Patricia & Perry, Anne. Fundamental of Nursing. Book 1. Edition 7. Jakarta: Salemba Medika. 2009.

15. Prayoto. Theory, Attitude & Behavior in Health is equipped with a sample questionnaire. Nuha Medika, Yogyakarta. 2014.

16. Setiadi. Concept and Practice of Writing Nursing Research. Issue 1 Yogyakarta: Graha Ilmu. 2007.

17. Sujarweni. V.W. Nursing Research Methodology. Gava Media Publisher. Yogyakarta. 2014.

18. Suyanto. Methodology and Application of Nursing Research. Nuha Medika: Yogyakarta. 2011.

19. Tan C. Factors Affecting Caring Behavior of Nurses in Dealing with Critical Patients in the ICU Room, HCU Hospital DOK II Jayapura and ICU Abepura Hospital in Papua Province. THESIS. Padjadjaran University. 2012. Opened on the site: URL: http://repository.unpad.ac.id/13375/1/220120100009_a_1383.pdf Accessed on 15 April 2017

20. Tiara. Caring Behavior of Nurses in Increasing Satisfaction of Inpatients. Journal of Nursing. 2013; IX(2): October 2013 ISSN 1907 - 0357.

21. Cut it. S. Analysis of Quality of Clinical Nursing Services and Level of Patient Satisfaction in Mambruk Room, Bhayangkara Jayapura Hospital. Essay. Cenderawasih University. 2013.

22. Tyan S, Triyoso, Prima D. F. Relationship between Caring Behavior of Nurses with Family Patient Satisfaction in IRJ RSJD Lampung Province in 2014. Holistic Health Journal. 2014;8(4) September 2014: 186-191. Lampung. Opened on the site: URL: http://malahayati.ac.id/wp-content/uploads/2016/08/7.-Tyan-Prima-Triyoso-Caring.pdf. Accessed on March 5, 2017

23. Yasmini. Relationship between Nursing Nurse Caring and Patient Satisfaction in the Inpatient Room of Telogorejo Hospital SMC. 2013. http://www.stikestelogorejo.co.id. accessed June 10, 2017.

Job Satisfaction and Mental Health among Bank Employees of Chidambaram Town

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ABSTRACT

Job satisfaction results from the worker's perception that the work content associate degreed context truly gives what an employee values within the work scenario. It is outlined as "a gratifying or positive emotion ensuing from the appraisal of one's job or job experiences". This positive emotion is extremely causative to associate degree employee's physical and mental well-being. Organizationally speaking, a high level of job satisfaction reflects an extremely favorable structure climate leading to attracting and holding higher employees. The current study aims to seek out the work Satisfaction and mental state among Bank staff of Chidambaram city. Samples of one hundred respondents chosen at random were studied. Primary knowledge was collected by employing a structured interview scheduled. All the respondents were asked identical queries within the same fashion and that they were conversant regarding the aim of the study. Descriptive statistics and analysis of variance, t-test and Chi-square analysis were applied. The findings and observations are the result and outcome of the interpretations created throughout the study of research.

Keywords: *Job Satisfaction, mental state, Demographic Variables*

Introduction

Though the premier mills operational space is weaving and knitting, there's an easy alternative for the event of human resources. They supply superb welfare measures like transport, medical facilities, education and recreation facilities. With the exception of this, they exercise special care in impartation coaching and grooming to their staff.

Human Resources Development itself is associate degree structure method. It starts from organization coming up with that identifies comes and fixes targets. Flowing through all aspects of job analysis, manpower, and achievement, the method of human resource development takes place in an exceedingly range of areas.

Job satisfaction is that the advantageousness or disadvantage with that staff read their work. It expresses the quantity of agreement between one's expectations of the work and therefore the rewards that the work provides[7]. Since job satisfaction involves expectations, it relates to equity theory, the psychological context, and motivation.

Job satisfaction could confer with either an individual or a bunch. Associate degree administrator will say either, "Antonio national leader has high job satisfaction" or "Department c has high job Satisfaction". Additionally, job satisfaction will apply to components of a person's job. For instance, though Antonio Ortega's general job satisfaction could also be high, he could also be discontent together with his vacation set up. Job satisfaction is very important as a result of it represents general human conditions. It needs attention, diagnosis, and treatment[2].

Review of Literature

Christopher and Nathan[3] examined the role of worker perceptions of justice within the relationship between job satisfactions of structure commitment. Four competitor models, linking worker satisfaction commitment were known two from the literature (i) job satisfaction is an antecedent to structure commitment (ii) structure commitment is an antecedent to job satisfaction (iii) structure commitment and job satisfaction are reciprocally connected and (iv) structure commitment of job satisfaction are freelance. The four models were then tested using conformity analytic techniques of a sample of 133 monetary services company staff. The results recommend that once considering the role of justice judgment satisfaction and commitment are causally freelance.

Pestonjee and Singh[10] administered the S.D employee's inventory the work involvement scale and a psychological participation index to 250 staff and 250 clerks of a nationalized bank in Republic of India to match job satisfaction with job standing within the banking system. Clerks indicated additional job satisfaction than bank staff World Health Organization showed higher job involvement and additional participation in decision-making than clerks. Implications for job achievement practices are noted.

Objectives of the Study

- To assess the extent of job satisfaction and mental state of staff on the premise of their demographic variables.
- To analyze the impact of welfare measures on the work satisfaction of bank staff.

Methodology

Research methodology could be thanks to consistently solve the analysis drawback. It's going to be understood as a science of finding out however analysis is finished scientifically. The strategies adopted in aggregation the info, choice of the sample, analysis, and interpretation are mentioned below. The study makes an attempt to investigate the work satisfaction among bank staff and connected factors of co-operation, physical, psychological issue to bank staff angle and behavior among employees and therefore the management with special respect to bank staff of Chidambaram city. During this analysis, the stratified sampling methodology was wont to choose the sample. The samples were chosen at random among the bank staff from completely different sections of the various banks, of that samples were chosen from each social control, body employees and coaching and development of the class of the employees. The overall samples collected for this study were one hundred. The info assortment relating this study involves each primary and secondary strategy. The first knowledge was collected victimization associate degree interview schedule through at random chosen samples. The secondary knowledge was collected from sources like manuals, company records, magazines, and journals, etc.

Analysis and Discussions

Table 1: Mean, Standard deviation, Standard error mean and F-ratio of different educational groups of employees on job satisfaction

Groups	N	Mean	SD	SE_M	F-ratio	LS
U.G	52	31.2	5.8	0.5	0.46	NS
P.G.	36	31.4	5.6	0.5		
Above P.G and Other Additional Qualification	12	32.7	7.0	0.6		

The table shows the mean, S.D, SEM and F-ratio of job satisfaction for different educational groups of employees. It is observed that the mean value for bank employees with U.G. Degree qualification is 31.2, the mean value for the employee with a P.G. degree is 31.4. The mean for employees with above PG degree and other educational qualification is 32.7. The S.D value for UG holders and PG graduates is 5.8 and 5.6 respectively, which shows no deviation. Whereas, for the employees with above PG degree and other educational qualifications, the S.D value is 7. It shows that there is room for enhancing the job satisfaction level of employees based on educational qualification. But the ANOVA result indicates that there is no significant level of difference in the job satisfaction among the respondents of different levels of education. Since the calculated F-ratio is not significant. Hence the proposed hypothesis is accepted. It is concluded that there is no statistical proof for variation in job satisfaction based on qualification[4].

Table 2: Mean, Standard deviation, Standard error mean and F-ratio of employees job satisfaction based on their department

Department	N	Mean	SD	SE_M	F-ratio	LS
Accounts	29	30.9	6.3	0.4	1.13	NS
Personnel & Administration	36	31.9	4.4	0.5		
Training & Development	35	31.0	9.2	1.9		

The table shows the mean, S.D, SEM, and F-ratio of employees job satisfaction based on their department. It is found that the mean value of employees in a different department is almost similar and it varies between 30.9 and 31.9. The standard deviation varies widely between 4.4 and 9.2. Personnel & Administration division is with the highest mean value of 31.9 with more job satisfaction and with least S.D (4.4). There is consistency. But in the weaving department the highest deviation is observed (9.2) with less level of job satisfaction. But, there is no significant proof. Since the calculated F-ratio is not significant. Hence it can be concluded that the hypothesis is accepted and that the job satisfaction level does not vary based on the different sections.

Table 3: Mean, Standard deviation, Standard error mean and t-ratio between gender and job satisfaction

Groups	N	Mean	SD	SE_M	t-ratio	LS
Male	68	32.4	5.8	0.5	0.56	NS
Female	32	31.1	6.6	0.6		

The above table shows mean, S.D, SEM and t-ratio of employees job satisfaction on the basis of gender. The mean value for the male employees is 32.4 and for the females, it is 31.1. S.D for males and females is 5.8 and 6.6 respectively. It is found that the male employees have higher job satisfaction than female employees[5]. The S.D value is higher among female respondents and the level of satisfaction is less, and the consistency is better among male respondents. But the 't'-test indicates that the difference among the male and female does not differ significantly. Hence it is concluded that the hypothesis is accepted.

Table 4: Mean, Standard deviation, Standard error mean and F-ratio of different income groups of employees on job satisfaction

Groups	N	Mean	SD	SE_M	F-ratio	LS
10000-15000	42	30.4	6.2	0.5	1.10	NS
15001-20000	33	31.9	6.2	0.6		
20001 and above	25	30.9	6.3	0.9		

The table shows the mean, S.D, SEM and F-ratio for different income groups of employees on job satisfaction. The mean value was higher for the employees with an income level 15001-20000. It is natural that the least income level people are at least a level of satisfaction. At the middle level, their aspiration is more and that might be a reason for the least level of satisfaction compared to others and S.D are found to be almost equal for all three groups. The one-way ANOVA result shows that the F-ratio is not significant. Hence the proposed hypothesis is accepted and it is inferred that the monthly income of the employees is not a considerable factor that influences job satisfaction[8].

Table 5: Mean, Standard deviation, Standard error mean and t-ratio between job satisfaction and number of dependents of employees

Groups	N	Mean	SD	SE_M	t-ratio	LS
Less than 3	55	31.3	6.8	0.5	0.26	NS
More than 3	45	31.0	6.5	0.4		

This table indicates Mean, S.D, SEM and t-ratio of employees on job satisfaction based on the number of dependents. The mean value for employees with less than 3 members as their dependents is 31.3 and 31.0 for those who have more than 3 members as their dependents. The S.D. value is 6.8 and 6.5 which shows no deviation among employees based on the number dependents they have. This is supported by the computed t-ratio, which is not significant. Hence, there is no statistical proof for rejecting the hypothesis. It is inferred that the number of dependents possessed by an employee is not a major factor in determining their job satisfaction[7].

Table 6: Chi-square test-showing the impact of age on medical benefits

Age	Strongly agree	Agree	DisAgree	Total
Less than 30 years	10	25	5	40
31 – 40 years	10	5	5	20
41- 50 years	5	15	5	25
Above 50 years	5	5	5	15
Total	30	50	20	100

Calculated Chi-square value	Degrees of freedom	Level of Significance
27.4	6	0.05

It is observed from the table that employees below 40 years strongly agree with the medical facilities provided by the company, whereas the employees above 40 years are not satisfied with the medical facilities provided by the corporate. This is confirmed by the calculated Chi-square value, which is greater than the table value at a 5 percent level. Hence the hypothesis is rejected, it is inferred that the opinion of employees varies based on their age.

Recommendations

From the results of the present study, the following recommendation has been made:

1. The research reveals that employees who are older by age are more satisfied with their job than young employees. The reason may be that the youth may expect some challenging jobs. The organization must provide some opportunities for the youngsters to take up new projects which are innovative and challenging.
2. The older employees are not satisfied with the medical allowances given by the bank. As the age of the employees grows, they may get more physical problem than the younger ones. So medical allowance should be given as per the need and requirement of the employees.
3. The management must conduct regular motivational programmes to identify key factors of job satisfaction among various categories of employees. A review committee may be constituted to look after the employee's job satisfaction aspects[6].
4. Employees should be invited periodically to contribute by sharing the skills, knowledge, and ability in increasing job satisfaction[9]. This would promote good mental healthy behavior and social interactions among the employees.
5. In order to enhance job satisfaction among various categories of employees, the existing welfare measure is to be reviewed thoroughly. Further, the need-based welfare schemes are to be introduced throughout the staff of the organizations.

Conclusion

The following conclusion was drawn from the present study: Personal variables have significantly contributed to job satisfaction. Employees education did not influence job satisfaction level. Employees age influences their opinion on medical benefits. Employees education and welfare measures influence job satisfaction levels. Employees gender and monthly income did not influence the level of job satisfaction. Employees age and welfare measures influence job satisfaction levels. Employees length of service influences the job satisfaction level. Overall, it is concluded that the result of one way ANOVA indicates that demographic variables like age, sex, educational qualification, marital status and length of past service influence job satisfaction. Further, it is concluded that identifying the key factors like personal variables is insufficient to increase the degree of job satisfaction.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Arya P.P. Work Satisfaction and its Correlates. Indian Journal of Industrial Relations. 1984;20(1).
2. Asha Hinger. Leadership styles and Job Satisfaction. Prent well Publisher, Jaipur.1986; 147-150
3. Christopher, Nathan. Some variables related to job satisfaction. the Indian Labour Journal, Government of India. 2016;12(5):699.
4. Madan pal, Vasudeva. Supervisory style and situational favorableness as related to workers job satisfaction. 1989;24(3):289-293.
5. Michael M.Gruneberg. Job Satisfaction. The Macmillan Press Ltd. London & Basingstoke. 1978.
6. Nair. N.G, Latha Nair. Personnel Management and Industrial Relations S.Chand & Company Ltd. Ram Nagar, New Delhi.1999.
7. Nigel Nicholson, Toy Wall, Joe Lischeron. Human Relations.1977;30(6):499-514.
8. Omer Bin Sayeed. Job satisfaction and Organisational evaluation in a government bureaucracy. 1988;23(4):487-493.
9. Paul E.Spector. Job Satisfaction, Application, Assessment, Cause and Consequence. Sage Publishers, New Delhi. 1997.
10. Pestonjee D.M, Singh A.D, Singh S.P.Attitude towards unions as related to morale and job involvement. International Review of Applied Psychology. 2017;30(2):209-212.

Neurodevelopmental Screening—A guide for Early Intervention in at-Riskinfants

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ABSTRACT

Background: Survival of at-risk infants increased but has not associated with a similar improvement in neurodevelopmental outcomes. The neurodevelopmental status of at-risk infants is used to indicate the functional integrity of the central nervous system.

Objective: To screen the Neurodevelopment of at-risk infants and identifies infants those who are in need of early intervention would be referred for early intervention.

Method: The study included 50 at-risk infants from the pediatric ward and pediatric well-baby clinic of Rajah Muthiah Medical College and Hospital (RMMCH) and was assessed using the Denver Developmental Screening Test (DDST) and the neurological examination was assessed using AmielTison. The DDST has four categories of domains; namely, gross motor, fine motor adaptive, language and personal social. Each domain was scored. When a child fails to perform the items, the child manifests a significant developmental deviation. The neurodevelopment of the babies have been assessed and the results were obtained. The infants deviated from normal development were intervened and compared to their normal age peer group in their level of achievement in developmental domains using DDST.

Results: From the study 26% of at-risk infants were abnormal and 74% of infants were normal. Among 26% of abnormal at-risk infants, prematurity infants deviate major from normal development when compare to other at-risk infants. A combination of certain at-risk infants among was: low birth weight and prematurity (33.3%); low birth weight, prematurity and respiratory distress syndrome (40%). Low birth weight, prematurity, and respiratory distress syndrome infants deviate major from normal development. The level of achievement in the four developmental domains taken individually shows an increasing trend in the case of intervention infants as the period of intervention increases when compared to normal infants.

Conclusion: The study was valuable in the identification of at-riskinfants prone to neurodevelopmental disabilities and also provides a tool for evaluating early interventional protocols.

Keywords: *At-risk infants, Neurodevelopmental assessment, Denver Developmental Screening Test.*

Introduction

Development refers to the maturation of functions and acquisition for optimal functioning of an individual of various skills. Developmental milestones are important, easily identifiable events during the continuous process of development[1]. With the advancement of a modern treatment technique in Pediatric care, morbidity and mortality of at-risk infants have reduced significantly[2, 3]. As the survival rate is increased, at the same time, the number of babies with developmental delay also has increased. Infants who are at risk have an increased likelihood of problems in development that tend to appear gradually over the first few years of life[4-6].

Developmental delay refers to a delay in development rather than a selected condition inflicting

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that lag. The developmental delay exists when a child fails to reach specific milestones at an expected age in any area of development. A child may have a gross developmental delay or a delay in specific areas[7]. The Objective of the study is to screen the Neurodevelopment of at-risk infants and identifies infants those who are in need of early intervention would be referred for early intervention.

Denver Developmental Screening Test (DDST II) [8] was used to assess the developmental status of the child for detecting developmental delays in infancy[9] and for early identification or prediction of at-risk infants, so that appropriate early intervention can be instituted. Evaluation of muscle tone is a part of the neurological examination by AmielTison[10]. The major advantage of following AmielTison in preference to other neurological evaluation techniques is that there is an individual objective for each baby in terms of monthly evaluations and corrective therapy.

The purpose of the study is, to identify and categorize the at-risk infants who are deviated from normal development. Deviations from normal identify an at-risk group of infants who needfurther evaluation and intervention. Due to the possibility of developmental delay, it is important to periodically screen all high-risk newborn and assesses their developmental status[11] in order to identify the problems[12] and implement early intervention and provide anticipatory guidance.

Materials & Method

A total of 50 at-risk infants from the pediatric ward and pediatric OP well baby clinic of RMMCH were assessed. Infants of Low Birth Weight, Prematurity, Respiratory Distress Syndrome, Jaundice, Neonatal Seizure, Meconium aspiration, Birth Trauma, Intrauterine Growth Retardation, and Birth Asphyxia were included. The Neurodevelopmental assessment comprised of developmental assessment by the Denver Developmental Screening Test (DDST II) and neurological assessment by AmielTisonangles.

DDST IIwas used to assess the developmental status of the child which is the most widely used, available, inexpensive screening test for detecting developmental delays in infancy.[8] The test item has four categories of domains; namely, gross motor, fine motor adaptive, personal social and language. The appropriate items scored as pass, fail, refusal, or no opportunity and interpreted as normal, suspect, untestable and delay[13].

A waxing and waning pattern of neuromotor development from 28 weeks of gestation for the first year of life was reported by AmielTison[10]. The babies are grouped into normal babies, babies with patterns of transient abnormalities and babies with patterns of persistent abnormalities.

The infants deviated from normal development undergone early intervention were compared to their normal infants of the age peer group in the level of achievement until 12 monthswith DDST. The hypothesis: There is no significant difference in the level of achievement between the infants under intervention and normal infants with regard to developmental domains.

Findings

The at-risk infants have been screened as already explained using the Denver Developmental Screening Test. The percentage of normal and abnormal at-risk infants is given in figure 1.

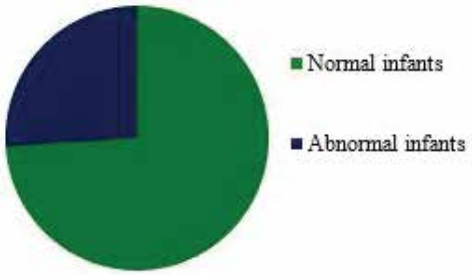


Figure 1: Percentage of Normal and Abnormal at-risk infants

From the screening, among the abnormal at-risk infants, 46.15% infants have prematurity, 15.38% infants have jaundice and low birth weight, and 7.69% infants had birth asphyxia, respiratory distress syndrome respectively was given in figure 2.

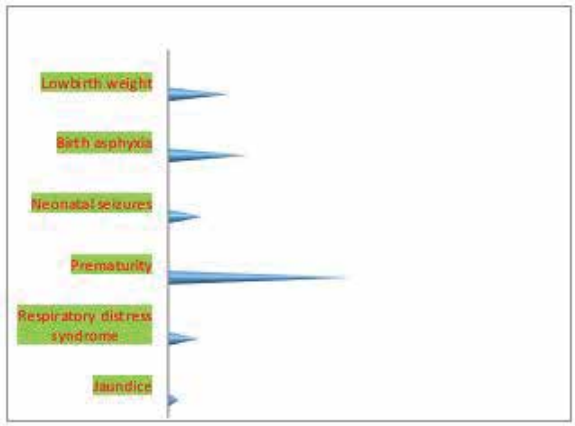


Figure 2: Abnormal at-risk infants

A combination of certain at-risk infants contributes to less performance in the test items are low birth weight and prematurity; low birth weight, prematurity, and Respiratory Distress syndrome. Figure: 3 show the percentage of the combination of certain at-risk infants.

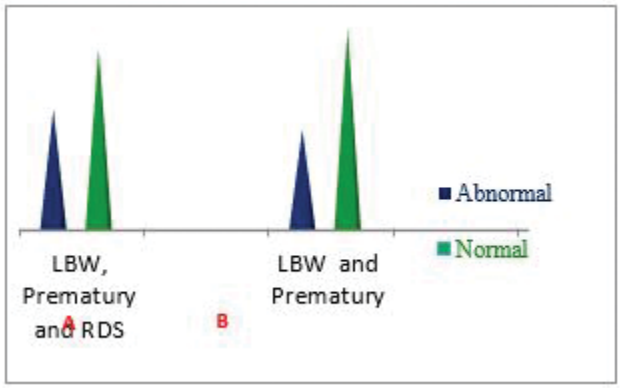


Figure 3: Percentage of the combination of certain at-risk infants with normal and abnormal development

Among this combination: (A) low birth weight, prematurity and Respiratory Distress syndrome infants (66.6%) deviates major from normal development when compared to (B) low birth weight and prematurity infants (33.3%).

DDDST assessment was carried out at 4th, 8th and 12thmonths for intervention infants and normal infants. The values of the descriptive statistics i.e. mean and S.D, of the four developmental domains, is given in table 1.

Table 1: The descriptive statistics of the developmental domains in intervention infants and normal infants at 4th,8th and 12th month

Domains	Intervention infants		Normal infants	
	Mean	S.D	Mean	S.D
4th Month				
Gross motor	1.3500	0.515	3.9219	0.270
Fine motor	1.3250	0.474	3.8594	0.350
Personal Social	1.3167	0.469	3.8438	0.365
Language	1.3146	0.457	3.7031	0.460
8th Month				
Gross motor	2.266	0.634	4.000	0.000
Fine motor	2.250	0.627	3.989	0.293
Personal Social	1.966	0.609	3.937	0.246
Language	1.900	0.573	3.8065	0.320

Conted…

12th Month				
Gross motor	3.083	0.787	4.000	0.000
Fine motor	2.983	0.791	4.000	0.000
Personal Social	2.616	0.691	3.943	0.365
Language	2.483	0.676	3.812	0.393

From the values of the descriptive statistics of the four developmental domains, it is observed that for infants who underwent early intervention the average values of their developmental domains are somewhat smaller compared with that of normal infants.

Discussion

The primary requirement from a physiotherapy perspective was that all infants had to have a neurodevelopmental assessment to identify developmental delays at the earliest and to intervene early. The challenge for the physical therapist is to accurately assess and comprehend the significance of delay that falls outside the limits of normal variability.

Developmental Screening is essential to detect abnormal development. Developmental delay indicates a child is functioning at least 25% below his or her chronological age in two or more of the developmental areas[14]. It has been estimated that only about half of these children's with developmental problems are detected. The isolated macro and micro prevalence surveys have reported5.4% to 15.3% of developmental disorders[15], as these numbers grow; the ability to identify infants with early developmental problems has become a priority. Many of these infants have developmental disabilities that require therapeutic intervention. Identification of risk status leads to early intervention services aimed at prevention of secondary problems for these infants[16, 17].

A developmental screening has a sensitivity of 70% to 80% to detect normal development[18]. The neurological examination of infants, toddlers, and children is an integral part of the screening, infants were intervened accordingly. In this study, the muscle tone was normal in 59.26%, hypertonic in 12.96% and hypotonic in 27.78% of intervention infants.

Denver II differentiates from other screening tests: a) It enables the tester to compare a child's development that was in the standardized population, like a growth

curve b) It consists of items which varied a clinically significant amount from the composite sample c) It provides a quick overview of the child's development. d) It also contains a behavioral rating scale. Test-Retest Reliability of DDST was 95.8% in a study with children between the ages of 2 months and 5 ½ years who were tested twice by the same examiner 80% to 95% with a mean percent agreement of 90%[19].

It is a method valuable in various ways, a) Identify and categorize the at-risk infants who are deviated from normal development b)Identification of at-risk infants who are in need of early intervention c) To improve the development of at-risk infants and minimize the potentials for developmental delay d) To enhance the family to get an awareness of developmental delay.

From the present study undertaken in a sample of 50 at-risk infants, it was found that 26% of at-risk infants were delayed in their development and 74% were normal. Among 13 abnormal at-risk infants, prematurity infants deviate major from normal development when compared to other at-risk infants. A combination of certain at-risk infants contributes to less performance in the test items, where low birth weight and prematurity; low birth weight, prematurity, and Respiratory Distress syndrome. Among this combination: low birth weight, prematurity, and Respiratory Distress syndrome infants deviate major from normal development when compared to low birth weight and prematurity.

From the present study, the average level of achievement in developmental domains of intervention infants is somewhat less when compared with that of normal infants. In addition, the difference between the levels of achievement in each domain decreases between the treated infants and normal infants as the period of intervention increases.

The DDST result showed that the screening test was good at identifying children with low developmental quotients. DDST detects most of the children who were later to show developmental delay[20]. Administration of the DDST provide a systematically observing and documenting significant qualitative aspects of an infant's developmental status particularly for the screener[21].

Early identification also facilitates the provision of anticipatory advice to parents, and caregivers for future planning. Early recognition may prevent severe disability. Some important developmental milestones sheets can be given appropriate guidance that can be provided to the parents.

If the intervention was started early in life before abnormal movement patterns are set in infants, it helps to develop normal movement patterns, because of the 'great adaptability and plasticity of the infant's brain'[22, 23]. The first 18 months of a normal child's life are a period of great and fast development[23]. Systemic and conscientious screening should be included in all infants not just those who are statistically at risk for developmental disabilities because of identifiable factors at birth. Identification of risk infants makes it possible to provide early intervention.

Conclusion

The study was valuable in the identification of infants at risk for neurodevelopmental disabilities and also provides a tool for evaluating early interventional protocols. The method of examination is less time consuming, does not require any special equipment or setting and it is applicable for neonates of all ages.

Ethical Clearance: Taken from the committee

Conflict of Interest: Nil

Source of Funding: Self

Acknowledgment

Infants and Parents who participated in the study,Dr. V.K. Mohandas kurup, Professor and Head, PMR Department, RMMCH, and Dr. S.Ramesh, Professor and Head, PediatricsDepartment, RMMCH, Annamalai University.

REFERENCES

1. Ramesh Agarvwal, Vandana Jain, Naveen Sankhyan. GHAI Essential of pediatrics, Development. 8th edition. CBS Publishers & Distributors Pvt Ltd.2013;P 42.
2. Fanaroff AA, Hack M, Walsh MC. The NICHD neonatal research network: changes in practice and outcomes during the first 15 years. Semin Perinatology.2003;27(4):281–7
3. Analysis of high-risk infant births and their mortality: ten years' data from Chonnam national

university hospital. Chonnam Med J.2011 Apr;47(1):31-8.

4. Hintz SR, Poole WK, Wright LL et al. Changes in mortality and morbidities among infants born at less than 25 weeks during the post-surfactant era. Arch Dis Child Fetal Neonatal Ed.2005; 90(2):128–33.
5. Lemons JA, Bauer CR, Oh W et al. Very low birth weight outcomes of the National Institute of Child Health and Human Development Neonatal Research Network, January 1995 through December 1996. NICHD Neonatal Research Network. Pediatrics.2001;107(1):1.
6. Narayan S, Aggarwal R, Upadhyay A, Deorari AK, Singh M, Paul VK. Survival and morbidity in Extremely Low Birth Weight (ELBW) infants. Indian Pediatrics.2003;40:130-135.
7. Valdivia R. The council for the exceptional children-Information center on disabilities and gifted education. The implications of culture on developmental delay 1999. Retrieved on 31 April 2005.
8. Seigel L.S. Reproductive perinatal and environmental factors as predictors of the cognitive and language development of preterm and full-term infants. Child development. 1992;53(4):963-973.
9. SurajGupte. The short textbook of Pediatrics, Growth, and Development. 10th edition. New Delhi: Jaypee Brothers Publishers (P) Ltd.45.
10. Amiel-Tison C, Grenier A. (Eds) Neurological assessment during the First year of life. New York: Oxford University Press.1986:96-145.
11. Meisels SJ, Provence S. Screening and assessment: Guidelines for identifying young disabled and developmentally vulnerable children and their families. Washington, GC: National Center for Clinical Infant Programs.1989.
12. Linden D, Paroli E, Doran M. Preemies: The essential guide for parents of premature babies. New York, New York: Pocket Book. 2000;49-52.
13. Irma J. Wilhelm. Clinics in physical therapy-Physical Therapy Assessment in Early Infancy, Physical & developmental assessment of the child. Chapter 7: Jaypee Brothers Publishers. 171.
14. Tennessee Department of Education. Tennessee early intervention systems http://child.estu.edu/program/teistech/definition-of-dd.htm Retrieved on 31 April 2005.
15. Bodhankar U, Shashikala G. Developmental disorders: Editorial. Indian Journal of Pediatrics.1995;(32):727-731.
16. T. Kanda, M. Yuge, Y. Yamori, J. Suzuki, H. Fukase. "Early Physiotherapy in the Treatment of Spastic Diplegia". Developmental Medicine and Child Neurology.1984;26(4):438-444.
17. A. Poblano. "Early Identification and Treatment of Infants with Neurologic Damage (in Spanish)". Editors de TextosMexicanos, México City.2003.
18. Behrman R.E, Kliegman R.M, Jenson H.B. Nelson Textbook of Paediatrics. 17th ed. Philadelphia: W.B. Saunders Company.2004;566–567.
19. Frankenburg WK Dodds JB, Fandel AW. Denver Developmental Screening Test MANUAL, Denver, Co, local project and publishing foundation.1973.
20. Thoman EB, Denenberg VH Sieval J. State organization in neonates, 'Development inconsistency indicates risk for development dysfunction ' Neuro Pediatrics.12-45-44;1981
21. WG Sciarilllo, NM Brown, NM Robinson, FC Bennett. Effectiveness of the DDST with biologically vulnerable infants; Developmental-behavioral pediatrics; 1986 April;77-83.
22. Kolb B, Brown R, Witt-Lajeunesse A, Gibb R. Neural compensations after lesion of the cerebral cortex. Neural Plast. 2001; 8:1-16
23. Hadders - Algra M. Early brain damage and the development of motor behavior in children: clues for therapeutic intervention. Neural Plast. 2001;8:31-49.

Local Wisdom in Pregnancy, Childbirth, Childcare in Mee Tribe, Papua

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ABSTRACT

The culture of the Mee tribe in the pattern of child care begins with the process of pregnancy, childbirth and when the child enters school age. This study aims to find the concept of value and wisdom in the Mee tribe community for the developmental strength of the nation's children in Paniai Papua in the process of pregnancy, childbirth, and parenting. This study uses a qualitative approach. This research was conducted on the Mee Tribe in Paniai District, which is in the mountainous region of Papua, Indonesia in May - October 2018. Data collection was carried out by in-depth interviews and observations. Interviews were conducted on 25 informants selected by purposive procedures, which consisted of mothers, pregnant women, nursing mothers, tribal heads and health workers. The Mee tribe marks pregnancy as the initial process of the birth of a new life in the family so it is very important to maintain the health of the baby, mother and family safety. For that, food, equipment, activities, and customs must be considered because it is believed to determine the process of pregnancy. When pregnant, the mother of the Mee tribe consumed a lot of shrimp which was her own catch. In the pattern of parenting, mothers carry out a care procession that strongly emphasizes local wisdom and culture, such as using noken, leaves, stoves and embers and the presence of large events involving large families and villages in welcoming children born.

Keywords: *Local wisdom, parenting, Mee tribe*

Introduction

Parenting is a factor that is very closely related to the growth and development of children under the age of five. Children aged 1-5 years (toddlers) are times when children still desperately need adequate and adequate food and nutrition supplies. Malnutrition at this time can cause developmental disorders physically, mentally, socially and intellectually which are permanent in nature and continue to be brought on until the child becomes an adult. More specifically, malnutrition can cause body growth delay, more importantly, delay the development of the brain and can also decrease or decrease the body's resistance to infectious diseases. At this time also, children are still really dependent on care and care by their mothers. Health and food care in the first year of life is very important for child development[4].

The pattern of parenting is influenced by the culture that exists in the environment because everything that is in the family both in the form of objects and people and the rules and customs that apply in the family is very influential and determines the pattern of child development and parents' education[5,6].

The culture of the Mee tribe in the pattern of child care begins with the process of pregnancy, childbirth and when the child enters school age. Cultural and social themes are inherent in the pattern of people's lives[1]. The command of adat, advice, and abstinence from food to traditional processions is strongly believed to be the main factor in childcare and providing safety to mothers and babies[14]. This study aims to find the concept of value and wisdom in the Mee tribe community for the developmental strength of the nation's children in Paniai Papua in the process of pregnancy, childbirth, and parenting.

Method

This study uses a qualitative approach. This research was conducted on the Mee Tribe in Paniai District in the mountainous region of Papua, Indonesia in May - October 2018. Data collection was carried out at the residence of the Mee tribe to interact in an effort to find

out the Mee tribe's wisdom in the process of pregnancy, childbirth and care child.

Data collection is done through in-depth interviews and observations. Interviews were conducted on 25 informants selected by purposive procedures, which consisted of mothers, pregnant women, nursing mothers, tribal heads and health workers.

Qualitative data analysis is carried out in order to explore the meaning of each phenomenon that appears during the study.

Result and Discussion

Local values and wisdom in pregnancy

1. **Food consumed during pregnancy:** The foods most often consumed by pregnant women of the Mee tribe are shrimp, fish, pork, sweet potatoes, potato, fruits and vegetables. The types of vegetables consumed are cabbage, potato leaves, pumpkin and others. These foods are always consumed by mothers from the beginning of pregnancy to the time of delivery.

   "... so if I get pregnant I usually eat potato, shrimp, sweet potatoes, beans, ordinary carrots... " (Informant GY, 56 years old)

   Most of the Mee tribe work as cassava farmers. Sweet potato is a staple food for the Mee tribe. Sweet potatoes have a very high-calorie content that is good for fetal development and maternal strength. Even though she is pregnant, the Mee tribe continues to carry out her activities as a farmer.

   In the Mee tribe culture, husbands are responsible for providing nutritious food for pregnant wives.

   "... the husband must prepare good food if the wife is pregnant. That must be... "(Informant SJ, 46 years).

2. **A form of family support:** The most important form of support done by the husband is providing nutritious food for a wife who is pregnant.

   "... yes, there are usually women who help - help work at home. Also normal husband... "(Informant GY, 56 years).

   Husbands help complete the heavy work that is usually done by the wife, such as cleaning the garden, lifting potato, and feeding pigs.

3. **The level of family acceptance of health services:** Some of the services received are weighing the body and other health checks, tension, adjusting the position of the head, injections. Take vitamins. However, the majority of mothers come for a pregnancy check-up when entering the 4th trimester and when they feel a physical disturbance is felt by the mother.

   "... Going to the Puskesmas is important because many of us don't know it to be a midwife who knows. I was injected there, checked my head position, not to turn it upside down. Same given vitamins... "(Informant GY, 56 years)

   Mee pregnant women if they do not feel any health problems, then the pregnant woman will not go to the health service. pregnancy is considered a personal matter so that things related to it need not be known by outsiders.

4. **Abstinence in pregnancy:** The Mee tribe community believes that if the mother consumes these foods, it is feared that the fetus in the mother's stomach will be large and this will later complicate the delivery process.

   "... if we are in the Mee tribe, parents often tell us that we should not eat nuts. Like long beans, peanuts, he said later that the children will grow up and it will be hard to give birth... "(Informant HJ, 53 years).

   This prohibition is not only directed at the mother, but there are also restrictions that apply to the husband. prohibition of activities for pregnant women such as mothers may not sit at the door for too long. It is feared that spirits can see pregnant women sitting at the door so that it can provide a negative aura to the mother that can endanger the mother and fetus.

   "... if you are pregnant, you are usually prohibited from sitting at the door. He said, don't let any spirits pass by, he saw that pregnant women were a danger... "(Informant GY, 56 years).

   "... may not pass on Daidah (sacred place) because there is a guardian. Children can die, mother too. Families can not survive. Especially if women who have menstruation are not allowed to pass. Dispose of saliva and urinate should not be there "(Informant KY, 46 years).

Pregnant women also cannot pass through areas that are believed to be sacred places. The sacred place in terms of the Mee tribe is Daidah. Daidah is an area that is sacred by the Mee tribe because it is believed to have a guardian (spirit), so that pregnant women cannot pass through the area especially throw away saliva and urinate.

In addition to the prohibitions that apply to pregnant women, the Mee tribe also knows the prohibitions that are shown to their husbands.

"... if the wife is pregnant, the husband may not shave. That hair, beard especially mustache. If he cuts, the child in the stomach is also cut off. Children can die... "(Informant GY, 56 years).

Local values and wisdom in labor: The unique thing that happened to the Mee tribe tradition community when giving birth was that the Mee tribe chose to do their own labor at home without the help of midwives and midwives. Mothers do their own labor in a lying position or sitting position.

"... I have all the children (9 children) giving birth at home. Only 1 child is the one you helped because I was a little difficult... because if I told my husband, the parents were banned because they could not. Then if other people also already know that the process will be long. Unless I'm weak, I just call my family, ade, brother-in-law... "(Informant GY, 56 years old)

Mee tribe women choose to give birth themselves due to 2 (two) reasons, namely 1) Husbands should not be close - close to the wife who will give birth because it will complicate labor and get bad luck; 2) The process of childbirth cannot be known by others, because it can cause labor to be long. The family (mother and sister) can only accompany the mother of childbirth if the mother experiences physical weakness so that she needs to get help in the process of giving birth.

For the Mee tribe, home care is an option, because living in their own home can provide comfort, calm and not cold (can sleep near embers), use their own language, and have family support and attention (Kayame[10])..

When the mother feels she is about to give birth, the first thing she does is pray, second, she picks up the things that are heavy, bear, holds on to the head. When entering the time of labor, the mother prepares labor kits to help her through her own labor, such as sharp bamboo to cut the umbilical cord, the rope to tie the abdomen, leaves for baby's bedding, cloth, and mats. If the father or mother has a bad past story, then the person concerned must confess, because otherwise, it will disrupt the delivery process. Children and mothers can be victims.

"... At the time of giving birth, the first one was when she had started giving birth, first to pray. Then the second one lifts heavy items, lifts up on the head, sometimes walks. Prepare the bamboo, the rope must also be ready for the umbilical cord, there are leaves - the leaves must also be prepared, Kobe - kobe, noken, then the cloths, if not there can use the leaves... "(Informant KY, 46 years).

The baby's umbilical cord is cut by the mother by using a razor blade and bamboo that has been prepared beforehand. The umbilical cord is dried on coals of fire. Small children are also dried on the fire barah. For this reason, nearing the time of delivery, the husband must prepare a lot of firewood which will be used to dry the baby. The mother took care of herself after giving birth using leaves available in the neighborhood of the Mee tribe, namely onage and Pegey leaves. Onage leaves and pegey leaves are heated on fire and placed on the stomach to clean the stomach. The leaves are also placed on the back of the back, the birth canal (such as sanitary napkins). This is used to accelerate wound healing. After 3 days the mother who has just given birth can go out and work in the garden.

"... for 3 days the mother and child continued, dried on coals. The umbilical cord is also dried in the sun. If it's been 3 days the child is given the noken. So if you want to go out, you can just hang it in noken... "(KY informant, 46 years).

As for baby care, for 3 days after delivery, the baby is dried on the stove. After 3 days, the baby is put in a noken which contains dried leaves such as banana leaves to provide warmth to the baby. Noken is also a baby carrier when the mother is traveling. When the mother left home and did not bring a noken baby containing a baby, she was kept at home by hanging.

Local values and wisdom on parenting (Infants and Toddlers): The mother gives food to the baby from the first month, in the form of porridge mashed with a spoon or food that is mummified by the mother and given to the child. Most Mee mothers give milk to children until the child is satisfied.

"... The milk is given up to 2 years... even up to 4-5 years. The other mothers used to give the milk until they were pregnant again. If you are not pregnant, your child is given ASI and continues... "(Informant GY, 56 years).

Mother stops giving ASI to children when the mother is pregnant again. In some children, mothers give breast milk until the child is 3 years old until the child enters kindergarten. Some children also get immunizations.

When children are sick, the first thing to do is pray to God, using traditional medicine such as using drugs such as using oil. If the child coughs, the mother gives Geos leaves while if the child suffers from diarrhea, the mother uses taro and Yatu (a type of vegetable candle).

This is a form of family independence in preparing family needs.

If the child still does not show an improved condition, the mother will take him to the hospital.

"... Kaka - those who died were due to no medicine. That's the first why I took it to the hospital. Maybe the child also died... "(Informant GY, 56 years).

This study found informants who are currently specialists. The informant was one of the sons of the Mee tribe who managed to get a higher education and now works as a specialist at one of the public hospitals in one of the regions in Papua[7, 8].

"... I have a father who once tied me in a chair all day in the school field because I didn't go to school. He hits in front of people. I was not given food... "(DA informant, 34 years old).

Conclusions and Recommendations

The Mee tribe marks pregnancy as the initial process of the birth of a new life in the family so it is very important to maintain the health of the baby, mother and family safety. When pregnant, the mother of the Mee tribe consumed a lot of shrimp which was her own catch. Shrimp is the main source of protein for mothers in addition to consumption of fish and pork. Without realizing it, this is an important source of protein nutrition for the process of growth and development of babies. Traditional Mee tribes prefer to undergo childbirth alone without anyone's help including their husbands, this is believed to ensure the safety of babies and families. This shows the meaning of independence and great sacrifice for the birth of a child. This spirit will later be passed on to their children later[9].

In the pattern of parenting, mothers carry out a care procession that strongly emphasizes local wisdom and culture, such as using noken, leaves, stoves and embers and the presence of large events involving large families and villages in welcoming children born. The event signifies pride for family members who will later make their family name scent. In parenting, the role of mother and father is very dominant, the mother gives love education while the father teaches about the independence of responsibility[11, 12, 15, 16, 17.]

Local wisdom needs to be maintained in an effort to maintain community culture and strong synergy so that health services are still accepted by the community.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCE

1. RM. Child, Family, School, Community Social, and Support. Harcourt Brace College Publishers.1997.
2. Budiono Kusumohamodjojo. Diversity of Indonesian Society, Grasindo Jakarta.2000.
3. Danandjaja James. Anthropology of Psychology, PT. Raja Grafindo Persada, Jakarta.1988.
4. Republic of Indonesia Ministry of Health. Guidelines for Implementation of Stimulation, Detection and Early Intervention of Child Growth. Jakarta: Indonesian Ministry of Health. Frank F Furstenberg. Jr. 2000. Parenting apart: patterns of childbearing after marital disruption. University of Pennsylvania.2005.http://www.jstor.org/pss/352332 (February 28, 2010).
5. Doni Koesoema. Character building; Strategy for Educating children in the Global Age. Jakarta: Grasindo.2011.
6. Furqon Hidayatullah. Character Education: Building Nation Facing, Surakarta: Yuma Putaka.2010.

7. Galih. Effect of parental education level on parenting in the village community in Boja district Kendal campurejo.2009.http://one.indoscription.com/ode/10123. July 17, 2009
8. Ginanjar, Hidayat. BALANCE OF THE ROLE OF PARENTS IN ESTABLISHMENT OF CHARACTERS OF CHILDREN. Islamic Education Journal of Islamic Education. 02,2013; January.
9. Jim, Taylor. Gives Positive Encouragement to Children, Jakarta: PT Gramedia Utama.2004.
10. Kayame, Robby. Qualitative Method: Grounded Theory (Proactive Health Seeking Behavior Theory. Nulisbuku.com.2016.
11. Kurniawan, Syamsul. Character Education. Yogyakarta: Ar-Ruzz Media.2013.
12. Muhammad Afandi. Character Education Investment in SD/MI. Elementary Journal. July 2016;2(2).
13. ACAdeMIA + TAZZAFA.2004.
14. Rakhmawati. The Role of Families in Childcare. Religious Counseling, Islamic Guidance and Counseling Journal.2015.
15. Syafei, M Sahlan. How Do You Educate Children, Bogor: Ghalia Indonesia. 2002.
16. Nuansa Aulia Editorial Team. National Education System (SISDIKNAS). Bandung: Nuansa Aulia. 2012.
17. Zubaedi. Character Education Design. Jakarta: Kencana renada Media Group.2011.

Implementation of Fixed Procedures for Care Action of Archipelago Surgery in the Regional General Hospital of Doc II Jayapura

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ABSTRACT

Fixed procedure follow-up care is a part of nursing care that has been simplified into a standard form so that all nursing action services can be done professionally both in terms of effectiveness, and efficiency. Application of fixed procedures for wound care at the General Hospital Doc II Jayapura area for each treatment action is very different, this difference is based and adjusted to the type of disease or health problems experienced by the client. Implementation of fixed procedures care actions can be continuously updated and developed along with the development of science and technology in the field of nursing. The challenge that is quite heavy in the world of nursing for nurses at the Regional General Hospital in Dok II Jayapura is how to apply the Procedure for Wound Care in the Regional General Hospital of Dok II Jayapura.

Keywords: *Fixed procedure, wound care*

Introduction

Fixed procedure follow-up care is a part of nursing care that has been simplified into a standard form so that all nursing action services can be done professionally both in terms of effectiveness, and efficiency[1, 17].

Wounds are the breakdown of continuity of skin tissue or tissue below it. The wound is also defined as damage or discontinuation of the skin caused by physical mechanical or temperature trauma.

Fixed Procedure Function: The fixed procedure serves to guide program implementers in maintaining the quality of health services (nursing) so that they can be guided by established standards, as well as the existence of written policies and procedures in accordance with the advances in science and the principles of nursing practice[2, 3, 4, 6, 7, 10].

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Wound Classification: Based on causes, related to forensic interests, including:Eczema (abrasions) is an injury to the surface of the epidermis due to contact with a rough surface object; Venus scissum is an incision or an iris that is marked with the edge of the wound in the form of a straight and regular line; Vulnus Laceratum (torn wound) with irregular or tattered edges is usually due to pulling or scratching a blunt object; Julius punctum (stab wound); Julian Morsum is a wound due to animal bites; Vulnus combutio (burn)

Physiology of Wound Healing: The wound healing process can be divided into 4 main phases according to Marison[13]

a. **Acute inflammatory response to injury:** A hemostasis process in which blood vessels undergo transient vasoconstriction from damaged blood vessels occurs when platelet blockages are formed and strengthened by fibrin fibers to form a clot. Damaged tissue and mast cells release histamine and other mediators, causing vasodilation in intact surrounding blood vessels and increasing supply of blood in the area, making it red and warm.

   The permeability of the blood capillaries increases and the protein-rich fluid flows into the interstitial space, causing local edema and possibly loss of function over the joint.

b. Destructive Phase: Cleansing of dead tissue and bacteria by polymorphs and macrophages. Polymorph swallows and destroys bacteria. Healing will stop when the macrophage is deactivated.

c. Proliferation Phase: Fibroblasts place basic substances and new collagen fibers and blood vessels begin infiltrating the wound. Once collagen starts to collapse, there is a rapid increase in the strain strength of the wound. Capillaries are formed by endothelial buds undergoing angiogenesis (new tissue growth).

d. Maturation phase: Epithelialization, contraction and reorganization of connective tissue: in each injury resulting in loss of skin, epithelial cells at the edge of the wound and from the sides of the hair follicles, and sebaceous glands and sudorifera glands, defend and begin to migrate over the new grandula tissue. If the tissue meets other epithelial cells that also experience migration, then mitosis stops, due to inhibition of contact.

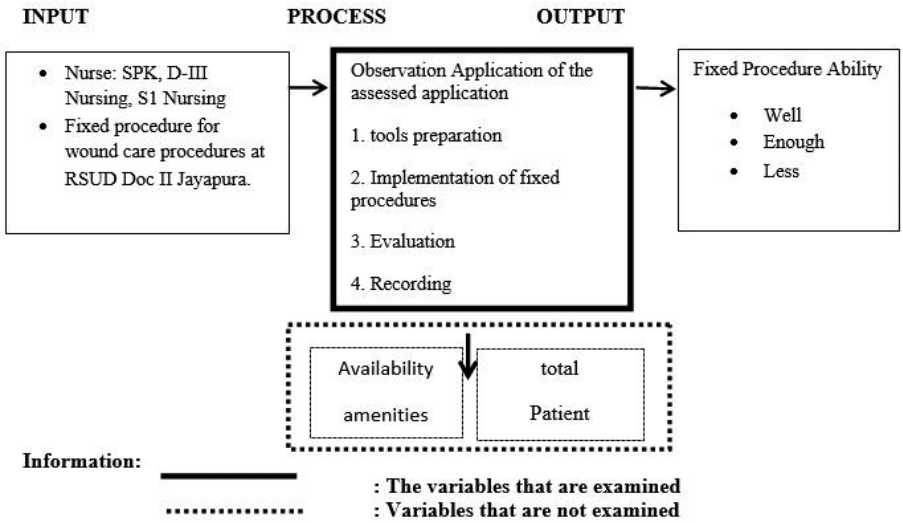
How is the Application of Wound Care Procedures at the Regional General Hospital of Dok II Jayapura, where the object of this study is the Male Surgery Inpatient Room of the Regional General Hospital of Dok II Jayapura[8].

Writing Purpose: Knowing the Application Process for Wound Care Procedures in the Regional General Hospital of Doc II Jayapura[16].

Research Method: The method to be used in this activity is quantitative descriptive research with a cross sectional design[18].

Location and Time of Research: This research was carried out in the Male Surgery Inpatient Room of the Regional General Hospital of Doc II Jayapura, Implementation of the study in September 2014

Research Variable



Research Result

Table 1: Frequency Distribution of Nurse Personnel Based on Education Level and Working Period in Inpatient Room Male Surgery Regional Public Hospital Doc II Jayapura Papua 2014

Level of education					
Years of service	**(S1) Bachelor of Nursing**	**Nursing Diploma**	**(SPK) health nurse school**	**Total**	**Percent (%)**
> 3 Year	2	7	2	11	55
< 3 Year	-	9	-	9	45
Jumlah	2	16	2	20	
%	10	80	10		100

From the table above, it can be seen that the number of care staff in the Inpatient Room for Male Surgery at the Regional General Hospital of Dok II Jayapura Papua is 20 people, with 2 Nursing Education Levels of 2 people or 10%, and D-III Keperawtan 16 people or by 80%, and SPK as much as 2 people or 10% with a working period of more than 3 years there are 55% and those who have a work period of less than 3 years there are 9 people or by 45%[5].

Table 2: Frequency Distribution of Wound Care Based on Education Level in the preparation phase of the Tool and implementation of Inpatient Male Surgery Regional Public Hospital Doc II Jayapura 2014

Education	Preparation						Implementation					
	Well		Enough		Less		Well		Enough		Less	
	∑	%	∑	%	∑	%	∑	%	∑	%	∑	%
S1 Bachelor of Nursing	2	100	-	-	-	-	2	100	-	-	-	-
Nursing Diploma	16	100	-	-	-	-	16	100	-	-	-	-
SPK	2	100	-	-	-	-	2	100	-	-	-	-

Based on the data from the observations in appendix table 2, it is explained that of 2 people with an educational background in nursing in the preparation stage the tool has a good rating of 100%, and 16 respondents in nursing D-III background, in the preparation stage during observation got a good value of 100%, and for respondents who were educated with SPK as many as 2 people, during the observation obtained a good predicate value or equal to 100%. and for the implementation phase, 20 people have good predicate or 100%.

From the results of the application of wound care procedures based on the level of education[14], especially SPK, in the preparation stage of the tool and the implementation stage predicate good at 100%, but there are still some items that are still under the standard, namely 1% for the tools in item 3, and at the implementation stage item 1 is 67%, and item 7 is 66%.

For the level of education of the D-III nursing in the preparation stage of the tool and the training phase the average ranges from 70% to the predicate of good, for nurses who are educated in nursing S1 both in the preparation stage and the implementation stage have a good rating above 70%[9]. This can illustrate the level of education affecting the success of the implementation of the fixed procedures for wound care in the Inpatient Room for Male Surgery at RSUD Dok II Jayapura Papua Hospital. According to Sedarmayanti.S.[20]. Education is an effort to increase knowledge and work skills so that it can increase work productivity.

Table 3: Frequency Distribution of Wound Care Based on Education Level in Inpatient Room Male Surgery Regional Public Hospital Dok II Jayapura 2014

Predicate	S1 Bachelor of Nursing		Nursing Diploma		(SPK) health nurse school	
	∑	%	∑	%	∑	%
Well	2	100	16	100	2	100
Enough	-	-	-	-	-	-
Less	-	-	-	-	-	-
Total	2	100	16	100	2	100

Observation data attached to table 3 can be explained that the application of fixed procedures for wound care based on the level of education of 20 respondents, there are 2 people with good predicate or 100% with an education background in Nursing S1 besides there are also 16 respondents with nursing D-III background good predicate or equal to 100%, and for SPK education level during the observation obtained good predicate or equal to 100%.

From the results of observations of nursing staff found in the Male Surgical Inpatient Room, in the application of fixed procedures wound care actions with an educational background of S1 Nursing by 10% of 20 people and for nursing education D-III level of 80% of 20 people and for SPK education level of 10% of 20 people, but in the application of fixed procedures wound care measures are all predicate with good or 100% even

though seen from the level of education in which there are 2 nursing undergraduate students[11], 16 nursing D-III and 2 SPK this is supported by theory (Sagala.S[19]) says that the abilities and skills a person possesses are certainly in accordance with the level of education he follows, the higher the education of a person it is assumed that the higher the knowledge, skills and abilities.

Table 4: Frequency Distribution of Wound Care Based on the period of work at the stage of preparation and implementation in the Inpatient Room for Male Surgery Regional Public Hospital Dok II Jayapura 2014

Years of service	Tools preparation						Implementation					
	Well		Enough		Less		Well		Enough		Less	
	∑	%	∑	%	∑	%	∑	%	∑	%	∑	%
< 3 Year	9	45	-	-	-	-	9	45	-	-	-	-
>3 Year	11	55	-	-	-	-	11	55	-	-	-	-

Observation data attached to table 4 can be explained that of the 20 respondents who carried out the procedure for wound care in a male surgical inpatient room based on a work period of less than 3 years in the tool preparation stage, 9 people were well-known as 45%, and for the implementation stage there are 9 people who have good predicate or 45%.

Respondents who have a working period of more than 3 years have 11 people with a good predicate of 55% for the preparation stage and for the implementation stage with a predicate of good for 11 people with a percentage of 55%. overall the application of procedures for face-to-face wound care based on a work period of less than 3 years as many as 9 people both from the preparation stage of the tool and the implementation stage with a good predicate with a percentage of 45%, as well as nurses who have more than 3 years working period of 11 people From the observations both from the preparation stage of the tool and the stage of implementing the action of wound care in the Inpatient Room, male surgery during the observation obtained a good predicate with a percentage of 55%.

According to sedarmayanti[20]. Work productivity is more emphasized on the size of power to carry out work that touches aspects of determination, accuracy, and attitude towards work. Determination and accuracy can be related to methods or methods of work and equipment available, in connection with that work productivity is said to be high if the process takes place according to the procedures and mechanisms of work that are precise and careful.

From the observations of the application of the fixed procedure wound care measures applied by 20 respondents in the Inpatient Room for Male Surgery at the Regional General Hospital of Doc II Jayapura Papua in the preparation criteria of the tool at 87.49% with a good predicate and at the implementation stage the results were 94, 13% with good titles[21].

This illustrates the application of the fixed procedure of Wound Care measures in the Inpatient Room for Male Surgery to the General Hospital of Dok II Jayapura Papua, which was observed to be of good predicate with a presentation of 90.81%[22].

Conclusion

The application of fixed procedures for wound care in the male surgical inpatient room at the Regional General Hospital of Dok II Jayapura Papua, with a total of 20 nurses who could carry out the Good Predicate application or by 90.81%. Inpatient Room for Male Surgery; The criteria for tool preparation were 87.49% or with good predictions, the implementation criteria were 94.13% or with good predictions. The application of the fixed procedure for wound care actions based on the education level of the entire nursing S1 was 2 people with good or 100% predicate, and D- In total III nursing numbered 16 people with good predicate or 100%, as well as nurses with SPK education as many as 2 people with good predicate or 100%, Application of regular procedures for wound care based on work periods of less than 3 years there were 9 people with a percentage of 45% who has a good predicate. For work periods of more than 3 years there are 11. people with 55% percentage are good.

Suggestion

Improving the quality of nursing services in the application of regular procedures for wound care in the

room as well as fostering nurses on an ongoing basis to maintain the quality of hospital services independently as well as completing the equipment and facilities needed in the application of fixed procedures for wound care. Nurses are expected to be responsible for carrying out fixed procedures for wound care actions in the application of antiseptic and aseptic techniques.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Ali Z. Basic - Basic Keperawata Profesional, Widia Medika, Jakarta. 2002.
2. Arikunto S. Research Procedure A Practice Approach, Revised Edition IV, PT. Rineka Cipta, Jakarta. 1998.
3. Chitty E. Professional Nursing Concepts and Challenges, Second Edition, W. Sounder Company, USA. 1997.
4. Republic of Indonesia Ministry of Health. Republic of Indonesia Law No.23 concerning Health, Jakarta. 1992.
5. Republic of Indonesia Ministry of Health. Evaluation of the Implementation of Nursing Standards, Ministry of Health of the Republic of Indonesia, Directorate General of Medical Services, Directorate of Public Hospital and Education of the Indonesian Ministry of Health, Jakarta. 1997.
6. Republic of Indonesia Ministry of Health. 1997, Standard Practice of the Health Nursing Section, Jakarta
7. Endarini S. Concept of Quality in Health Services, In: Training of Quality Circles, Yogyakarta, Not Published. 1999.
8. Eko Susilo. Relationship between the Application of Nursing Care Standards and Patient Satisfaction with Nursing Care in the Inpatient Room of Panti Rapi Hospital, Thesis is not published, Nursing Science Program of the Faculty of Medicine, UGM, Yogyakarta. 1999.
9. Gellies D. Nursing management; A System Apporoach, Third edition, Philadelphia, WB Sounders. 1994.
10. KemenKes.RI. Guidelines for the Management of Health Services in 2013 Ministry of Health of the Republic of Indonesia, Jakarta. 2013.
11. Kwando. Overview of Nurses' Performance in Graduates of Special Class Nursing III and Nursing Procedures in Inpatient Room at Bethesda Hospital, Thesis not published, Nursing Science Study Program, Faculty of Medicine UGM, Yogyakarta. 2004.
12. Republic of Indonesia Minister of Health. Decree of the Minister of Health of the Republic of Indonesia Number 1239/Menkes/SK/2001, concerning Registration and Practice of Nurses. 2001.
13. Morison J. Wound Management, Medical Book Publishers, EGC, Jakarta. 2004.
14. Nursalam. Nursing Management: Application in Professional Nursing Practice, Salemba Medika Jakarta. 2002.
15. Notoadmojo S. Health Research Methodology, PT. Rineka Cipta, Jakarta. 2002.
16. Novi A. Obedience of Officers in Implementing Permanent Procedures for Tailoring Wounds in the Emergency Unit of Sleman Regency General Hospital, Thesis Not Published, Nursing Science Study Program, Faculty of Medicine UGM, Yogyakarta. 2004.
17. Priharjo R. Practice of Professional Nursing Basic Concepts and Law, EGC, Yogyakarta. 1995.
18. Sugiono. Administrative Research Methods, Alfabeta, Bandung. 2002.
19. Sagala S. Concepts and Meanings of Learning, Alfabeta, Bandung. 2005.
20. Sedarmayanti. Development of employee personality. Mandar Maju. Bandung. 2004.
21. Wijono D. Quality Management of Health Services; Theory, Strategy and Application, Arlangga University Press, Surabaya. 1999.
22. Wijayanti. Relationship Motivation with the Implementation of Permanent Procedures for Bathing Patients in the 1st Floor Hospital Inpatient Installation. DR. Sardjito, Unpublished Thesis, Nursing Science Study Program, Faculty of Medicine, UGM, Yogyakarta. 2003.

The Affairs of Anopheles Mosquito in the Working Area 2015 Hamadi Puskesmas Kota Jayapura

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ABSTRACT

Mosquitoes are arthropods that many of us encounter in our lives. One type of mosquito encountered in Indonesia is Anopheles, sp. The genus Anopheles, sp. Is a mosquito transmitting several diseases, mainly malaria. In Papua province, three species of Anopheles, sp, were found to act as malaria vectors, namely: Anopheles farauti, Anopheles koliensis, and Anopheles punctulatus (Elyazar, et al, 2013). The purpose of this study was to determine the density of Anopheles, sp in the working area of the City of Jayapura Hamadi Health Center in 2015. The samples in this study were 429 people with malaria homes.

Based on the results of the study, catching mosquitoes in 429 samples in 3 districts and 2 villages, the density of Anopheles sp mosquitoes perched on the wall was 720 individuals with a density (KN) of 1.67 tails/ person/hour. The results of mosquitoes and mosquitoes were identified at 429 samples of capture location houses consisting of 3 Districts and 2 Villages, the most common type of mosquito was obtained from the genus Anopheles sp, which was 2452 of 3140 mosquitoes caught and identified. For Culex sp mosquitoes, there are 640 tails from 3140 tails and Aedes sp mosquitoes which are 68 tails. Based on the results of the study it was found that the incidence of malaria in the work area of Hamadi Community Health Center was 9.19%, meaning that there were 9.19% of malaria sufferers among 100 residents in the Hamadi Community Health Center working area said the incidence of malaria was high.

The conclusion is that the density of Anopheles sp and malaria cases in communities in the Hamadi Community Health Center density of Anopheles sp mosquitoes with the feed of MHD bodies in the working area of Hamadi Health Center is 0.275 individuals/person/hour. Suggestions that can be given are in preventing the occurrence of malaria, the community will maintain and maintain habits and pay attention to the conditions/ conditions around the yard, if they get sick, immediately go to the doctor or community health service center for treatment so that they know the symptoms illness, sleeping at night must use mosquito nets or mosquito repellent and install wire netting on house ventilation, to prevent entry of mosquitoes into the house.

Keywords: *Anopheles sp. Mosquito Density.*

Introduction

The genus Anopheles, sp. Is a mosquito transmitting several diseases, mainly malaria. In Indonesia there are around 80 species of Anopheles, sp whereas those stated as malaria vectors are as many as 22 species Arsunan[1]. In Papua province, three species of Anopheles, sp, were found to act as malaria vectors, namely: Anopheles farauti, Anopheles koliensis, and Anopheles punctulatus (Elyazar, *et al*, 2013).

The World Health Organization (WHO) estimates that in 2012 there were 207 million malaria cases in 3.3 billion people, and caused deaths in around 627 thousand residents. The highest malaria cases in the world occur in Africa and other poor countries. In Africa 90% of deaths from malaria occur in children under the age of 5 (WHO, 2013).

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Based on Indonesia's health profile in 2012, the national figure for Annual Parasite Incidence (API) or the number that shows a positive incidence of parasites in the blood of patients, shows a downward trend although it is still volatile[3]. API in 2007 amounted to 2.89/1000 population, decreased to 2.47/1000 population in 2008, in 2009 decreased again to 1.85/1000 population, but in 2010 it increased to 1.96/1000 inhabitants and then it dropped to 1.75/1000 population in 2011. In 2011 there were 1,321,451 clinical cases and 256,592 were positive for malaria. In the Ministry of Health's strategic plan for 2010-2014 it aims to reduce malaria-related morbidity from 2 to 1/1000 residents Ministry of Health[4-10].

Case Fatality Rate (CFR) data from malaria obtained from hospitals in Indonesia shows that from 2004 to 2006 there was a drastic decline, from 10.61% to 1.34%. However, from 2006 to 2009, the CFR tended to increase to more than double Epidemiology of Malaria[19].

The Annual Parasite Incidence (API) rate of the Papua Province still exceeds the national figure and is the second highest nationally after West Papua province. Annual Parasite Insidence (API) data in the last 5 years, namely: 2007 amounted to 41.66/1000 population, in 2008 amounted to 18.35/1000 population, in 2009 amounted to 9.94/1000 population, in 2010 amounted to 18.03 1000 residents and in 2011 increasedto 23.34/1000 inhabitants Ministry of Health, Republic of Indonesia[4-10].

Research Purposes: Knowing the Anopheles density, sp in the working area of the Hamadi Health Center in Jayapura City[11] in 2015

Research Method

This research is a descriptive study to describe the density of Anopheles, sp and identify species of mosquitoes caught inside and outside the work area of the Hamadi Health Center in Jayapura City with a survey approach.

Research Result

Calculating the density of mosquitoes that bite people/perched on the location or area of capture, namely Hamadi, Argapura, Numbay, village Tahima and village Tobati the mosquito density can be seen in the table below:

Table 1: The amount of density of mosquitoes that landed and caught with people's bait in the house according to the fishing area in the Working Area of the Hamadi Community Health Center in Jayapura City in 2015

No.	Catching point	Total mosquito	Total House	*Anopheles sp*		*Culex sp*		*Aedes sp*	
				Total	MHD	Total	MHD	Total	MHD
1.	Hamadi	1170	138	372	310	93	77,5	7	5,83
2.	Argapura	944	128	281	234,16	64	53,33	5	4,16
3.	Numbay	796	102	243	202,5	53	44,16	4	3,33
4.	Tobati	118	29	23	19,16	7	5,83	-	-
5.	Tahima S	112	32	31	25,83	11	9,16	1	0,83
Total		3140	429	950	791,65	228	189,98	17	14,15

Source: Primary Data, 2015

Based on the table above shows that the number of Anopheles sp mosquitoes caught in the house by bait body starting from the first catching point to the last catching point is 950 mosquitoes, with a total density (MHD) of 791.65 individuals/person/hour.

Table 2: The amount of density of mosquitoes that landed and caught with bait from people outside the house according to the fishing area in the Working Area of Hamadi Community Health Center, Jayapura City in 2015

No.	Catching point	Total mosquito	Total House	*Anopheles sp*		*Culex sp*		*Aedes sp*	
				Total	MHD	Total	MHD	Total	MHD
1.	Hamadi	1170	138	332	276,66	51	42,5	4	3,33
2.	Argapura	944	128	253	219,16	23	19,16	2	1,66

Conted…

3.	Numbay	796	102	147	122,5	19	15,83	1	0,83
4.	Tobati	118	29	21	17,5	5	4,16	-	-
5.	Tahima S	112	32	26	21,66	7	5,83	-	-
Total		3140	429	779	657,45	105	87,48	7	5,82

Source: Primary Data, 2015

Based on the table above, the number of Anopheles sp mosquitoes caught outside the house by bait body starting from the first catching point to the last fishing point was 779 mosquitoes, with a total density (MHD) of 657.45 individuals/person/hour.

Table 3: The density of mosquitoes that perch and caught on the walls of the house according to the fishing area in the Working Area of the Hamadi Health Center in Jayapura City in 2015

No.	Catching point	Total mosquito	Total House	*Anopheles sp*		*Culex sp*		*Aedes sp*	
				Total	MHD	Total	MHD	Total	MHD
1.	Hamadi	1170	138	169	140,83	120	100	14	11,66
2.	Argapura	944	128	217	180,83	87	72,5	11	9,16
3.	Numbay	796	102	252	210	92	76,66	10	8,33
4.	Tobati	118	29	55	45,83	4	3,33	4	3,33
5.	Tahima S	112	32	27	22,5	4	3,33	5	4,16
Total		3140	429	720	599,99	307	255,82	44	36,64

Source: Primary Data, 2015

Based on the calculations in the table above, the number of Anopheles sp mosquitoes caught on the walls of the house from the first catching point to the last arrest was 720 mosquitoes with a density (MHD) of 599.99 individuals/person/hour. While the total number of mosquitoes on the wall was 720 from 429 houses surveyed. So the catch on the wall is (KN) which is 1.67 tails/person/hour.

Table 4: The number of genera of mosquitoes caught in the Working Area of the Hamadi Community Health Center in Jayapura City in 2015

No.	Catching point	Total mosquito	*Anopheles sp*	*Culex sp*	*Aedes sp*
1.	Hamadi	1170	877	264	25
2.	Argapura	944	751	174	18
3.	Numbay	796	642	164	15
4.	Tobati	118	98	16	4
5.	Tahima S	112	84	22	6
Total		3140	2452	640	68

Source: Primary Data, 2015

Based on the table above, the highest number of genera of mosquitoes caught was Anopheles sp, which was 2542 tails, Culex sp mosquitoes as many as 640 tails and Aedes sp mosquitoes as many as 68 tails from the total number of mosquitoes caught namely 3140 mosquitoes.

Table 5: Malaria Incidence Data at Hamadi Health Center in Jayapura City in 2015

Month	New Sufferers
January	32
February	42

Conted…

March	41
April	57
May	32
June	48
July	37
August	45
September	56
October	39
November	-
December	-
Total	429

Source: Secondary data

Conclusion

Based on the results of research and discussion it can be concluded that the density of Anopheles sp and malaria cases in the community in Hamadi Health Center is as follows: The density of Anopheles sp mosquitoes with bait of MHD bodies in the working area of Hamadi Health Center is 0.275 individuals/person/hour who settled on the wall of the house of KN were 1.67 individuals/hour (low density), adult mosquito species in the working area of Hamadi Health Center included Anopheles sp mosquitoes totaling 2452, Culex sp mosquitoes totaling 640 tails, Aedes sp Mosquitoes totaling 68 individuals, malaria incidence Based on the results of the study it was found that the incidence of malaria in the working area of Hamadi Community Health Center was 9.19%.

Suggestion

In preventing the occurrence of malaria, the community continues to maintain and maintain habits and pay attention to the conditions/conditions around the yard. If you get sick, immediately go to the doctor or community health service center (Puskesmas), to get treatment so that you know the symptoms of the disease suffered. Sleeping at night should use mosquito nets or mosquito repellent and install wire netting on house ventilation, to prevent entry of mosquitoes into the house.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Arsin. Arsunan A. Analysis of the Effect of Climate Factors on Malaria Events on Kopoposang Island, Pangkajene Regency, South Sulawesi Islands, YARSI Medical Journal. Jakarta. April 2006;14.
2. Aswar A. Introduction to Health Sciences. Medical Book Publishers EGC. Jakarta. 1988.
3. CDC, Life Cycle of Malaria Parasites, http//www.encerta.msn.com. downloaded on February 28, 2011.
4. Republic of Indonesia Ministry of Health. Epidemiology of Malaria. Directorate of Prevention of Eradication of Communicable Diseases and Settlement of Environmental Health. Jakarta. 1995.
5. Republic of Indonesia Ministry of Health. Malaria Eradication Program, Directorate General of P2M and PLP. 1993.
6. Republic of Indonesia Ministry of Health. Malaria Entomology, DG PPM & PLP. Jakarta. 1999.
7. Republic of Indonesia Ministry of Health. Malaria Management Module, Gebrak Malaria. Jakarta. 2001.
8. Republic of Indonesia Ministry of Health. Epidemiology Malaria Module, DG P2M & PLP, 2003.
9. Republic of Indonesia Ministry of Health. Malaria Eradication Program Management Module, DG PPM & PLP. Jakarta. 2003.
10. Republic of Indonesia Ministry of Health. 2003, AMI Data per Province http//www.depkes.go.id. downloaded on February 28, 2011.
11. Imbiri. Heri Fandri. KTI of Anopheles sp. Mosquito Density and Malaria Incidence in Imbi Health Center Work Area in North Jayapura. 2006.
12. Notoatmodjo, Soekidjo. Clinical Health Research Methodology. Rineka Cipta Publisher. Jakarta. 2002.
13. Prabowo, Arlan. Malaria: Preventing and Overcoming It. Puspa Swara. Jakarta. 2007.
14. Sari, Jana Fitria K. Ayomi. Andreas C, Jarona. Marlin M. Health Entomology Practicum Guide, Compiler of Jayapura Polytechnic. 2007.

15. Sushanti Idris - Idram. N, M. Sudomo, I.G. Wayan Djana, Sunardi Empi, Anopheles Fauna in South Tapanuli and Mandailing Natal, North Sumatra, Journal. 2002;30(4). Litbangkes, Jakarta. http://www.litbangkes.com. downloaded on February 16, 2011.

16. www.kesehatanlingkungan.wordpress.com. Downloaded on April 29, 2011.

17. http://laodehabil.wordpress.com/2011/04/09/anopheles-sp/was downloaded on July 6, 2011.

18. http://www.cdc.gov/malaria/falcth.htm#BioPathEpi. Downloaded on February 28, 2011.

19. http://en.us.www. Mozilla.com/en-us/firefox/central/.2008, Epidemiology and Eradication of Malaria html. Downloaded on February 2, 2011.

20. http://www.undp.or.id/pubs/imdg2004/BI/IndonesiaMDGBIGoal6.pdf. Report on the Progress of Achieving the Millennium Development Goals in Indonesia, downloaded on February 4, 2011.

21. http://www.kompas.com/kompas-cetak/0103/01/iptek/tert10.htm. Figures for Clinical Malaria in Irja, downloaded February 4, 2011.

22. http://www.undp.org.id/pubs/imdg2004/BI/IndonesiaMDG_BI_Goal6.pdf Combating HIV/AIDS, Malaria and Other Communicable Diseases. Downloaded on February 5, 2011.

Intervention Effect of Ultra Violet and Exhause Lights on Microbal Density Decreasing in Honai in Kurulu District, Jayawijaya District, Papua Province

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ABSTRACT

Background: The quality of physical environmental factors (lighting, temperature, relative humidity, and room density) and germ density numbers show that more than 91% of germ numbers and 71% -87% of physical environment quality do not meet the health requirements required by the Decree RI Minister of Health No. 1204/MENKES/SK/X/2004. The study took place in Wamena, Kurulu District, Jayawijaya Regency, Papua Province, aimed at: (1) To determine the amount of microbial density before and after the Ultraviolet + Exhause lamp intervention (2) To examine the effects of Ultraviolet + Exhause Lamps on reducing microbial density before and after intervention honai in Kurulu District, Jayawijaya Regency, Papua Province.

Method: This research is a pre-experimental designs in the form of One-group pretest-posttest design. Honai in the Kurulu district of Jayawijaya Regency was intervened on the basis of the design of a cohort study intended to observe the course of bacterial density. Research looks at aspects of problems that occur in the physical environment of Honai. Observations are followed "in the future", ie starting from the Honai target then followed for a certain time/period to see whether there is an effect on Honai after being given intervention or treatment. The sample consists of 32 sample points, sampling until purposive sampling.

Results: The overall effect of the intervention in the first week has decreased the average microbial density of 98.07%, in the second week there has been a decrease in microbial density on average 99.92%, and in the third week there has been a decrease in average microbial density 99.99%. This is confirmed by the results of the Friedman test where the value of p = 0,000 and post hoc analysis where the value of p = 0,000. This gives the meaning that the intervention carried out is very effective in reducing microbial density carried out for 3 weeks or it takes up to 3 weeks to reduce microbial density to reach 99.99%. Therefore, based on the results of this study the intervention of 35 watt + Exhause ultraviolet light which starts at 07.00 CEST until 18:00 CEST is highly recommended for use in Honai.

Conclusion: The effect of the intervention on decreasing microbial density before and after the intervention showed a significant difference in decreasing microbial density.

Keywords: *Honai, Ultraviolet Lights, Exhause*

Introduction

Honai is a home of tribes in the central mountainous region of Papua. Honai is made of wood with a cone shaped roof made of straw or thatch. The honai is intentionally built narrow or small and not windowed with the aim of keeping the mountains of Papua cool. The honai is usually built 2.5 meters high and in the middle part of the Honai is a place for making fires that can warm themselves.

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Honai is divided into three types, namely for men (called Honai), women (called Ebei) and pig pens (called Wamai). The Honai shape is made circular and only has one door with a size of 100 cm x 60 cm so when you want to enter the Honai you have to look down.

Most of the Honai and Ebei do not have Lighting and Ventilation so that circulation does not occur. This makes the Honai and Ebei have a high level of humidity and very potential as a breeding ground for microbes Ministry of Health[4].

Abdullan and Hakim's[1] study showed that the quality of physical environmental factors (lighting, temperature, relative humidity, and room density) and germ density in 5 inpatient rooms (pavilion, class 1, class 2, class 3, and recovery room) measured 3 times (morning, afternoon, and before sunset) at 3 different measurement points per room. The results show that more than 91% of the germ number and 71% -87% of the physical environment quality do not meet the health requirements of the Decree of the Minister of Health of the Republic of Indonesia No. 1204/MENKES/SK/X/2004.

Based on 4 measured physical environmental factors, only relative humidity is directly related to germ density (p = 0.023), even though the linear correlation is very low (Pearson correlation 0.299). In accordance with this level of correlation, the contribution of all physical environmental factors to the germ rate is only 14.6% Abdullah and Hakim[1].

Microbial density assessment (MRA) refers to a structured process used to estimate the possible adverse effects of human health along with exposure to pathogenic microbes (such as certain bacteria or viruses). Exposure can occur directly, such as from air or drinking water, or indirectly, through germ contaminating matrices. Quantitative or qualitative assessments can be carried out to meet broad objectives in the community (for example, establishing regulations relating to prevention of disease transmission). The aim of microbial risk assessment is to protect public health through a policy-making process that is scientifically credible. Microbial density assessment results can be used to set regulatory standards, develop guidelines, support public decision-making processes, educate and inform policy makers and the public, identify differences between risk management choices, and prioritize risks and or research problems.

Materials and Method

Lokasi Penelitian dan Jenis Penelitian: Research on microbial risks to health was carried out in the Kurulu district, Jayawijaya Regency, Papua Province. This research is a pre-experimental designs in the form of a One-group pretest-posttest design based on the design of a cohort study intended to observe the course of bacterial density. Observations are followed "in the future", ie starting from the Honai target then followed for a certain time/period to see whether there is an effect on Honai after being given intervention or treatment.

Research Result

Number of Microbial Density Before and After Intervention in Honai in Kurulu District, Jayawijaya Regency, Papua Province.

Table 1: Air Microbial Examination Results in Kurulu District, Jayawijaya Regency in 2018

No.	Before Intervention Honai	Sample Code	Results (CFU)	Results (CFU) Week intervention		
			Pre	1	2	3
1.	1	1A	172000	666	6	0
2.			8000	0	0	0
3.			40000	0	0	0
4.		1 B	88000	15	3	0
5.			56000	8	0	0
6.			2000	0	0	0

Conted…

7.	2	2A	181333	666	20	0
8.			174000	200	0	0
9.			121333	666	19	0
10.		2 B	5333	56	0	0
11.			1333	66	15	2
12.			6666	60	0	0
13.	3	3 A	10666	533	15	2
14.			14666	666	19	3
15.			8000	66	20	5
16.		3 B	33333	666	19	6
17.			166666	666	15	3
18.			6666	0	0	0
19.	4	4 A	34666	2.000	20	5
20.			122666	56.000	200	13
21.			57333	666	0	0
22.		4 B	114666	666	17	0
23.			168666	666	20	3
24.			122666	666	18	0
25.	5	5 A	10333	666	15	0
26.			50333	2000	19	5
27.			26000	666	15	2
28.		5 B	2000	0	2	0
29.			4000	0	0	0
30.			5333	666	10	0
31.	6	6 A	26000	666	15.00	2
32.		6 B	57333	666	0	0

A: Upper Room, B: Bottom Room

Source: Results of Air Microbial Examination in Kurulu District in 2018

Based on Table 1. it showed that there was a significant decrease in microbial density after the administration of Ultraviolet + Exhause intervention in the first, second and third weeks in column 1 A which decreased before the intervention of 172,000 microbial density, after intervention the first week there was a decline to 666, after intervention in the second week it became 6 and after intervention the third week became 0. The decrease in microbial density also occurred in columns 1B, 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B, 6A and 6B

Effects of Ultraviolet + Exhause on Decreasing Microbial Density Before and After Intervention in Honai in Kurulu District, Jayawijaya Regency, Papua Province

a. Normality Test Results

Table 2: Data Normality Test Results

No.	Time	Before Data Transformation (p)	After Data Transformation (p)
1.	Before treatment	0,005	0,005
2.	Week 1 treatment	0,000	0,000
3.	Treatment Week 2	0,000	0,000
4.	Treatment of Week 3	0,000	0,000

Source: 2018 Primary Data

The normality test before and after transformation shows that the p value is <0.05 so the statistical test used in the data analysis is the Friedman Test followed by Post Hoc analysis using the Wilcoxon test.

b. Friedman Test Results and Post Hoc Analysis

Table 3: Friedman Test Results and Post Hoc Analysis

No.	Treatment	Friedman Test (p)
1.	Before Intervention	0,000
2.	Intervention Week I	
3.	Intervention Week II	
4.	Intervention Week III	

Post Hoc analysis with the Wilcoxon test; Week 1 intervention - before intervention (p = 0,000), intervention week 2 - before intervention (p = 0,000), intervention week 3 - before intervention (p = 0,000), intervention week 2 - intervention week 1 (p = 0,000), intervention week 3 - week 1 intervention (p = 0,000), week 3 intervention - week 2 intervention (p = 0,000).

Source: 2018 Primary Data

Table 3. shows there is a decrease in microbial density and based on Friedman test results (alternative repeated anova test) the value of p = 0,000, this means the intervention gives a significant positive change and it occurs from the first week to the second week and to the third week.

a. The measurement results of microbial density before the intervention differed significantly from after the intervention in the first week (p = 0,000).

b. The results of microbial density measurements before the intervention differed significantly from after intervention in week II (p = 0,000).

c. The results of microbial density measurements before the intervention differed significantly from after intervention at week III (p = 0,000).

d. The results of the first week microbial density measurements differed significantly after the intervention in week II (p = 0,000).

e. The results of the measurement of microbial density in week I were significantly different from after intervention in week III (p = 0,000).

f. The results of measurement of microbial density in week II differed significantly from after intervention in week III (p = 0,000)

Conclusion

The number of microbial densities before and after intervention in the Honai in Kurulu District, Jayawijaya Regency, Papua Province, namely, overall in the first week there has been a decrease in average microbial density of 98.07%, the effect of the overall intervention in the second week has decreased average microbial density - average 99.92%, and the overall effect of intervention in the third week has decreased the microbial density on average by 99.99%.

The effect of the intervention on decreasing microbial density before and after intervention in the honai in Kurulu District, Jayawijaya Regency, Papua Province, was that the intervention was very effective in reducing microbial density carried out for 3 weeks which showed a significant difference in decreasing microbial density between pre-intervention and the first week. pre-intervention with the second week, pre-intervention with the third week, between the first week and the second week, between the first week and the third week and between the second and third week.

Successful intervention was carried out on decreasing microbial density in honai in Kurulu District, Jayawijaya Regency, Papua Province, namely that based on the results of this study the intervention of 35 watt ultraviolet lights starting at 07.00 CEST until 18.00 WIT accompanied by exhause intervention at night was highly recommended on Honai.

Recommendation

For the Jayawijaya District health office, the results of this study can be used as a reference for eradicating microbial diseases, especially those that develop or that occur in Honai. For Scientists to be able to conduct further research related to disease transmission and obstacle eradication in Honai, for example MDR patients TB patients in Honai residents.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Abdullah M.T, Hakim H. A. Physical Environment and Air Germ Germs in Makassar Haji General Hospital, South Sulawesi. FKM Unhas.

2. DKI Jakarta Housing Agency. http://www.jakarta.go.id/dinasperumahan- DKI Jakarta Housing Office. Accessed July 2008.

3. Dahlan S. Statistics for Health Medicine. Edition 4. Salemba Medika: Jakarta. 2009.

4. Decree of the Minister of Health of the Republic of Indonesia No. 829 Minister of Health SK/VII/1999 concerning Housing Health Requirements.

5. Manangsang Frans. Model Analysis of Risk Factors for Transmission of Pulmonary TB in the Community of Honai Residents in Kurulu District, Jayawijaya Regency, Papua Province. 2017.

A Model of Malaria In Pregnancy Prevention Counseling in Clinics District of Jayapura, Papua

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ABSTRACT

Malaria is still the health problems in the community, especially in endemic areas like Papua. Malaria in pregnancy is contributing to the high numbers of pain and maternal mortality. One effort decreases the prevalence of malaria is empowering officers and clients or pregnant women by increasing knowledge to do prevention. One effort to increase knowledge with counseling at the time of antenatal. Effective counseling using the picture/media sheets behind a great way make it easier for mothers to understand the information provided. This research was to know relationship counseling using media sheet back toward an increase in knowledge, attitudes and compliance perform prevention of malaria infection. The method used was the stage that is training midwives Next research experiments with design pre-and post test-test, determination of sample with randomized assigment, group counseling is a treatment using media sheet turning 85 mothers and control group counseling without the media as much as 85 mothers. After counseling, conducted observation for 3 months in a row to see malaria prevention practices.

Results: there was a change in the average knowledge of 2.014 ($p < 005$) between the pre and post test-test. Statistically, there is a change of attitude and knowledge difference 2.07 6.68 group treat compared to the kelompk control. Malaria prevention practices as using mosquito nets, do not hang the thrift in the home, use protective clothing when outside the House on the first and second month after statistically meaningful counseling with a value of $p < 0.05$.

Conclusion: turning sheet using media counseling can improve knowledge, attitudes in a positive and pregnant mother dutifully do well compared with malaria prevention counseling without the media. Recommended to maternal and child health services in particular in the territory of Papua to benefit from this feedback sheet when giving malaria prevention counseling to pregnant mothers.

Keywords: *media flipcharts, counseling, pregnant women, malaria, RCT.*

Introduction

Prevalence of malaria still is one of the contributing causes of maternal and child death indirectly in Indonesia. In particular in Papua prevalence and incidence has decreased from year to year. Nationally, according to the report on the achievement of the Millennium development goals in Indonesia in 2011, has decreased from 4.68 per 1,000 inhabitants be 1.75 per 1,000 inhabitants. However, the highest incidence of malaria (63%) is found in the province of NTT, Papua and West Papua. To that end, efforts to reduce the numbers in areas such as Papua is endemic with the prevention and treatment of infection of malaria parasites is a top priority, one of prevention efforts by reducing the transmission through the protection of vulnerable groups such as pregnant women.

Prevention of malaria in pregnancy in Jayapura Regency was no longer using drugs as pecegahan, preferred doing prevention community behavior to avoid malarial mosquito bites. Can be done using mosquito

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nets while sleeping the night especially at risk groups (pregnant women, infants and children), use protective clothing when being outside the home at night, using the anti mosquitos, hygiene in the home page and from the water puddle.

Prevention of malaria can be done well if health workers provide information clearly to the public. Information can be provided in various ways, and in this study the information given by way of face-to-face counseling using media sheet back specifically for pregnant women. Expected with counseling using media sheet behind it, people especially pregnant women can understand and can apply it well[8]. The results will be compared with pregnant women who are dikonseling without media.

Method of Study

The method of this research uses experimental design pre test – post on two groups of treatment and control group. On the Group's treatment was given counseling and back sheet using the media control group were given counseling without the media. Study area and population. Research conducted in Jayapura on some government health services centre i.e. clinics and posyandu. The population was pregnant women visiting clinics for the first time to checked her pregnancy. Design research studies randomized controlled trial (RCT) design pre test – post in the intervention group and the control group. Record keeping and intervention does is granting counselling using media sheet back and control group counseling without the media. Follow up observations done each month after the giving of the counseling as much as 3 times consecutive observations. Laboratory examination methods on the thick blood drops samples for examination of parasitemia officers conducted by laboratories using microscopes and RDT. The management of data collected using a questionnaire for the assessment of the knowledge and attitude, and sheets of observations for the assessment of compliance. Methods of statistical analysis with its homogeneity test, paired t-test, t-tets to compare the mean results of the pre-and post test-test in the intervention group with a control group, the research hypothesis testing decision based on the significance level $p < 0.05$. The results of statistical tests and analysis results are interpreted to address the research objectives.

Result and Discussion

a. Changes in knowledge and attitudes of respondents

Table 1: The relationship of changes in knowledge and attitudes towards score pre-and post test-test

	Changes in knowledge and attitudes								
		Pre-test		post-test					
	N	Mean	Sd	Mean	Sd	T	P	Δ	CI 95%
Knowledge									
Media	85	8.40	2.09	10.47	2.10	7.04	0.000	2.07	1.48-2.65
Without media	85	7.98	1.92	8.99	1.28	5.48	0.000	1.01	0.64-1.37
Attitude									
Media	85	58.47	5.57	65.15	4.43	14.70	0.000	6.68	5.77-7.58
Without media	85	58.65	4.70	63.39	4.68	10.97	0.000	4.74	3.88-5.60

Sig = $p < 0.05$

Table 2: Independent t-test analysis of the difference between knowledge and attitude change

	Difference in knowledge and attitude change							
	Media		Withoutmedia					
	Mean	Sd	Mean	Sd	T	P	Δ	CI 95%
Knowledge	2.07	2.71	1.01	1.70	3.04	0.002	1.06	0.37-1.74
Attitude	6.68	4.18	4.74	3.98	3.09	0.002	1.94	0.70-3.17

Sig = $p < 0.05$

The table above shows the average score value, pre-test of knowledge and value score average post-test anomaly difference statistically meaningful 2.07, p = 0000 (p < 0.05) at the media group. The difference in the average value of pre-test and post test group without media amounted to 1.01, a statistically meaningless p = 0000 (CI 0.64-1.37). Value score average pre-test attitude and post-test attitude there is a statistically meaningful change p = 0000 (p < 0.05) on media group and a change in attitude in the group without a statistically meaningful also media p = 0000 (p < 0.05). The results of the analysis showed the value of average difference changes post-test and pre-test a statistically meaningful on knowledge with an average value of 2.07 (p = 0.002) and attitude with the average value of 6.68 value p = 0000

1. Paired sample t-test results-test of knowledge, attitudes, and behavior

Table 3: The relationship between the variables are free, beyond and against compliance characteristics

	Compliance				χ^2	p	RR	95% I
	Obedient		Without					
	N	%	N	%				
Counseling with								
Media	58	68.2	27	31.8	9.57	0.002	1.53	1.15-2.01
Without media	38	44.7	47	55.3			1	
Age								
20-35	76	55.5	61	44.5	0.28	0.594	0.91	0.66-1.25
<20 or>35	20	60.6	13	39.4			1	
Gravida								
Multipara	66	58.9	46	41.1	0.80	0.369	1.14	0.85-1.52
Primipara	30	51.7	28	48.3			1	
Age Gravid								
Trimester2	54	56.8	41	43.2	0.01	0.912	1.01	0.77-1.32
Trimester3	42	56.0	33	44.0			1	
Education								
High	84	56.4	65	43.6	0.01	0.947	0.98	0.66-1.46
Low	12	57.1	9	42.9			1	
Distance								
>5 km	31	53.5	27	46.5	0.32	0.567	0.92	0.69-1.22
≤5 km	65	58.0	47	42.0			1	
Economic								
High	59	64.8	32	35.2	5.57	0.018	1.38	1.04-1.83
Low	37	46.8	42	53.2			1	

Sig = p <0.05

Based on the table above, the variable age groups, gravida, gestational age, maternal education and distance not significance statistically (p > 0.05), it means there is no relationship towards compliance. Based on the results of the analysis in the table above, it is seen that the proportion of media group of 42.4% compared to 27.8% media without having links against a statistically meaningful compliance with the value p = 002 (p < 0.05) and the value of RR 1.53 (95% CI 1.15-2.01). This means that the media likely being dutifully 1.53 times as compared to the group without media.

Economic variables with high proportions of 40.3% higher than the low economy, statistically meaningful relationship has p = 0.018 (p < 0.05) and the value of RR 1.38 (95% CI 1.04-1.83). That is, a high level of social possibilities become obedient amounting to 1.38 times in comparison with economy.

2. **Multivariate Analysis:** Multivariable Analysis conducted to see Knowledge relationship counselling, meaningful economic-level variables are statistically against the difference in knowledge by using multiple linear regression.

   a. Test and the result can be seen in the following table:

Table 4: The relationship between economic, social, counselling with difference of knowledge

Selisih p	Coef	Std. Err	Z	p> (z)	CI 95%
Counceling 1	0.656	0.221	2.97	0.003	0.222-1.089
Distance 1	0.260	0.231	1.13	0.261	-193-0.713
Economic 1	0.068	0.221	0.31	0.758	-365-0.502
Cons	2.713	0.207	13.10	0.000	2.307-3.118

Sig = $p < 0.05$

Based on the table 4 above, it is seen that the counseling had a relationship with the media significantly to knowledge difference p 0.05, but clinically meaningless value of CI 0.37-1.74. variable distance and economic level statistically there is no difference in the relationship towards knowledge. It can be concluded that a statistically meaningful counseling in the change of knowledge, whereas the variable distance and economic level as a confounding variable.

a. Attitude Multivariable: Multivariable Analysis done attitude to see the relationship counseling, economic level variables statistically meaningful difference in attitude towards using multiple linear regression test and the result can be seen in the following table:

Table 5: The relationship between economic, social, counselling with difference in attitude

Attitude	Coef	Std. Err	t	P > (t)	CI 95%
Counceling 1	1.75	0.58	3.00	0.003	0.59-2.91
Distance1	1.54	0.61	2.50	0.013	0.32-2.75
Economic 1	2.68	0.58	4.57	0.000	1.52-3.84
Cons	2.86	0.54	5.25	0.000	1.79-3.94

Sig = $p < 0.05$

Based on Table 3 above, seen counseling with the media, distance and level of economic ties is a significant difference in the attitude towards the value of $p < 0.05$. On the value 95% CI clinically meaningful is the economic level (CI 1.52-3.84), while counselling and clinical secaara not meaningful distance.

Compliance: To view the compliance practice prevention of malaria, will be presented in the form of recurrent observations measure results on the second and third month after giving of the counseling. It can be seen in the following table.

Tablel 6: Relationship counselling against malaria prevesssntion practices with 1 month and 2 months after counselling

	Early	Month 1	Month 2	Comparison	Caomparison
	p (CI 95%)	p (CI 95%)	p (CI 95%)	Bl 1-2 (p,CI)	Bl 1-3 (p,CI)
Nets	0.229 -3.620-.868	0.001 1.748-7.148	0.000 4.275-9.157	0.238 -1.728-6.946	0.000 5.435-13.979
Hanging Clothes	0.588 -1.537-2.711	0.014 .580-5.075	0.000 8.670-14.800	0.014 1.011-8896	0.000 4.977-16.360
Protected	0.988 -2.127-2.159	0.009 .857-5.886	0.000 6.750-13.929	0.135 -1.030-7.622	0.040 .316-13.666
Anc	1.000 -134.51-134.89	0.995 -699.62-694.62	0.995 -699.88-694.36	1.000 -134.64-134.75	1.000 -134.37-134.03

Sig = 0.05

According to table 6 shows that at the initial visit no statistically meaningful (P > 0.05). After counseling conducted observations then seen that in the first month and two pregnant women who use nets, do not hang the thrift in the home and use protective clothing outside the House statistically meaningful value p each < 0.05, and if the comparison between the initial visits with 1 month after counseling practices look meaningless in statistic (p > 0.05), whereas if compared to the practice in the second month, statistically meaningful. To practice the ANC visit statistically meaningless both from the beginning up to the observation after counseling.

a. Multilevel Analysis: To see the effect of media counseling against the difference between knowledge and attitudes after the analysis is performed in the same crucible with variable control after a midwife.Then it can be assumed the existence of a meaningful relationship. It can be seen in the following table:

Table 7: Effect of media counceling against the difference between Knowledge and attitudes

Attitude	Coef	Std. Err	z	p>(z)	CI 95%
Counceling 1	1.93	0.88	2.18	0.03	0.19-3.67
Cons	4.79	0.62	7.63	0.000	3.56-6.02

LR test vs linear regression: chi2 (2)= 9.60 Prob > chi2 = 0.008

Discussion

a. Based on the results of the t-test analysis, there is a change in the mean score of knowledge and attitude between the pre-and post test-test significantly value t calculate (7.04) greater than t table, meaning that there is a difference between pre-test and post-test that showed an increase in knowledge and attitude between the pre-and post test-test after being given counselling by turning sheets than media without the media.

b. Relationship of the level of knowledge and attitudes toward the economy: Based on the results of the analysis variables outside (distance and socio-economic) of difference in knowledge (table 5), there is a statistically meaningful relations at a high level of socio-economic changes than to economic level of knowledge is low. Socio-economic relationships within the attitude there is a statistically meaningful relationship, meaning that high economic level have a change in the attitude of the average difference is higher than the economic level is low.

c. Relationship counselling, external variables against the difference between knowledge and the difference in attitude is performed with multivariate analysis. Based on the results of the analysis (table 4) indicates the counseling with statistically meaningful and media had influence on the difference of knowledge when analyzed along with the economic level and distance. Likewise on Multivariate analysis against the difference in attitude, stated that the economic level of counselling, and the distance has positive influence to change the difference in attitude. Very meaningful is the level of the economic value of p = 0000 (95% CI 1.53-3.84).

d. Relationship counselling towards compliance: Observations made on malaria prevention practices after the giving of the counseling during the first month and months into two meaningful statistically (P < 0.05), where pregnant women use mosquito nets at night while sleeping, there hung a thrift in the home, use protective clothing when outside home.

Malaria prevention practices in comparison between the initial observations with the month first just practice thrift drape a statistically meaningful. While in the initial observation with month-2 statistically meaningful on users mosquito nets, not hanging in homes, thrift and use clothes covers when outside the home. It can be concluded that pregnant women can practise prevention malaria properly when being in the second month after receiving counselling and followed with periodic observation.

According to some studies say that meaningful counseling against adherence to using mosquito nets while sleeping the night, for various reasons such as the hot, uncomfortable, Chukwocha[3]; Mbonye[4], stating that as much as 40% of pregnant women use mosquito nets

when sleeping the night, due to prevention strategies conducted by officers of the low (14.4%) less got recommendations from health workers.

On the practice of the ANC, a statistically meaningless since the beginning of the counselling up to the last observation. This illustrates that counselling does not affect the frequency of visits of pregnant women to conduct the examination Browning and Shane[1].

Summary

Risk characteristics of respondents include: age, gestational age, gravida, and education. There is no meaningful difference between a score of pre-and post test. Counseling using media sheet behind the statistically meaningful increase knowledge and attitude with the difference in average higher results compared to counseling without the media[6].

Counseling with statistically improve media conducted compliance precautions by using mosquito nets while sleeping at night without hanging the thrift at home, using protective clothing when outdoors. High economic level are statistically meaningful improvement in attitude and compliance malaria precautions. Thus it can be concluded that, with the media counseling sheet behind the positive influence and the result is quite effective to enhance the knowledge, attitudes and compliance to conduct malaria infection, prevention, and action.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. Browning C. J, Shane, A. T. Behavioral Change: An Evidence-based Handbook for Social and Public Health. Livingstone Churchill Elseiver. 2005.
2. Catarina Yossi. BNS, Julian Dewantiningrum, Rebriarina Hapsari. Effect of Delivery Labor Delivery on Knowledge and Anxiety Level of Pregnant Women, Obstetrics and Gynecology Department, Diponegoro University, Semarang. Obstetrics & Gynecology Magazine. 2012. 20(September 3 - December 2012): 111-116.
3. Chukwuocha UM, Dozie INS, Onwuliri COE, Ukaga CN, Nwoke BEB, Nwankwo BO, Nwoke EA, Nwaokoro JC, Nwoga KS, Udujih OG, Iwuala CC, Ohaji ET, Morakinyo OM, Adindu BC. Perceptions on the use of insecticides in parts of the Imo River Basin, Nigeria: Implications for Preventing Malaria in Pregnancy. African Journal of Reproductive Health Mar 2010;14(1):117.
4. Mbonye A. K, Stella N, Pascal M. Preventing malaria in pregnancy: a study of implications and policy implications in Mukono district, Uganda. Hygiene and Tropical Medicine. 2005. doi: 10.1093/heapol/ez/002
5. Sanjaya H. W. Learning System Planning and Design., Kencana Prenada Media Group., Jakarta. 2010.
6. Rahmawati I, Toto Sudargo, Paraswati I. Effect of Audio Visual Extension on Increasing Knowledge, Attitudes and Behavior of Mothers of Under-5 and Poor Nutrition in Kotawaringin Regency, West Kalimantan, Indonesian Clinical Nutrition Journal. November 2007;4(2);69-77.
7. Nurhidayat O, Eram Tunggul P, Bambang Wahyono. Comparison of Media Point Power with Flip Chart in Increasing Knowledge of Dental and Oral Health, Unnes Journal of Public Health. 2012. http://journal.unnes.ac.id/sju/index.php/ujph
8. Zulkarnain E, Leersia Yusi R, Nikmatul Farida. Differences in Effectiveness between Methods of Counseling with Flipchart and Using Video Compact Disc (vcd) in Increasing Knowledge and Attitudes of Pregnant Women towards Early Breastfeeding Initiation. Faculty of Public Health, University of Jember. 2009.

Molecular Docking Studies of a Chalcone Derivative Compound *p*-hydroxy-*m*-methoxychalcone with Tyrosine Kinase Receptors

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ABSTRACT

Chalcone compounds have been studied as therapeutic, especially as antitumor drugs. A chalcone derivate, *para*-hydroxy-*metha*-methoxychalcone (*p*H*m*MC) or 3 - (4'-hydroxy-3'-methoxyphenyl)-1-phenyl-2-propene-1-on, has been studied to explore its potential utilization as chemoprevention in several cancers cell lines. The main objective of the present work is to perform a docking analysis of *p*H*m*MC with tyrosine kinase receptors EGFR, HER2, and VEGFR comparing with ligand ATP. Docking studies were performed using PLANTS (Protein Ligand ANT System) software, while the preparations of protein and reference ligand was used YASARA, and visualizing amino acids was used Molecular Operating Environment (MOE) program. The docking studies indicated that the binding energy of *p*H*m*MC with EGFR (1XKK) and HER2 (3PPO) was higher than the ATP binding energy with the EGFR and HER2. However, the binding energy of *p*H*m*MC with VEGFR (2P2I) almost had the same energy binding compared with the ATP binding on VEGFR. VEGF is a protein that plays a role in angiogenesis. Data from the MOE program showed there were similarities in the amino acids involved in the interaction between *p*H*m*MC and ATP in binding to EGFR, HER2, and VEGFR. The results indicated that *p*H*m*MC has the potential to be developed as an anticancer which might through the mechanism of inhibiting the process of angiogenesis.

Keywords: *molecular docking; pHmMC; EGFR;HER2;VEGFR.*

Introduction

The number of cancer patients and the death rate caused by cancer increases every year. World Health Organization (WHO) reported that in 2018 there were 8.1 million new cases and 9.6 million cancer deaths[1]. Cancer is a disease with very complex molecular mechanisms. In cancer cells the various dysregulations occur in proteins involved in signal transduction so that the proliferation of cancer cells becomes uncontrolled[2]. One protein often dysregulated is tyrosine kinases. These proteins catalyze the transfer of phosphate from adenosine triphosphate (ATP) to a tyrosine residue of a polypeptide. Tyrosine kinases play a role in signal transduction which regulates cellular proliferation, differentiation, function and movement[3-5]. Dysregulations of tyrosine kinase is found in many types of cancer, for example dysregulation of epidermal growth factor receptor (EGFR)[6], human epidermal growth factor receptor 2 (HER2)[7] and vascular endothelial growth factor (VEGFR)[8]. Over expression and mutation in EGFR results in increased its activity so that EGFR is a target in cancer therapy[5]. Amplification or over expression of HER2 has an important role in the development of breast cancer. HER2 is an important biomarker for detecting breast cancer and is a therapeutic target for breast cancer patients[9, 10]. VEGFR plays a role in endothelial cell proliferation, vascular permeability and angiogenesis process. Angiogenesis is the process of forming new blood vessels in the human body and is a natural process that plays an important role in wound healing and reproduction. Angiogenesis plays an important role in the growth and spread of cancer cells. The new

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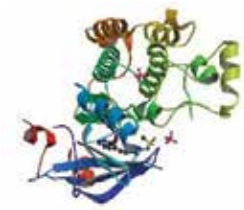
blood vessels produced will feed tumor cells with oxygen and nutrients that make cancer cells urge the surrounding tissue, develop throughout the body and form colonies of new cancer cells (metastatic). Therefore, VEGFR is the target therapy for cancer patients through antiangiogenic therapies[11-13]. Inhibition of protein tyrosine kinase is one strategy in treating cancer. All kinase enzymes share a catalytic domain that contains a cleft where ATP binds. This catalytic cleft is a major focus of small-molecule drug design for protein kinases[14].

Research to develop chemoprevention agents with specific molecular targets has been widely carried out. A derivate chalcone, *para*-hydroxy-*metha*-methoxychalcone (*p*H*m*MC) or 3 - (4'-hydroxy-3'-methoxyphenyl)-1-phenyl-2-propene-1-on, is one the compounds that have the potential to be developed as a chemoprevention agent. The compound was synthesized by reaction between vanillin and acetofenon through cross-aldol condensation reaction in acidic condition. This compound has cytotoxic activity against several cancer cells, including HeLa cervical cancer cells, Raji lymphoblastic cells[15], MCF-7[16] and T47D breast cancer cells[17]. The action mechanism of *p*H*m*MC on T47D and MCF-7 cells is through apoptosis induction by decreasing the expression of Bcl-2 protein and increasing the expression of Bax protein[18]. It has also been reported that the combination of *p*H*m*MC with doxorubicin chemotherapy agents has a synergy effect on T47D[19]. This research aims to study the effect of *p*H*m*MC on influencing the activity of several receptor tyrosine kinases: EGFR, HER2, and VEGR using docking method. The study was conducted by comparing the interaction of these receptors with *p*H*m*MC compared to their interactions with ATP.

Experimental Method

Materials: The *p*H*m*MC compound as a ligand and the target protein are tyrosine kinase receptors (EGFR, HER-2, and VEGFR). The structure of target protein obtained from Protein Data Bank (PDB) (https://www.rcsb.org/) presented in Table 1.

Table 1: The structure of target protein of *p*H*m*MC and its native ligand

Protein	PDB ID	Structure	Native Ligand
EGFR	IXKK		FMM
HER2EGFR	3PPOIXKK		DCK
VEGFR	2P2I		608

Tools: The tools used for this research were a set of computers with Windows 7 32 bit specifications and Linux co-PenDrive program for Linux simulation on Windows, PLANTS (Protein-Ligand ANT-System) Software for molecular docking downloaded from http://www.tcd.uni_konstanz.de/research/plant.php., YASARA version 10.1.8 (C) 1993-2010 by Elmar Kreiger (licenced to Hari Purnomo Universitas Gadjah Mada) for protein visualization and preparation, Marvin Sketch 5.2.5.1 for ligand preparation (*p*H*m*MC), and Molecular Operating Environment (MOE) program for visualizing amino acids.

Procedure: The stages of this research were protein preparation, preparation of test compound (pHmMC) structures, validation, and molecular docking20.

Protein Preparation: Conformation of target proteins (EFGR, HER2, and VEGFR) sought from Proteins Data Bank (PDB) (https://www.rcsb.org/) [21]. Proteins was selected in active form that bind to native ligand (Table 1). Native ligand was then removed by the YASARA program to provide space (pocket/cavity). This space will be used to analysis the interaction of ligand (*p*H*m*MC) and target protein.

Preparation of *p*H*m*MC Structure: Optimization of the *p*H*m*MC structure was carried out using the Marvin Sketch program. The three-dimensional structure of *p*H*m*MC was drawn complete with its hydrogen atom and then conformation optimization was carried out[20].

Validation of Molecular Docking Methods: The validation of binding was done by the calculation of Root Mean Square Distances (RMSD) of heavy atoms (native ligand) with ligand copy. The target protein was removed from the native ligand using the PLANTS program. Native ligand is then paired back to the protein. The RMSD of heavy atoms native ligand with proteins are analyzed. If the RMSD value is less than 2.0 angstroms, the protocol was received and docking of the test compound on the target protein can be carried out. If the RMSD value ≥ 2.0 angstroms, then protein with another code (PDB ID) was used[20, 22].

Molecular Docking of *p*H*m*MC on Protein Target: The *p*H*m*MC compound tethered to the protein that has been removed from the native ligand using the PLANTS program. The results of the analysis will show which compound with the lowest conformation to bind to the target protein. Visualization of amino acid residues that interact with the ligand is processed using the MOE program[20].

Results and Discussions

Results

Validation Results: The validation of the docking method was done by observing the RMSD score of the target protein PDB with its native ligand. In this study the RMSD score between target protein PDB and native ligand had less than 2 angstroms (Table 2). The data showed that the protocol was accepted because the validation requirements was met, and then molecular docking can be done[20, 22].

Table 2: RMSD score of target protein and native ligand

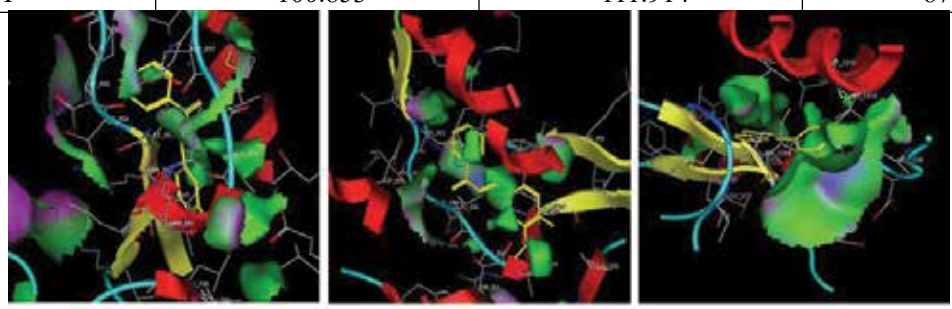
Protein	PDB ID	Native Ligand	RMSD (Angstroms)
EGFR	IXKK	FMM	1.96
HER2	3PPO	DCK	1.19
VEGFR	2P2I	608	1.64

Docking Score of ***p*H*m*M*C*** and Target Protein

The docking score of interaction between *p*H*m*MC and ATP with EFGR, HER-2, and VEGFR is presented in Table 3. While the visualization of *p*H*m*MC interaction with receptor kinases is displayed in Figure 1.

Table 3: Docking Score of *p*H*m*MC and ATP with EGFR, HER2, and VEGFR

Compound	Docking score (kcal/mol)		
	EGFR[1XKK]	HER2[3PPO]	VEGFR[2P2I]
*p*H*m*MC	-87.2131	-93.2788	-86.9070
ATP	-100.853	-111.914	-87.4485



***p*H*m*MC-EGFR[1XKK]** ***p*H*m*MC-HER2[3PPO]** ***p*H*m*MC-VEGFR[2P2I]**

Figure 1: The visualization of interaction between *p*H*m*MC with EGFR, HER2, and VEGFR. The *p*HmMC compound is shown in yellow

The visualization of *p*H*m*MC Interaction with Target Protein: The visualization of interactions between *p*H*m*MC as a ligand with target proteins (EGFR, HER2, and VEGFR) were carried out using the MOE program. These results indicated that there were similarities of amino acids involved in the interaction between *p*H*m*MC with target proteins and ATP with target proteins and Table 4.

Table 4: Interaction of *p*H*m*MC with tyrosine kinases receptor, and comparison with ATP

Tyrosine Kinase receptor	Ligand	Amino Acid Interaction/*similar**
EGFR [1XKK]	*p*H*m*MC	Ala 839, Ala 840, Arg841, Asn842, **Leu798***, **Val843***
	ATP	Cys797, **Leu798***, Leu844, **Val843***, Val845
HER2[3PPO]	*p*H*m*MC	**Ala 847***, **Ala848***, Arg849, **Asn850***, Thr911, **Val851***
	ATP	**Ala 847***, **Ala848***, **Asn850***, Ile861, Leu846, Thr862, **Val851***
VEGFR[2P2I]	*p*H*m*MC	Asp1033, Cys1045, **His1026***, Ile1034, **Ile1044***, **Leu1029***, **Met1016***, Val1012
	ATP	**His1026***, **Ile1044***, **Leu1029***, **Met1016***

Discussions

Molecular docking study is one technique that is often used in the discovery of new drugs[23, 24]. In this study, the test compound was *p*H*m*MC (ligand) and the target protein were EGFR, HER2, and VEGFR tyrosine kinase receptors. The structure of the target proteins were obtained from (https://www.rcsb.org/) with PDBID were 1XKK, 3PPO, and 2P2I respectively[20, 21]. Each protein was separated from its natural ligand (FMM, DCK, and 608) using the Yasara program. Then the protein from the separation, native ligand and ligand (*pHmmC*) were prepared by adding H atoms and followed by molecular docking test using PLANTS[20].

In this study, validation was done to calibrate the accuracy of the docking method used. The validation process was done by comparing the native ligand position to the receptors that have been tested experimentally at the binding site of pocket ligands using RMSD. In general predictions in RMSD 2 Å are considered successful, while values higher than 3 Å indicate docking failure[22]. In this study, the RMSD value was below 2A (Table 2) so that the docking method can be used for analysis.

The docking analysis was carried out by comparing docking scores from receptor tyrosine kinase interactions with *p*H*m*MC and tyrosine kinase receptor interactions with ATP. ATP ligand is used as a comparison because tyrosine kinase is a protein that catalyzes phosphate transfer from ATP residues to tyrosine residues.

The score docking (Table 3) is Gibbs free energy (ΔG) which shows the strength of the bond between compounds (ligand) and receptors (kcal/mol). The small ΔG value indicates the bonding of ligand-receptor is strong and forms a stable conformation. Conversely, if the ΔG value is high, the bond of the receptor-ligand complex is weak and the conformation is unstable. A stable conformation of a ligand causes the ligand to become more potent[20, 23, 24].

The studies showed that the docking score between ATP and EFGR[1XKK] and HER2[3PP0] was lower than the *p*H*m*MC docking score with the receptors. These showed the interaction of ATP with EFGR[1XKK] and HER2[3PP0] were stronger and the conformation was more stable than the interaction of *p*H*m*MC with the receptors. An interesting result was the ATP-VEGFR docking score (2P2I) of -87.4485 kcal/mol has almost equal to the docking score of *p*H*m*MC-VEGFR[2P2I] (-86.9070 kcal/mol). VEGFR is a protein kinase that plays a major role in the angiogenesis process. Angiogenesis is a growth process of new blood vessels from blood vessels that already exist in body tissues. The presence of angiogenesis indicates that cancer cells have experienced further growth, namely experiencing metastasis to other tissues[11-13]. The ability of *p*H*m*MC to interact with VEGFR and the bonding strength is almost the same as ATP, indicated that *p*H*m*MC has the potential to be used as an anti-angiogenenic. Several studies of chalcone have shown that several chalcone derivatives have anti-angiogenic activity[25-27].

In the interaction of *p*H*m*MC-EGFR[1XKK] there are two amino acids that similar with the amino acid that involved in interaction and ATP-EGFR. The amino acids

were Leu798 and Val843 (Figure 2). While the *pHmMC*-HER2 [3PPO] interactions there are four amino acids which are similar to the amino acids involved in the interaction and ATP-HER2 [3PPO]. These amino acids are Ala847, Ala848, Asn850 and Val851 (Figure 3). Although the bonding energy between ATP- EGFR [1XKK] and ATP-HER2 [3PP0] are lower than the bond energy between *p*H*m*MC with EGFR [1XKK] and HER2[3PP0], but because of similarities the amino acids involved in this interaction allow *p*H*m*MC to interfere with the interaction between ATP and the target protein.

In the interaction of *p*H*m*MC-VEGFR [2P2I] there are four amino acids which are the same as those involved in ATP-VEGFR [2P2I] interactions, viz Met1016, His1026, Leu 1029, and Ile 1044. This is probably what causes the *p*H*m*MC -VEGFR [2P2I] bond energy to be low and stable, and almost as large as ATP-VEGFR.

The results of this study support previous research that *p*H*m*MC has the potential as an anticancer. Besides that it also provides guidance for further research to explore the mechanism as anti-angiogenesis.

Conclusion

The *p*H*m*MC interfere with the interaction of EGFR, HER2 and VEGFR with ATP which is indicated by the similarity of amino acids involved in their interaction. The docking score of *p*H*m*MC-VEGFR has the lowest and almost the same as ATP-VEGFR, so it has the potential to inhibit angiogenesis in cancer cells. The results of this study can be used to guide the drug mechanism in developing cancer drugs.

Acknowledgement

We would like to thank the Ministry of Health Research and Development Agency has funded this research through “Riset Pembinaan Ilmu Pengetahuan dan Teknologi Kedokteran (Risbin Iptekdok)”

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. International Agency for Research on Cancer, World Health Organization, *Latest Global Cancer Data: Cancer Burden Rises to 18.1 Million New Cases and 9.6 Million Cancer Deaths* in 2018. Press Release No. 263. 2018 September;1-3.
2. Hanhanan D, Wienberg R.A, *Hallmarks of Cancer: The Next Generation*. Cell, 144, 646-674. 2011 March.
3. Cohen P. *The Role of Protein Phosphorylation in Human Health and Disease*, Eur. J. Biochem. 2001;268,5001-5010.
4. Hubbard S.R, Miller W.T. *Receptor Tyrosine Kinases: Mechanisms of Activation and Signaling*, Curr Opin Cell Biol. 2007 April;19(2):117–123.
5. Krause D.S, M.D, Ph.D, Van Etten R.A. *Tyrosine Kinases as Targets for Cancer Therapy*, N Engl J Med. 2005 July;353(2):172-87.
6. Joseph S.R, Munoz L.E, Gaffney D.C, Saunders N.A, Simpson F. *Dysregulation of Epidermal Growth Factor Receptor in Actinic Keratosis and Squamous Cell Carcinoma*, Curr Probl Dermatol. Basel, Karger. 2015;46:20–27.
7. Zhou B.P, Hung M.C. *Dysregulation of Cellular Signaling by HER2/neu in Breast Cancer*, Seminars in Oncology, Seminars in Oncology, 30, Supplement. 2003 October;16:38-48.
8. Bender R.J, Mac Gabhann M. *Dysregulation of The Vascular Endothelial Growth Factor and Semaphorin Ligand-receptor Families in Prostate Cancer Metastasis*, BMC Systems Biology. 2015;9(55):1-14.
9. Gutierrez C, Schiff R. *HER 2: Biology, Detection, and Clinical Implications*, Arch Pathol Lab Med. 2011 January;135(1):55–62.
10. Iqbal N, Iqbal N. *Human Epidermal Growth Factor Receptor 2 (HER2) in Cancers: Overexpression and Therapeutic Implications*, Molecular Biology International. 2014 Sept; 2014: 1-9.
11. Roskoski R. *Sunitinib: A VEGF and PDGF Receptor Protein Kinase*, Biochemical and Biophysical Research Communications. 2007 March;356:323–328.
12. Caballero J. Muñoz C, Alzate-Morales J.H, Cunha S, Gano L, Bergmann R, Steinbach J, Kniess T. *Synthesis, in Silico, in Vitro, and in Vivo Investigation of 5-[11C]methoxy-substituted sunitinib, a Tyrosine Kinase Inhibitor of VEGFR-2*,

European Journal of Medicinal Chemistry. 2012 Oct;58, 272-280.

13. Shibuya M, *Tyrosine Kinase Receptor Flt/ VEGFR Family: Its Characterization Related to Angiogenesis and Cancer*, Genes & Cancer. 2010;1(11):1119–1123.
14. Liao J.J.L. *Molecular Recognition of Protein Kinase Binding Pockets for Design of Potent and Selective Kinase Inhibitors*, Journal of Medicinal Chemistry. 2007 Feb;50(3):409-424.
15. Arty I. A. *Synthesize and Citotoxicity Test of Several Compounds of Mono Para-hidroxy Chalcon, Indo. J. Chem.* 2010;10(1):110–115.
16. Arianingrum R, Sunarminingsih R, Meiyanto E, Mubarika S. *Cytotoxic Effect of Para Hydroxy Meta Methoxy Chalcone (pHmMC) on MCF-7 Breast Cancer Cells by Inducing Cell Arrest and Apoptosis*, Proceeding of International Conference on Research Implementation and Education of Mathematics and Sciences. 2015;89-95.
17. Arianingrum R, Sunarminingsih R, Meiyanto E, Mubarika S. The Effect of *Para Hydroxy Meta Methoxy Chalcone (pHmMC) on Bcl-2 and Bax Protein Expression*, Saintek. 2016 April;21(1):10-20.
18. Arianingrum R, Sunarminingsih R, Meiyanto E, Mubarika S. *Cytotoxic and Apoptotic Effect of Para Hydroxy Meta Methoxy Chalcone (pHmMC) on T47D Breast Cancer Cells*, International Journal of Pharmaceutical and Clinical Research. 2016;8(5)Suppl:335-340.
19. Arianingrum R, Sunarminingsih R, Meiyanto E, Mubarika S. *Synergistic Effects of para-Hydroxy meta-Methoxy Chalcone (pHmMC)-Doxorubicin Treatments on T47D Breast Cancer Cells*, I. J. Biotechnology. 2015 Dec;20(2):141-151.
20. Purnomo H. *Computational Chemistry: Molecular Docking Plants Tethering Molecules Plant (Protein-Ligand-Ant-System) (Science Ant")*, First Edition,, Yogyakarta: Pustaka Pelajar. 2011 December;1-23.
21. Berman H.M, Westbrook J, Feng Z, Gilliland G, Bhat T.N, Weissig H, Shindyalov I.N, Bourne1 P.E. *The Protein Data Bank*, Nucleic Acids Res. 2000 Jan;28(1), 235–242.
22. Yusuf D, Davis A.M, Kleywegt G.J, Schmitt S. *An Alternative Method for the Evaluation of Docking Performance: RSR vs RMSD*, J. Chem. Inf. Model. 2008 March;48:1411–1422.
23. Cheng T, Li Q, Zhou Z, Wang Y, Bryant S.H. *Structure-based Virtual Screening for Drug Discovery: A Problem-centric Review*, AAPS J. 2012 March;14:133–141.
24. Yurieva E, Holienb J, Ramsland P.A. *Improvements, Trends, and New Ideas in Molecular Docking: 2012–2013 in Review*, J. Mol. Recognit. 2015 Jan;28:581–604.
25. Pilatova M, Varinska L, Parjesi P, Sarissky M, Mirossay L, Solar P, Ostro A, Mojziz J. *In Vitro Antiproliferative and Antiangiogenic Effects of Synthetic Chalcone Analogues*, Toxicol In Vitro. 2010 Aug;24(5):1347-1355.
26. Kolundzija B. Markovic V, Stanojkovic T, Joksovic L, Matic I, Todorovic N, Nikolic M, Joksovic D.M. *Novel Anthraquinone Based Chalcones Analogues Containing an Imine Fragment: Synthesis, Cytotoxicity and Anti-angiogenic Activity.* Bioorg. Med. Chem. Lett. 2014 Jan;24(1):65-71,
27. Mahapatra D.K, Bharti S.K, Asati V. *Anti-cancer Chalcones: Structural and Molecular Target Perspectives*, European Journal of Medicinal Chemistry. 2015 May;98:69-114.

Clean Healthy Living Behaviours (Phbs) Household Order Kampong Sarmi Regency Bonggo Subdistrict Armopa Papua in 2017

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ABSTRACT

Public health experts agreed that for the implementation of the health care efforts in the community, these efforts should be implemented through community organizing. This idea is then developed in a variety of health programs and most are activities through the health program community outreach (PKM). The main goal of the program is to change the behavior of the PKM society becomes unhealthy behavior that is healthy (Trangkoso, 1984). From the background of these problems arises the question of the proposed research are: "how the description (profile) of the PHBS household services in kampungArmopa. The Purpose of research is to find out an overview of the health problem in KampungArmopa and special-purpose is to know the profile of life health behavior in kampungArmopa Papua's Sarmi. Research methodology can be described as follows: phases of this research include: (1) the preparatory Stage, (2) the stage of data retrieval (3) data processing. This research in terms of time is cross sectional study. Researchers want to see conditions a life clean and healthy Behaviors (PHBS) in KampungArmopa. Research Time conducted for 3 months from preparation up to his percentage. A place or location of Sarmi of research conducted at KampungArmopa around 150 Km from the provincial capital Jayapura. A technique used to gather the data is (1) interview and (2) and recording of observations. There are two kinds of data sources, namely (1) primary Data and secondary data (2). This research is only one Variable which is free healthy life behavior which includes 2 sub variables namely (1) the order of household and school order (2). Analysis of the statistics used in the processing of data is to use a statistical analysis is quantitative. This research only a survey descriptive.

Keywords: *Clean Healthy Living Behavior, Household*

Introduction

Health status is influenced by four (4) major components, namely: environment, health services, behavioral, and genetic. Of the four components is virtually simultaneously yet rendered its full potential. Indicators used in health status improvement still reflect a situation that is conducive to realizing the optimal health status[7,8].

On health issues, while this transition occurs in the form of health, demographic transition, transition, transition epidemiology nutrition, and transition behaviors. The health transition gives a double load (*double burden)* health problems. Rising life expectancy, on the other hand the problem of babies and toddlers are still piling up, infectious diseases chronic disease hadn't while increasing dramatically, nutrition less everywhere, while increasing more nutritional problems anyway.

Health problems in Indonesia, quantitatively estimated around 15% of the population have the disease, while those between the healthy and sick about 85%. It is these conditions occur during the development of this inequality[6]. Almost the entire allocation of government budget devoted to minority group (15%). While the group that did not get a lot more promotional services. This situation must be changed, with the budget and giving greater attention to more groups, as a human rights enforcement efforts and investments in the field of health. The issue of clean and healthy living behaviors (PHBS) is a very serious problem especially in countries that are increasingly in Papua due to the classic problem

of low education level. Statistical data on Large shows that 70% of the population did not finish elementary school[1,2,3,4,5].

Method

This research in terms of time is survey descriptive. Researchers want to see conditions a life clean and healthy Behaviors (PHBS) in KampungArmopa. Research Time conducted for 3 months from preparation up to his percentage. A place or location of Sarmi Regency research was at KampungArmopa kl. The distance is 150 Km from the provincial capital Jayapura.

Result

PHBS Household Order: On respondents Living clean and healthy Behaviors (PHBS) order of the household respondents are interviewed who was also in pregnant women and housewives are there in KampungArmopa.

The birth of a Baby in you please by health workers and the exclusive breast feeding: The 44 respondents know not having a baby so not done early initiation and birth are rescued by health workers. When we perform data retrieval, many of the residents who are following TRC in Sarmi and stay stay at house Brothers so there is some data on mothers and babies who had noresponse because until we get back the family yet again of sarmi.

Pregnancy Checkups for Pregnant Women: The 44 respondents found the respondent as much as 2 pregnancy women in a state of pregnancy and as many as 1 (2.3%) of respondents checked the uterus during pregnancy, whereas 1 (2.3%) of the respondents of pregnant women without checked content and as many as 42 (95.5%) of respondents found no members who are a pregnancy.

Use Family Planning for couples Ages fertile: The 44 respondents, a total of 10 (22.7%) of respondents age fertile couples use KB, as many as 29 (65.9%) of the respondents in the fertile age Couples don't use KB and 5 respondents (11.4%) is not a fertile women.

The Initiation of Early After the Baby is Born to Suckle: The 44 Respondents, a total of 44 (100%) of the respondents did not do a initiation suckle after her baby was born due to not having a baby.

Members of the Fund Healthy (JPKM): Figure 1 presented the origin of the 44 respondents, a total of 30 (68.2%) KK became a member of the Fund is healthy, and as many as 14 (31.8%) KK don't become members of the Fund healthy.

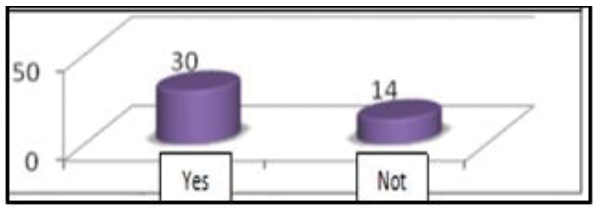


Figure 1: Distribution of respondents became healthy members

Members who Smoke: A total of 29 (65.9%) of the respondents shows that the family members who smoke, and the remainig 15 (34.1%) of respondents family members who do not smoke.

The number of Cigarettes consumed in One day: Figure 2 illustrated the 44 respondents, a total of 13 (29.5%) respondents in 1 day can be spent < 10 cigarettes, as much as 14 (31.8%) of the respondents can spend 10-20 cigarettes, as much as 2 (4.5%) respondents can spend > 20 cigarettes in 1 day, and as many as 15 (34.1%) have family members who do not smoke.

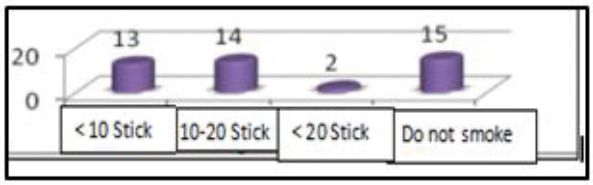


Figure 2: Distribution of the number of cigarettes consumed by respondents in 1 day

Members Who Consume Alcohol: The respondents 44, of as many as 16 (36.4%) of respondents had family members who consume alcoholic beverages, and as many as 28 (63.6%) of respondents have family members who do not consume alcoholic beverages.

The amount of Alcohol consumed in one day: Figure 3 shows that the 44 respondents, a total of 1 (2.3%) of the respondents had a family member that consume alcohol as much as < 1 or 2 bottles, as many as 12 (27.3%) of respondents have a member of family who consume alcohol as much as ½ bottle, as much as 3 (6.8%) of the respondents had a family member consume alcohol as much as > 2 bottles, and as many as 28 (63.6%) of respondents did not consume alcohol (not a drinker).

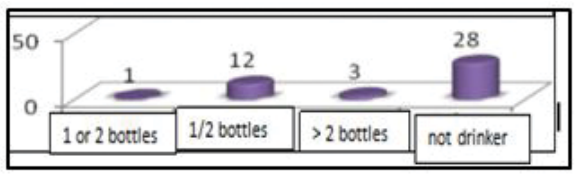


Figure 3: Distribution of the number of alcohol consume by the respondent

Physical activity or sport on a regular basis: The 44 respondents (KK), as many as 20 (45.5%) KK in KampungArmopa do physical activities, and as many as 24 (54.5%) KK more physical activities do not several residents interviewed in time about doing physical activity, they said that either a working in the farm is also physical activity. When lifting the result field is also the replacement exercise physical activity.

Diversified eating habits: The origin of the 44 Respondents, a total of 25 (56.8%) respondents said they eat rich food every day, and as many as 19 (43.2%) of respondents said that they did not eat the food varied each day.

The Use of Clean Water: The 44 respondents, as many as 3 (75.9%) of respondents use clean water for daily needs and a total of 11 (25.0%) did not use clean water for daily necessities.

The Number of Occupants Fit Wide Home: The number of residents in accordance with an area of the house is for 2 adults and 1 baby people require spacious 8 m^2. The 44 respondents, a total of 32 (72.7%) of respondents (KK) number of residents of her home in accordance with the floor area of the house and as many as 12 (27.3%) of respondents (KK) number of residents of her home not according to the floor area of the house.

The floor of the House rather than from the ground: The 44 Respondents, a total of 40 (90.9%) respondents to the floor of his home is not made from the ground and as many as 4 (9.1%) respondents to the floor of his house made of ground.

In The State House Yard Clean: The 44 respondents, a total of 28 (63.6%) of respondents in the Court of the conditions of her house is clean and as many as 16 (36.4%) of respondents in the state court of the condition of her home is not clean.

Garbage Dumps: The 44 Respondents, a total of 24 (54.5%) of respondents have a landfill in his house and as many as 20 (45.5%) respondents have no landfills.

Discussion

Based on the study, we could simplicity explain that:

a. From 44 respondents, a total of 10 (22.7%) of respondents Age fertile Couples use KB, as many as 29 (65.9%) of the respondents in the fertile age Couples don't use KB and 5 respondents (11.4%) is not fertile women.

b. As many as 29 (65.9%) of the respondents have family members who smoke, and as many as 15 (34.1%) of respondents have family members who do not smoke.

c. Of the 16 respondents, 44 (36.4%) of respondents had family members who consume alcoholic beverages, and as many as 28 (63.6%) of respondents have family members who do not consume alcoholic beverages.

d. From the 44 respondents (KK), as many as 20 (45.5%) KK in KampungArmopa do physical activities, and as many as 24 (54.5%) KK more physical activities do not.

e. The origin of the 44 Respondents, a total of 25 (56.8%) respondents said they eat rich food every day, and as many as 19 (43.2%) of respondents said that they did not eat the food varied daily.

f. Of the 44 Respondents, a total of 33 (75%) of respondents use clean water for daily needs and a total of 11 (25%) did not use clean water for daily necessities.

g. Of the 44 Respondents, a total of 28 (63.6%) of respondents in the Court of the conditions of her house is clean and as many as 16 (36.4%) of respondents in the State Court of the condition of her home is not clean.

h. Of the 44 Respondents, a total of 24 (54.5%) of respondents have a landfill in his house and as many as 20 (45.5%) respondents have no landfills.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES

1. ArwamHermanus. Waves Health Research, Yogyakarta. 2015.
2. ArwamHermanus. I Century of Health Development in Sarmi, Yogyakarta. 2015.
3. ArwamHermanus. Malaria in Papua 1884-2010, Yogyakarta. 2015.

4. ArwamHermanus. 180 Years of Health development in Tanah Papua, Yogyakarta. 2015.
5. ArwamHermanus. Qualitative Statistics, Yogyakarta. 2015.
6. AzrulAzwar. Health Administration and Policy, Jakarta. 2000.
7. Dedy Alamsyah. Health Service Management, Jakarta. 2011.
8. Noto Atmojo. Health Promotion and Behavioral Sciences, Jakarta. 2001.

Global Trend on Incivility Research

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ABSTRACT

Violation of workplace norms is perceived as incivility and could potentially bring negative consequences to psychological health and organizational attitudes. Given this, abundant research on incivility is conducted to look at the dynamics, causes, and outcomes of incivility and its negative impacts on employees' well-being. Up until this date, no work of bibliometric study has been carried out and published. Therefore, this paper aims to analyze, and reports published works related to incivility based on the data obtained from the Scopus online database. Using standard bibliometric indicators, this article reports the growth rate of publications, analysis of the citation, global trends and research productivity. A total of 594 valid published documents is retrieved and finalized based on selected keywords search results. The results show that there is an increased growth rate of incivility literature, particularly in nursing and health-related area. The plausible reason for this is the high attention given to organizational change derived from cultural differences, as can be seen from the cluster of countries with high and low interests in incivility research.

Keywords: *Incivility, bibliometric analysis, Scopus Database, mistreatment, health*

Introduction

Literature on incivility, which is also referred to as uncivil or antisocial behavior in the workplace, has received a lot of attention nowadays due to the increasing prevalence of academic incivility and the nature and evolution of organizational culture. The incivility as a form of interpersonal mistreatment where the intention to harm and violate norms of mutual respect are ambiguous[3]. In an organization, a moral understanding formed by universal norms and culture of respect allows cooperation and collaboration among its organizational members[15]. The violation of the norms and code of conduct is a starting point where an act is regarded and is perceived as uncivil.

For incivility to occur, instigators often use subtle and disguised forms of mistreatment in which the intention is not apparent. For this reason, it is more challenging to attribute the harm caused by instigators to the targets of incivility[16]. Similarly[10],argued that some instigators intentionally hide discriminatory intentions behind other forms of mistreatments, like bullying or aggression, to retain an egalitarian image and escape sanctions that are posited to them.

The incivility categorized into three types[17]. The first one is top-down incivility, which is an uncivil behavior by a higher-status individual towards someone of a lower status position within an organization. The second category, bottom-up incivility, is directed towards a person in a higher position by someone in a lower position, for example, a subordinate to the supervisor. The third is lateral incivility, which refers to uncivil acts between individuals in positions of equal status within an organization. Most research on incivility focuses on top-down incivility as individuals with power will use their position to mistreat individuals in the lower position. While top-down incivility is the most common type of incivility to occur, bottom-up and lateral incivility could also occur in low rather than high power distance countries.

According to the affective events theory (AET), there is a relationship between employees' internal influences,

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namely emotions and moods, and their reactions to daily work events[21]. Therefore, it is not surprising that many conceptual and empirical research suggests that any form of incivility is associated with various organizational attitudes and well-being, for example, decreased job satisfaction, burnout, life satisfaction, commitment and turnover intention to other institutions[1,14].

Similarly, the study by[6] extended the literature on interpersonal mistreatment in the workplace by examining the incidents, targets, instigators, and impact of incivility among 1180 public sector employees. They found that uncivil workplace experiences were associated with greater psychological distress from the thoughts of quitting more frequently. In a broader view, this brings a negative impact among the employees in four categories: physical, psychological, economic and social. Distinctively, the physical and psychological impacts are the most prevalent due to its severity that eventually causes financial loss, thus worth to be studied.

As of now, a related study of bibliometric analysis can be found on conflict management research by[4]. It is similar in the nature of violating the common norms by disagreement between two or more employees, and the psychological impacts it has on the victims. The focus of the paper is to propose theoretical foundations of conflict management of the field 2007-2017, specifically on the emerging concepts, themes and relationships of studies by laying out the intellectual structure. The present study, however, explores in wider scope by taking into consideration the geographical relationships, top journals, top authors and the annual growth of incivility. The current paper serves to complement the above-mentioned paper in the understanding of the evolution of interpersonal mistreatment in addition to identifying direction areas of conflict management at the workplace from the identified themes. In general, this study provides a comprehensive review and analysis on all types of publications related to incivility as published in Scopus online databases.

Method

This study used the data obtained from the Scopus database as of15th April 2019. Considering the fact that Scopus contains high indexed peer-reviewed documents[18], the most effective search engine[19], and the largest scholarly works database as compared to Pubmed or Web of Science, this study employs this database as a basis to extract published works on incivility. The focus of all the documents that have the word "incivility" in the title of the document for the period until 2018. As such, the following query has been specified in the search process: (TITLE (incivility)AND(EXCLUDE (PUBYEAR,2019))).This query generated a total of 594 documents for further analysis.

Analysis and Findings

Document and Source Type: The first analysis reports document type and source type of data. The document type can be defined as the original type of the published document, while source type refers to the source of that original document. There are 10 document types published on incivility on the Scopus database. Specifically, documents gathered are in the form of journal articles (468:78.8%), followed by book chapter (41:6.9%), review (24: 4.0%), conference paper (17:2.9%), note (13:2.2%) and article in press (12:2.0%), editorial (7:1.2%), letter (5:0.8%), book (4:0.7%) and short survey (3:0.5%).

For the source type of the documents gathered, most of the published documents are journals with 530 documents (89.23%), followed by books with 45 documents (7.58%), and conference proceedings with 12 documents (2.02%), book series (5:0.84%) and trade publications (2:0.34%). Publishing an article in a journal provides visibility, recognition, and as an excellent communication medium among the scientific community in the area of research. Besides, journal article also works as a stamp of approval than any other published documents as it is peered-review, and hence, gives plausible justifications on the top score.

Top Journal: This paper also presents the top journal based on the 530 journal articles retrieved from 1999 to the present. Since the nature of incivility is related to work of organizational psychology, and it impacts the well-being, it is of no surprise that 26 articles are published in the *Journal of Occupational Health Psychology*. The second top journals articles are published in is *Journal of Nursing Management* followed closely by *Journal of Nursing Administration*, showing that articles on incivility are many studies on nursing area. There are ten articles published each in *Journal of Applied Psychology*, *Journal of Nursing Education* and *Journal of Organizational Behavior.* Other works of incivility that focus on nursing can be seen from eight publication

in *Nursing Education Perspective*, closely follows by *Nurse Education Today*, *Nurse Educator* and *Nursing Management* with 6 published documents each sharing the same level with *Advances* and in *Developing Human Resources*, and *Work and Stress*.

Publication by Year and Annual Growth: Figure 1 shows the first document published on incivility begin in 1992 and grew steadily until 1999. The trend fluctuated between 2000 to 2006 and grew significantly from 13 documents in 2007 (11.62%) to 111 documents in 2018 (18.69%). Bases on Scopus records, [3]is the first published research on incivility. With the growing demands of incivility research, it is expected the number will be increased, aligned with the increasing awareness of mental health among employees.

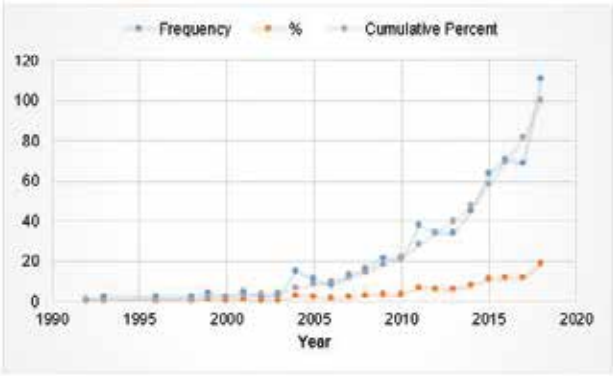


Figure 1: Publication Year and Annual Growth

Subject Area: Table 1 presents the published documents based on the subject area from 1992 until 2018. Most of the documents emerged in the subject area of social sciences with 253 documents (42.59%), followed by psychology with 152 documents (25.59%), and business, management and accounting with 140 documents (23.57%). Other subject areas include medicine, computer science, mathematics, and energy show a diverse range of subject areas. This table also provides an area of subjects that are lacking in incivility research and can be explored more to examine the similarities and differences of findings with another subject area.

Table 1: Frequency and Percentage by Subject Area (N = 594)

Subject Area	F requency*	%
Social Sciences	253	42.59
Psychology	152	25.59
Business, Management and Accounting	140	23.57
Nursing	122	20.54
Medicine	109	18.35
Arts and Humanities	52	8.75
Computer Science	23	3.87
Economics, Econometrics and Finance	22	3.70
Environmental Science	10	1.68
Engineering	9	1.52
Decision Sciences	8	1.35
Health Professions	6	1.01
Mathematics	5	0.84
Agricultural and Biological Sciences	3	0.51
Biochemistry, Genetics and Molecular Biology	3	0.51
Energy	2	0.34
Earth and Planetary Sciences	1	0.17
Immunology and Microbiology	1	0.17
Materials Science	1	0.17
Pharmacology, Toxicology and Pharmaceutics	1	0.17
Undefined	2	0.34

*Some documents are categorized in more than one subject area

Keywords Analysis: The network visualization of authors' keywords is demonstrated by color, circle size, font size, and thickness of connecting lines indicate the strength of the relationship among the keywords. The same color is used for related keywords and words that are commonly listed together[20]. For example, incivility, human, female, stress, interpersonal relations and job satisfaction are usually co-occurred together.

It also can be seen from Table 2 that female, male, adult, article, workplace, psychology, interprofessional relations, and public relations are among the keywords with the highest occurrences compare to the keywords specified in the search query, "incivility". However, if we count "human" as a single keyword by combining the keywords "human" and "humans", this keyword will represent more than 60% of the keywords used in the incivility literature.

Table 2: Frequency and Percentage by Top 20 Keywords (N = 1828)

Author Keywords	Frequency	%
Incivility	200	33.67
Human	196	33.00
Humans	161	27.10
Female	125	21.04
Male	119	20.03
Adult	116	19.53
Article	116	19.53
Workplace	95	15.99
Psychology	77	12.96
Interprofessional Relations	73	12.29
Public Relations	73	12.29
Workplace Incivility	66	11.11
Nursing Education	57	9.60
Social Behavior	54	9.09
Middle Aged	53	8.92
Bullying	51	8.59
Questionnaire	51	8.59
United States	51	8.59
Interpersonal Relations	47	7.91
Nursing Student	47	7.91

Geographical Distribution of Publications: Table 3 shows the top ten countries contributed in publishing works on incivility with the highest documents are produced from the United States with a total of 349 documents (58.75%), followed by Canada with 55 documents (9.26%), and the United Kingdom with 31 works (5.22%). With a clear pattern of higher research produced by certain countries, there could be to two plausible reasons. First, the country may be exercising laws on zero-tolerance policy on incivility. Second, cultural differences in power distance could be a factor. Low power distance, in which power between the employees is viewed similar regardless of the hierarchical positions, could be the cause for incivility to occur more frequently as compared to a country with a high-power distance, in which power between the employees is viewed differently.

Table 3: Frequency and Percentage by Top 10 Countries (N = 594)

Country	Frequency	%
United States	349	58.75
Canada	55	9.26
United Kingdom	31	5.22
Australia	30	5.05
South Korea	15	2.53
Singapore	13	2.19
China	11	1.85
Israel	11	1.85
Switzerland	11	1.85
Iran	10	1.68

Citation Analysis: Based on the 594 papers gathered from the Scopus database, there are a total 13663 citations obtained, with 506.04 citations per year. For the past 27 years (1992-2018), 23 citations per paper are reported with h-index of 54. Turning to Table 4 results, the most cited article is “Tit for tat? The spiralling effect of incivility in the workplace” by Andersson and Pearson (1992) with 1034 citations, and with an average of 51.7 per year. For the total of 10 top-cited articles, the total number of citations by Google Scholar is also reported for each of the articles.

Table 4: Top 10 Cited Articles and Citation Metrics

No.	Document title	Authors (Year)	Cited by	Cites per Year	GS Cites	GS Cites per Year
1.	Tit for tat? the spiralling effect of incivility in the workplace	Andersson & Pearson (1999)	1034	51.70	2350	126.5
2.	Incivility in the workplace: incidence and impact.	Cortina, Magley, Williams & Langhout (2001)	636	35.33	1499	83.28
3.	Perceived risk and fear of crime: Role of social and physical incivilities	Lagrange, Ferraro &Supancic (1992)	416	15.41	832	30.81
4.	Job stress, incivility, and counterproductive work behavior (CWB): The moderating role of negative affectivity	Penney & Spector (2005)	326	23.29	784	56

Conted…

5.	The new videomalaise: Effects of televised incivility on political trust	Mutz & Reeves (2005)	306	21.86	653	46.64
6.	Personal and Workgroup Incivility: Impact on Work and Health Outcomes	Lim, Cortina &Magley (2008)	287	26.09	646	58.73
7.	"Incivility, social undermining, bullying...oh my!": A call to reconcile constructs within workplace aggression research	Hershcovis (2011)	286	35.75	544	68
8.	Unseen injustice: Incivility as modern discrimination in organizations	Cortina (2008)	271	24.64	594	54
9.	Interpersonal mistreatment in the workplace: The interface and impact of general incivility and sexual harassment	Lim & Cortina (2005)	236	16.86	522	37.29
10.	On the nature, consequences and remedies of workplace incivility: No time for "nice"? Think again	Pearson & Porath (2005)	235	16.79	582	41.57

*GS: Google Scholar

Conclusion

The results from the study showed that incivility grabbed the attention of scholars in the field of social sciences, psychology and business, management and accounting. Yet, there are psychologists, for example, social and organizational psychologist, who regard themselves as social science researchers, hence the number of psychology subject area may be bigger than what it is claimed in Scopus. From data generated, researchers would be able to understand the importance of producing quality papers with multiple authors and also, would be able to identify the top authors that have similar interests around the globe. With that information, cross-cultural studies, for example, could be conducted to investigate the dynamic, experience, factors and impact of incivility between two or more cultures.

In spite of the specific nature of the bibliometric analysis, the study also has limitations that should be addressed to improve future research. First, the results only emerged from the specific keyword. The word "incivility" is chosen although there is a possibility that other researchers who use other phrases that carry similar meaning to incivility such as "interpersonal mistreatment" or "subtle aggression/harassment/ bullying". Therefore, there may be existing studies are excluded due to the specific scope of word used in the search query. It is also worth to note that there is no search query, which is 100% perfect[18]. Thus, false positive and negative results should be anticipated. Thirdly, this study is only focused on the Scopus database as the main source of the documents. Although Scopus is among the largest databases that indexes all scholarly works[2,18], it does not effortlessly cover all available sources. Other available databases probably can be included in future research such as Web of Science and Google Scholar. Despite these limitations, this study was among the first to analyze bibliometric indicators of incivility research.

Acknowledgment

This research is supported by University Research Grant (*GeranPenyelidikanUniversiti*) Sultan Idris Education University, 2016-0171-106-01.

Ethical Clearance: Taken from the committee

Source of Funding: University Research Grant (GeranPenyelidikanUniversiti) Sultan Idris Education University, 2016-0171-106-01

Conflict of Interest: Nil

REFERENCES

1. Abas N. A. H, Awang, Marinah. Online Incivility: Exploring from Malaysian Academic Perspective. International Journal of Academic Research in Business and Social Sciences.2018;7(12):1235-1245.

2. Ahmi A, MohamadR. Bibliometric Analysis of Global Scientific Literature on Web Accessibility. International Journal of Recent Technology and Engineering. 2019;7(6):250-258.

3. Andersson, L. M. Pearson, C. M.Tit for tat? The spiraling effect of incivility in the workplace. Academy of Management Review.1999;24(3):452-471.

4. Caputo, A., Marzi, G., Maley, J., Silic, M. Ten years of conflict management research 2007-2017: An update on themes, concepts and relationships. International Journal of Conflict Management.2019;30(1):87-110.

5. Cortina, L. M. Unseen injustice: Incivility as modern discrimination in organizations. Academy of Management Review.2008;33(1):55-75.

6. Cortina, L. M., Magley, V. J., Williams, J. H., &Langhout, R. D. Incivility in the workplace: incidence and impact. Journal of Occupational Health Psychology,2001;6(1):64.

7. Hershcovis, M. S. "Incivility, social undermining, bullying… oh my!": A call to reconcile constructs within workplace aggression research. Journal of Organizational Behavior, 2011;32(3):499-519.

8. LaGrange, R. L., Ferraro, K. F., Supancic, M. Perceived risk and fear of crime: Role of social and physical incivilities. Journal of Research in Crime and Delinquency.1992;29(3):311-334.

9. Lim, S., & Cortina, L. M. Interpersonal mistreatment in the workplace: the interface and impact of general incivility and sexual harassment. Journal of applied psychology,2005;90(3):483.

10. Lim, S., Cortina, L. M., &Magley, V. J. Personal and workgroup incivility: Impact on work and health outcomes. Journal of Applied Psychology. 2008;93(1):95.

11. Mutz, D. C., & Reeves, B. The new videomalaise: Effects of televised incivility on political trust. American Political Science Review.2005;99(1):1-15.

12. Pearson, C. M., & Porath, C. L. On the nature, consequences and remedies of workplace incivility: No time for "nice"? Think again. Academy of Management Perspectives. 2005;19(1): 7-18.

13. Penney, L. M., & Spector, P. E. Job stress, incivility, and counterproductive work behavior (CWB): The moderating role of negative affectivity. Journal of organizational behavior. 2005;26(7):777-796.

14. Piotrowski, C., & King, C. The enigma of adult bullying in higher education: A research based conceptual framework. Education. 2016;136(3):299-306.

15. Porath, C. L., Gerbasi, A., Schorch, S. L. The effects of civility on advice, leadership, and performance. Journal of Applied Psychology.2015;100(5):1527.

16. Reich, T. C., &Hershcovis, M. S. Observing workplace incivility. Journal of Applied Psychology. 2015;100(1),203.

17. Schilpzand, P., De Pater, I. E., &Erez, A. Workplace incivility: A review of the literature and agenda for future research. Journal of Organizational behavior. 2016;37:S57-S88.

18. Sweileh, W. M., Al-Jabi, S. W., AbuTaha, A. S., Zyoud, S. H., Anayah, F. M. A., &Sawalha, A. F. Bibliometric analysis of worldwide scientific literature in mobile - health: 2006–2016. BMC Medical Informatics and Decision Making.2017;17(1):72.

19. Tober, M. PubMed, ScienceDirect, Scopus or Google Scholar – Which is the best search engine for an effective literature research in laser medicine? Medical Laser Application. 2011;26(3):139-144.

20. van Eck, N. J., & Waltman, L.VOSviewer manual. Leiden: Univeristeit Leiden.2013;1(1).

21. Weiss, H. M., &Cropanzano, R. Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work.1996;

A New Approach to Detect Macular Hole from Optical Coherence Tomography Images

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ABSTRACT

Introduction: Macular hole is a tear or break in the macula, located in the center of the retina. A macular hole affects central vision of human; the vision will be wavy, blurry and distorted. Macular hole commonly affects aged women.

Aim: Optical Coherence Tomography (OCT) enables accurate diagnosis of macular hole. Existing algorithms available related to finding layers and cyst detection, but identifying macular hole in an accurate manner is still a missing entity. Hence we propose a fully automated system for the accurate macular hole identification.

Method: Ee propose a fully automated system for the accurate macular hole identification. The proposed methodology has six stages in process. The first stage starts with preprocessing the OCT image, then by Nerve Fiber Layer (NFL) detection. The detected NFL layer is then processed using our proposed method.

Result & Conclusion: It helps to identify the macular hole from the OCT images. The proposed methodology is evaluated with the health macula and macular hole OCT images. By experimentation results, the proposed algorithm provides 87% accuracy in finding macular hole.

Keywords: *Biomedical Imaging, Macular Hole, Optical Coherence Tomography (OCT).*

Introduction

Optical Coherence Tomography (OCT) imaging tool can be used to identify variety of retinal diseases, including macular holes, glaucoma, pigment epithelium and macular edema and, by visualizing the retinal layers [1,2]. Several methods have been proposed for identifying the fluid associated abnormalities, intra retinal Cystoid Macular Edema (CME) and automatic retinal layer segmentation from OCT images [3,4]. Although a number of automatic image processing techniques have been proposed to identify anomalies in the macula, there is no technique to identify macular hole from OCT images [5,6].

In this paper, we proposed a new method to automatically detect macular hole from OCT images. In this work, we considered HD-OCT retinal images for macular hole identification. This paper is organized into the following sections: in section two, the proposed methodology is exposed for automatic macular hole detection. The experimental results obtained by the proposed method are analysed in section three and conclusions and future works are presented in the fourth section.

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Proposed Methodology

The steps involved in our proposed methodology, in sequence, are: Grayscale conversion, image filtering, binary image conversion, morphological operation, extracting boundary, NFL layer extraction, calculating the depth using the proposed algorithm, macular hole detection [7,8]. The block diagram of the proposed methodology is depicted in Fig.1. From the block diagram of the proposed system presented in Fig. 1, there are six stages:

1. Input OCT image
2. Preprocessing
3. Extracting Layer Boundary

4. NFL layer segmentation
5. Updating Color above NFL layer
6. Macular hole identification

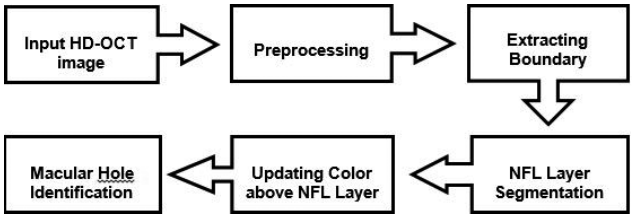


Fig. 1: Block Diagram of Proposed System

The entire stages of the proposed system are implemented in MATLAB version R2013a, MathWorks, Inc. It is a fully automated system the only user input is the HD-OCT image. Each stage of the proposed methodology is described sequentially as follows:

Preprocessing: Initially, the input HD-OCT retinal images are obtained from the Cirrus HD-OCT System as shown in fig. 2. Then, the HD-OCT B-Scan image is loaded into the proposed system. To use the images for analysis, we converted the color image to a grayscale image as shown in fig. 3 and the pixel values are converted to a full range between 0 and 1. This normalized image is then processed and the formation of macular hole is identified using the proposed methodology. To remove the noise, the median filter is applied on the normalized image and obtained the filtered image, fig. 4.

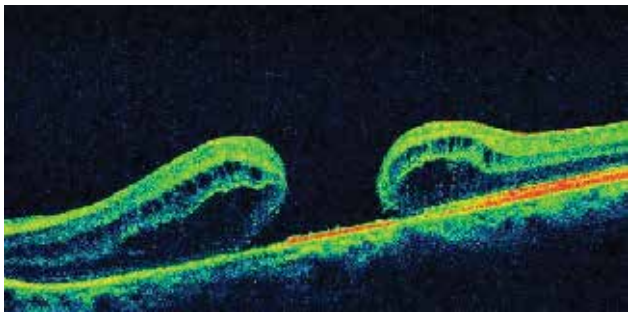


Fig. 2: Input OCT B-Scan image

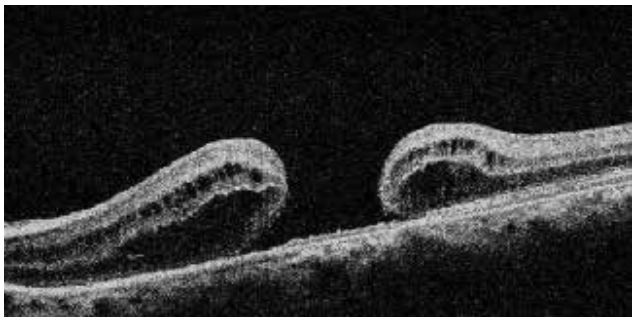


Fig. 3: Gray scale image

Extracting Boundary: Extracting retinal layer boundary is an important process to identify retinal diseases from HD-OCT images. The filtered image is then converted to binary image[9]. The morphological close operation is then performed on the binary image, to close discontinuity of the NFL layer, with disk size 10 and obtained the output image. Then the boundaries are extracted from the output image.

NFL Layer Segmentation: The steps involved in NFL layer segmentation are as follows: retinal layer boundary selection and NFL layer extraction. Discrete numbers of continuous regions are identified from the retinal B-scan image. To detect the NFL layer, at first the valid layer boundary should be identified from the discrete number of contiguous regions in the image. In the discrete number of contiguous regions, the longest length region is the analysis area. So the longest length region is selected from the regions. Then, the NFL layer is extracted from the longest length region.

Updating Color above NFL Layer: The colors above the extracted NFL layer are changed to black on the grayscale image by setting the pixel value to zero. Then, the proposed methodology is applied on the image for identifying macular hole, fig. 4.

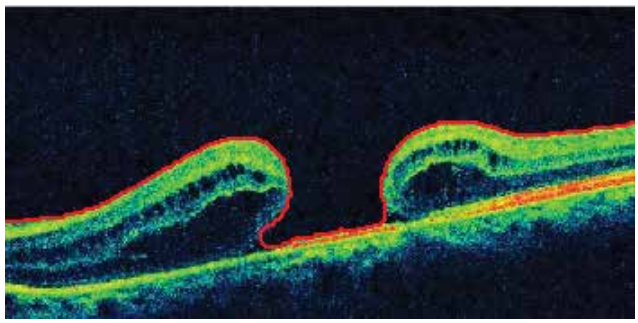


Fig. 4: NFL layer overlying on input image

The pseudo code for updating the color above NFL layer is:

```
Function UpdateColorAboveNFL(Image I)
For each boundary pixels p(x,y) do
For j=1 to y-1
I(x, j)=0
Next j
End
```

Where, x is the column value and y is the row value.

Macular Hole Identification: The proposed algorithm checks the continuous black color of the image from left to right columns. Then the depth difference of two adjacent columns is calculated. If the difference is greater than the threshold value, the counter value is incremented and checks the counter value. The function returns true if the counter value is two true otherwise the process is repeated till the last column and finally returns false. If the function returns true then macular hole is found in the HD-OCT image otherwise macular hole is not found.

```
Function IsMacularHole(Image I)
Count=0
For j = 1 to width(I)
    d1 = Cm
    d2 = Cn
    If (|d1-d2|>20) then
        Count=Count+1
        If (Count==2) then
            Return true
        End if
    End if
Next j
Return false
End
```

Where,

C_m - Number of continuous zeros from the top of the image on j^{th} column.

C_n - Number of continuous zeros from the top of the image on $(j-1)^{th}$ column.

Experimental Results

OCT Data Set: In this research work, we used the local data set acquired from the hospital. This local data set contains 100 HD-OCT images (50 healthy macula and 50 Macular hole).

Evaluation of Proposed System: The proposed system is applied to the B-scan images with the macular hole and healthy macula. The proposed system correctly detects the macular hole in both the cases. Table 1 shows the result of the proposed system on macular hole identification and fig. 5 shows the analysis of the proposed system on macular hole identification.

Table 1: Result of macular hole identification

Input HD-OCT Images	No. of Input Images	No. of Correct Diagnosis	No. of Incorrect Diagnosis
Macular Hole	50	41	9
Healthy macula	50	46	4

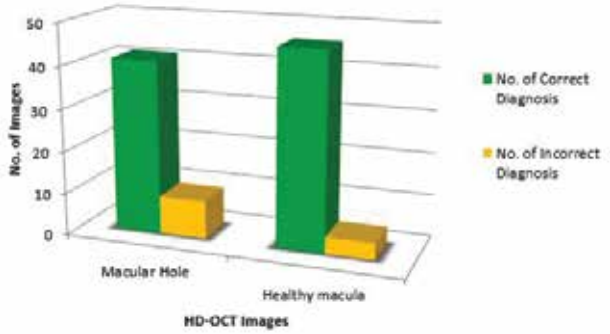


Fig. 5: Analysis of proposed system on macular hole identification

The confusion matrix of the proposed system is shown in Table 2. For evaluation, we used 100 HD-OCT images (50 images with macular hole and 50 healthy macula images).

Table 2: Confusion matrix of proposed system

		Predicted	
	N = 100	Negative	Positive
Actual	Negative	TN = 46	FP = 4
	Positive	FN = 9	TP = 41

Then, the accuracy, error rate, sensitivity, specificity and precision of the proposed system are calculated:

Accuracy = (TN+TP)/N = 0.87

Error Rate = (FP+FN)/N = 0.13

Sensitivity = TP/(FN+TP) = 0.82

Specificity = TN/(TN+FP) = 0.92

Precision = TP/(FP+TP) = 0.91

Thus, the accuracy of the proposed system is 87%, error rate is 13%, sensitivity is 82%, specificity is 92% and precision is 91%.

Conclusion and Future Work

A new efficient, fully automated system for identifying macular hole from OCT images is presented. This methodology is evaluated by applying the method

on healthy macula and macular hole HD-OCT images. All the six modules have been implemented in MATLAB and the proposed system given accurate results for identifying macular hole. This proposed methodology gives 87% accuracy, 82% sensitivity and 92% specificity for identifying macular hole from HD-OCT images. This proposed method gives wrong output if the NFL layer is not identified correctly. In future, this method can be evaluated by applying the method on the retinal HD-OCT images affected with other retinal diseases, such as Central Serous Chorioretinopathy (CSCR), Macular Edema (ME) and Pigment Epithelial Detachment (PED). Machine learning algorithms can also be used to improve the accuracy for identifying macular hole from the OCT images.

Acknowledgements

The authors are grateful to the Bharathiar University, Coimbatore for providing necessary laboratory facilities.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

Ethical Clearance: Ethical clearance is taken from advisory committee, Bharathiar University, Coimbatore.

REFERENCES

1. Puliafito CA, Hee MR, Lin CP, Reichel E, Schuman JS, Duker JS, Izatt JA, Swanson EA, Fujimoto JG. Imaging of macular diseases with optical coherence tomography. Ophthalmology. 1995 Feb 1;102(2):217-29.
2. Hee MR, Izatt JA, Swanson EA, Huang D, Schuman JS, Lin CP, Puliafito CA, Fujimoto JG. Optical coherence tomography of the human retina. Archives of ophthalmology. 1995 Mar 1;113(3):325-32.
3. Wilkins GR, Houghton OM, Oldenburg AL. Automated segmentation of intraretinal cystoid fluid in optical coherence tomography. IEEE Transactions on Biomedical Engineering. 2012 Apr;59(4):1109-14.
4. Wang J, Zhang M, Pechauer AD, Liu L, Hwang TS, Wilson DJ, Li D, Jia Y. Automated volumetric segmentation of retinal fluid on optical coherence tomography. Biomedical optics express. 2016 Apr 1;7(4):1577-89.
5. Wu M, Chen Q, He X, Li P, Fan W, Yuan S, Park H. Automatic subretinal fluid segmentation of retinal SD-OCT images with neurosensory retinal detachment guided by enface fundus imaging. IEEE Transactions on Biomedical Engineering. 2017 Apr 18;65(1):87-95.
6. Zhang L, Zhu W, Shi F, Chen H, Chen X. Automated segmentation of intraretinal cystoid macular edema for retinal 3D OCT images with macular hole. In2015 IEEE 12th International Symposium on Biomedical Imaging (ISBI) 2015 Apr 16:1494-1497.
7. Shi F, Chen X, Zhao H, Zhu W, Xiang D, Gao E, Sonka M, Chen H. Automated 3-D retinal layer segmentation of macular optical coherence tomography images with serous pigment epithelial detachments. IEEE transactions on medical imaging. 2014 Sep 24;34(2):441-52.
8. Yazdanpanah A, Hamarneh G, Smith BR, Sarunic MV. Segmentation of intra-retinal layers from optical coherence tomography images using an active contour approach. IEEE transactions on medical imaging. 2010 Oct 14;30(2):484-96.
9. Liu YY, Chen M, Ishikawa H, Wollstein G, Schuman JS, Rehg JM. Automated macular pathology diagnosis in retinal OCT images using multi-scale spatial pyramid and local binary patterns in texture and shape encoding. Medical image analysis. 2011 Oct 1;15(5):748-59.

Synthesis and Characterization of Graphene Quantum Dots from Turmeric Powder *(Berberisaristata)* and Its Biomedical Applications

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ABSTRACT

Introduction: A facile, eco-friendly and large scale amenable extracellular biological synthesis of GQD was achieved by using the natural products of Berberisaristata (turmeric), as the reducing agents.

Aim: The aqueous silver ions, when exposed to Berberis aristata, Curcumin longa and Curcuma aromaticawere reduced and resulted in the biosynthesis of Graphene Quantum Dots size range from 80 to 195 nm.

Method: The Graphene Quantum Dots were characterized by UV-Vis, XRD, FT- IR, SEM. Synthesized GQDs and biomass of Berberis aristata, Curcuma longa, and Curcumin aromaticawere evaluated for their anti-inflammatory properties.

Result & Conclusion: Carrageenan-induced paw edema animal model evaluations found excellent for GQDs. Decisively, the inevitability of development of these GQDs could be recommended for their further investigations as an effective anti-inflammatory, cytotoxicity therapeutics, biocatalyst and nano particle with drug complex.

Keywords: *Berberis aristata, Curcuma longa, Curcuma aromatica, GQDs, Anti-inflammatory.*

Introduction

Nanotechnology can be well-defined as the handling of atom by atom from the material world by the grouping of engineering, chemical and biological approaches. Solicitation of nano scale material and structures are typicallyreaching from 1-100 nm and is evolving zone of nano science and nanotechnology [1]. Nanotechnology is innovativemeadow just its onset, the tendency in the followingeras being its involvement with the green chemistry approach.[2] Utmost of the recent approaches are generally employed by the use of physical or chemical main beliefs to synthesize metal nanoparticles. Both research methods are not ecofriendly due to many downsides such as the occurrence of noxious organic solvents, manufacture of hazardous by-products and transitional compounds and great energy consumption [3].Though nanoparticles can be synthesized overrange of conventional methods biosynthesis methods are good competent over the physical and chemical techniques. Green principle way of synthesizing takearisen as substitute to stunned the control of expected techniques. Curcumin has constraint for anticancer analysissince of its unfortunate solubility in aqueous solution and its poor bioavailability in complete circulation. Polymer-based nanoparticles consuming chitosan is one of the process which takesexisted to enhance curcumin solubility and

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bioavailability.[4] The prepared nanoparticles of curcumin by ionic gelation processby means ofsmallgelatinous chitosan and tripolyphosphat at severalmeditations, Curcumin nanoparticles has characterized for their particle size, zeta potential, morphology and entrapment efficiency. Likewise, curcumin nanoparticles evaluated on behalf of their stability in artificial gastric fluid (AGF) and artificial intestinal fluid (AIF), cytotoxic effect and cellular uptake on HeLa cell lines.[5,6] *Berberis aristata*is also known as tree turmeric. It act as a chillingpurgative to children. The stem is believed to diaphoretic and laxative and beneficial in rheumatism. The dehydrated extract of the roots is applied in ophthalmia. It is also an admirablemedicine in the example of sun-blindness. The bark of its root is a valuedremedy in recurrent and remittent fevers. *Berberis aristata* is widely used in ayurvedic medicines for inflammation, wound healing, skin disease, menorrhagia, diarrhea, jaundice and affection of eyes [7]. This plant have active pharmacological action in anti-diabetic, anti-cancer, anti-microbial, anti-inflammatory [8]. Both Aqueous and alcoholic extract of *Berberis aristata* reportedsignificant anti-inflammatory activity on acute inflammation process [9, 10] the nanoparticles are not yet reported for*Berberis aristata.* In this study, the Graphene Quantum Dotswere synthesized by using and tree turmeric (*Berberis aristata*). It is characterized by UV-Visible spectroscopy, FT-IR, SEM, XRD, HORIBA-the nanoparticle analyzer. Synthesized Graphene Quantum Dots were evaluated for*in vivo* and *in vitro* anti-inflammatory activity.

Materials and Method

Synthesis: The *Berberis aristata* have been cleaned, crushed and arid in a hot-air oven at 80. After drying, 0.1 g of *Berberis aristata* sample is taken with 1 ml of hydrazine hydrate also dissolved in 10 ml of water in an ultrasonic water bath around half an hour. This solution was transferred to a 25 ml Teflon lined stainless autoclave. This was then heated between 150-200 in an electric oven and kept for 6-10 h additionally. This water-soluble GQD product sample was cooled to 37°c and then drained via 0.22 mm micro-porous membrane to expel the insoluble carbon products from the sample. Further, these samples were dialyzed using a dialysis bag for 2 days to expel the un fused small molecules from the sample. These purified black colored GQDs were later dried at 80 with a yield of nearly 33% and moreover utilized for basic portrayal and property measurements.

Characterization of Graphene Quantum Dots

UV – Vis and FTIR spectroscopy analysis: UV-visible spectro photometric analysis was conducted on the *Berberis aristata* extract using a UV-visible spectrophotometer (Perkin Elmer, USA Model: Lambda 950) with a slit width of 2nm, using a 10-mm cell at room temperature. The extract was examined under visible and UV light in the wavelength ranging from 300-800nm for proximate analysis. For UV-VIS spectrophotometer analysis, the extract was centrifuged at 3000 rpm for 10 min and filtered through Whatman No. 1 filter paper. The sample is diluted to 1:10 with the same solvent.

X-Ray Diffraction: The crystallinity and phase purity of the synthesized GQDs was analyzed by using X-ray diffraction (XRD) analysis. X-ray diffraction pattern was observed by using Shimadzu (XRD -6000, Japan) instrument. X-ray pattern equipped with Cu K _ radiation (_ = 1.5406 Å)with the targeted voltage of 45 kV and current of 40 mÅ.

FTIR: Fourier transform infrared (FTIR) was used to identify the characteristic functional groups in the extract. It provides the information about the structure of a molecule could frequently be obtained from its absorption spectrum. A small quantity of the *Berberis aristata* extract was mixed in dry potassium bromide (KBr). The mixture was thoroughly mixed in a mortar and pressed at a pressure of 6 bars within 2 min to form a KBr thin disc. Then the disc was placed in a sample cup of a diffuse reflectance accessory. Fig 2 shows that The IR spectrum was obtained using Bruker, Germany Vertex 70 infrared spectrometer. The sample was scanned from 4000 to 400 cm-1. The peak values of the UV-VIS and FTIR were recorded.

Acute Toxicity Studies: Acute toxicity was carried out according to OECD guideline. Wistar rats (100 ± 10 gm) either sex were divided into four groups with three animals each in a group (n=3). The animals fasted overnight and test compounds were administered orally. The animals were examined daily up to an 8-10th day for the behavioral change or mortality.

Carrageenan-induced Rat Paw Edema Studies: As we reported earlier, Wistar rats (100 ± 10 gm) of either sex were weighed and randomized into 5 groups (n=6). The initial volume of the right paw of each animal was determined using a plethysmometer (UGO Basile, 7140). Animals were starved for 12 h and to ensure uniform hydration, the rats received 5 ml of water by stomach tube. Group I served as control (Vc), Group II received Indomethacin (10 mg/kg), and Group III to VI

was received GQD, GQD+plant biomass suspensions in different doses (5and 10 mg/kg). 30 minutes later, 0.1 ml of 1% w/v freshly prepared λ-carrageenan in saline injected into the plantar side of the left hind paw. The paw volume (Vt) was measured every 30 min up to 2 h (Vigneshwaran N et al. 2008). % inhibition of each group was determined using the following formulae:

$$\% \text{ Inhibiltion} = (Vc - Vt/Vc) \times 100$$

Where, Vc = mean variation of edema for the control group; Vt = mean variation of edema.

Statistical Analysis: All results were expressed as percentage decrease with respect to control values and compared by one-way ANOVA with Dunnett's post test was performed. GraphPad Prism version 7.1 for Windows, GraphPad Software, San Diego California USA, www.graphpad.com was used for statistical analysis. A difference was considered statistically significant if $p \leq 0.05$.

Results and Discussions

Biosynthesis of Graphene Quantum Dots: As depicted in Fig. 1, shows that biosynthesis of Graphene Quantum Dots observed by the color change caused by the reduction in the reaction mixture. The pale yellow to deep green color in solution revealed the formation of GQDs. Evidently, the presence of metabolites in the plant biomass exposed to silver may possibly diminish silver ions, obviously representing that the reduction of the ions happens during electron shuttle or through reducing agents present in the solution.

Characterization of Graphene Quantum Dots

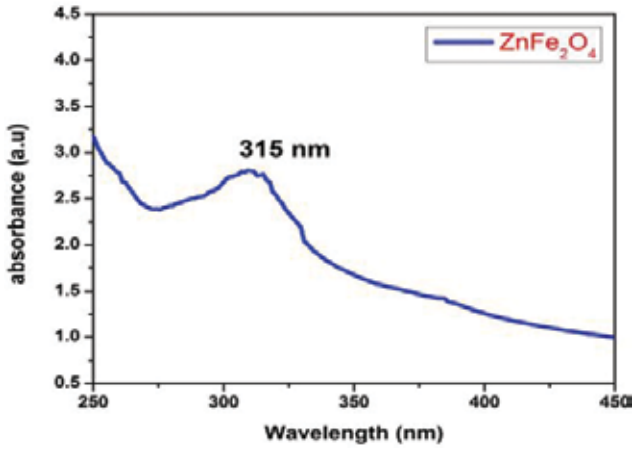


Figure 1: UV-Visible absorption spectra of Graphene Quantum Dots

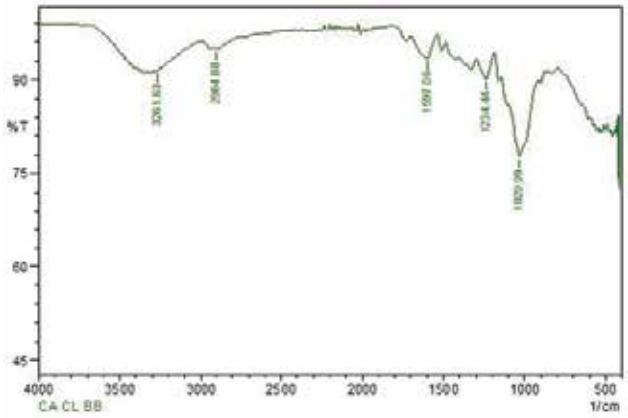


Figure 2: FT-IR Spectrum of Graphene Quantum Dots

X-RAY Diffraction Studies: The biosynthesized silver nanostructure by employing plant extract was further demonstrated and confirmed by the characteristic peaks observed in the XRD image Fig. 3 shows that it showed characteristic peaks near the 2θ value of 38.84°. A Bragg reflection corresponding to (111) sets of lattice planes are observed which may be indexed based on the face-centered cubic (fcc) structure of silver [Dubey et al., 2009]. The XRD pattern thus clearly shows that the Graphene Quantum Dots are crystalline in nature. In addition to the Bragg peak representative of fcc silver nanocrystals, unassigned peaks were also observed suggesting that the crystallization of bio-organic phase occurs on the surface of the Graphene Quantum Dots. XRD results for the GQD found with θ value (degree) of 19.104, d-spacing (Å) 2.352, FWHM (degree) 0.68, intensity (counts per second) 85.81. Crystallite size of Graphene Quantum Dots as estimated from the full width at half maximum (FWHM) of the (111) peak using the Scherrer's formula exhibited average particles size of 20.71 nm.

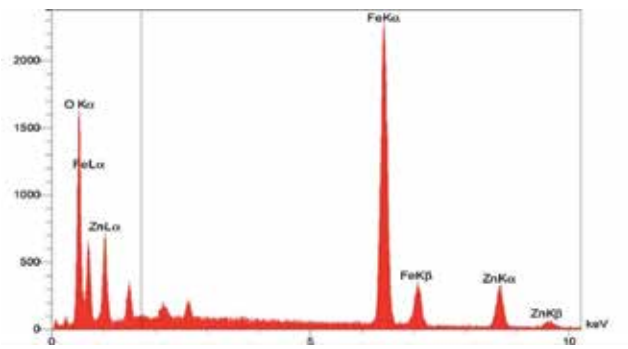


Figure 3: X-ray diffraction of Graphene Quantum Dots

Electron Microscope Studies (SEM): SEM image demonstrates the entity silver particles plus numerous

aggregates. There was no straight contact within the aggregates was found which indicates the stabilization of the nanoparticles by a ceiling agent which are may be the proteins secreted by plant extracts. The existence of secondary materials capping with GQDs may be allocated to bio-organic compounds from plant extracts. Grid shows the cone shaped Graphene Quantum Dots in the range of 80-150 nm in size Fig 4 shows that analysis additionally confirms that the nanoparticles don't comprise any straight contact even within the aggregates.

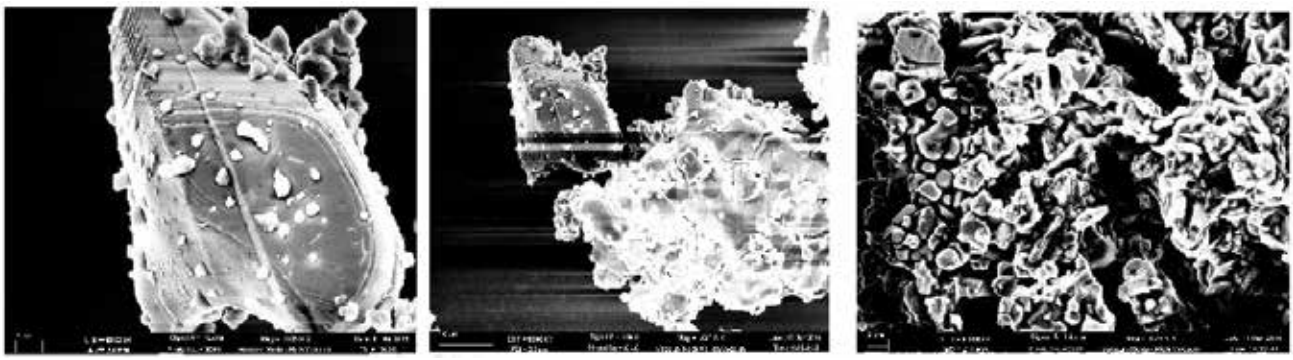


Figure 4: a-d SEM image of Graphene Quantum Dots

Results of carrageenan-induced paw edema studies: From the observations Table 1 shows that GQD and indomethacin results were excellent for anti-inflammatory activity. The average percentage inhibition (Mean ± SD % Reduction) in paw edema after 3 hours was recorded as 73 ± 0.74 for indomethacin and 78 ± 0.88 (GQD). A moderate activity found as 63 ± 1.28 for GQD+ *Berberis aristata*. plant biomass alone was totally inactive for the activity.

Table 1: Effect of indomethacin and 4a-l in the carrageenan-induced rat paw edema

Group	Dose (ml/kg)	Edema Volume in mL Mean ± SD[#] %				
		1½hr	2 hr	2½ hr	3 hr	Reduction
Control	5 ml/kg	0.38 ± 0.01	0.34 ± 0.02	0.40 ± 0.01	0.36 ± 0.01	-
Indomethacin	10 mg/kg	0.23 ± 0.02	0.15 ± 0.01*	0.14 ± 0.01*	0.12 ± 0.01*	73 ± 0.74*
Plant	10 mg/kg	-	-	-	-	-
GQD	10 mg/kg	0.19 ± 0.01	0.17 ± 0.01*	0.11 ± 0.01*	0.12 ± 0.01*	78 ± 0.88*
	50 mg/kg	0.18 ± 0.02	0.15 ± 0.01*	0.13 ± 0.01*	0.11 ± 0.01*	
GQD+plant	10 mg/kg	0.38 ± 0.01	0.37 ± 0.01*	0.31 ± 0.01*	0.21 ± 0.01*	63 ± 1.28*
	50 mg/kg	0.39 ± 0.02	0.38 ± 0.01*	0.20 ± 0.01*	0.20 ± 0.01*	

[#] Standard Deviation, n=3, (one-way ANOVA), statistically significant from control *p<0.001

Results of acute toxicity study: OECD guideline for testing of chemicals (guideline 423) was used to determine the acute toxicity and the results showed that there was no mortality or any significant change in the behavior of the mice recorded up to the dose of 200mg/kg. Based on the results of the preliminary toxicity testing, the doses of the compounds were decided to be 10-100 mg/kg body weight of the rats.

Discussion

Present study targeted the biosynthesized silver nanoparticle (GQDs) as the anti-inflammatory therapeutics. From the literature, anti-inflammatory mechanisms of GQDs' may recognize in evidence through their earlier successful capabilities to decrease lymphocyte and mast cell infiltration, stimulate apoptosis in inflammatory cells, decrease cytokine discharge and matrix metalloproteinase GQDs have evidently distorted the expression of proinflammatory cytokines which are converting growth factor and tumor necrosis factor in dermatitis induced swine model GQDs effectively attenuated nasal symptoms in the allergic rhinitis mice and the inflammatory cell permeation and goblet cell hyperplasia were also inhibited. By not only restricting bacterial growth, GQDs also improved

therapeutic effects of chronic leg ulcers by restricting further inflammation when they are applied through wound dressings. In the carrageenan-induced rat paw edema animal model evaluations, by comparing with a standard drug, GQDs were recognized as precious anti-inflammatory therapeutics. They are bio-originated, feasible for large-scale and only required in nM for their therapeutic usages.

Conclusion

The biosynthesis of nano-material offers a priceless involvement to nanobiotechnology. In the present study, bio-reduction of aqueous Ag+ ions by using *Berberis aristata* extracts has been demonstrated and the biosynthetic methods have been examined as an alternative to chemical and physical methods. *B. aristat* to be a significant biological ingredient for extracellular biosynthesis of stable Graphene Quantum Dots. The reduction of the metal ions by *B. aristata,* extracts leads to the formation of GQDs of moderately healthy distinct dimensions. *In vitro* and *in vivo* biological evaluations of GQDs proved their therapeutic potentials evidently. From these valuable findings, our future desire to evaluate the post-inflammatory expression, pharmacodynamics/ pharmacokinetics (PD/PK) studies after administrating the GQDs prompted. Also desire this nano particles for further biological evaluations.

Acknowledgements

The authors are grateful for the SIF (Sophisticated Instrumentation Facility), School of Bio-Science and Technology (SBST), VIT University for providing necessary laboratory facilities and financial assistance.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

Ethical Clearance: Ethical clearance is taken from advisory committee, Department of Nanotechnology, Noorul Islam University.

REFERENCE

1. Aloukos P, Papagiannouli I, Bourlinos AB, Zboril R, Couris S. Third-order nonlinear optical response and optical limiting of colloidal carbon dots. Optics express. 2014 May 19;22(10):12013-27.
2. Choi J, Reipa V, Hitchins VM, Goering PL, Malinauskas RA. Physicochemical Characterization and In V itro Hemolysis Evaluation of Silver Nanoparticles. Toxicological Sciences. 2011 Jun 7;123(1):133-43.
3. De B, Karak N. A green and facile approach for the synthesis of water soluble fluorescent carbon dots from banana juice. Rsc Advances. 2013;3(22):8286-90
4. Gedda G, Pandey S, Bhaisare ML, Wu HF. Carbon dots as nano antennas for anti-inflammatory drug analysis using surface-assisted laser desorption/ ionization time-of-flight mass spectrometry in serum. RSC Advances. 2014;4(72):38027-33.
5. Guo X, Wang CF, Yu ZY, Chen L, Chen S. Facile access to versatile fluorescent carbon dots toward light-emitting diodes. Chemical communications. 2012;48(21):2692-4.
6. Han S, Zhang H, Xie Y, Liu L, Shan C, Li X, Liu W, Tang Y. Application of cow milk-derived carbon dots/Ag NPs composite as the antibacterial agent. Applied Surface Science. 2015 Feb 15;328:368-73.
7. Hsu PC, Shih ZY, Lee CH, Chang HT. Synthesis and analytical applications of photoluminescent carbon nanodots. Green Chemistry. 2012;14(4):917-20.
8. Huang P, Lin J, Wang X, Wang Z, Zhang C, He M, Wang K, Chen F, Li Z, Shen G, Cui D. Light-triggered theranostics based on photosensitizer-conjugated carbon dots for simultaneous enhanced-fluorescence imaging and photodynamic therapy. Advanced Materials. 2012 Sep 25;24(37):5104-10.
9. Kovacic P, Somanathan R. Nanoparticles: toxicity, radicals, electron transfer, and antioxidants. InOxidative Stress and Nanotechnology 2013 (pp. 15-35). Humana Press, Totowa, NJ.
10. Li F, Tian F, Liu C, Wang Z, Du Z, Li R, Zhang L. One-step synthesis of nanohybrid carbon dots and TiO 2 composites with enhanced ultraviolet light active photocatalysis. RSC Advances. 2015;5(11):8389-96.

Development of Novel Classifying System to Identify the Right Sense of Image Sharing in Social Networks Using Deep Convolution Neural Network

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ABSTRACT

Introduction: The use of social networks differs according to the socio-cultural, demographic and psychological aspects of individuals. People share photos and feel that they satisfy their needs of belonging along with the groups they have joined. Social media is not only a domain of freedom where individuals express themselves overtly or secretly, but also an area where several ways of violence emerge or even a means used for some aspects of violence.

Aim: Being an interactive medium and addressing quite a large number of users, social media issue has become rather sophisticated and problematic. Developed a system to identify abusing images shared/ posted by an individual on a people/group based on common language, race, sexual preferences, religion, or nationality.

Method: We investigate a new paradigm from machine learning, namely deep machine learning by examining design configurations of deep Convolutional Neural Networks (CNN) and the impact of different hyper-parameter settings towards identifying the negative aspects in social networks.

Result & Conclusion: Deep CNN automatically generate powerful features by hierarchical learning strategies from massive amounts of training data with a minimum of human interaction or expert process knowledge.

Keywords: *Deep Convolutional Neural Networks (CNN), Social Networks, Softmax, image classification.*

Introduction

We live in a world where the whole thing is an illustration or an illusion. The matrix is real and always with us. Then, who cares what is right or wrong? Despite the use of easiness it provides to share different views and emotions, we can hardly say that social networks has noticeably changed and shaped the real world. Twitter, Facebook and the other social networks function as platforms where individuals express their opinions about anything, anytime. Nevertheless, certainty and continuity of these ideas are quite debatable[1]. Instantaneous approvals and quick transformations with regard to different ideas make us question the reliability of this medium.

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Recently, the new trend called internet banging, has been reported by media, in which persons caught up in gangs or neighborhood factions use social media sites such as Twitter and Facebook to make threats of violence which may result in slaughter or ill-treatment. These examples clearly indicate the extremities of the Internet abuses [2]. Cyber-bullying can be defined as harassment which is exercised by using electronic technology including “mobiles, computers, and tabs as well as communication tools including social media, text messages, chat, and websites intractable and recurring damage inflict through the use of electronic devices”.

Social media gives every person the chance to carve their own scenarios and turn into heroes or heroines[3]. The way these people use social networks would naturally differ as these scenarios are written by those having different values. Probably social networks makes everything, either positive or negative, is the world more

conspicuous or normal [4]. A social media produce the associations surrounded by a native structure of meaning and discourse [5]. The main purpose of joining the social networks and surviving in that territory is the need of individuals to express themselves to the others and also expect to be perceived important by them.

Overall, restrictions on freedom inevitably lead to breakup of social values. The members of a society that feels continuous oppression is somehow obliged to express themselves by resorting to violence. By way of social media that provide the placate of getting away from facts, the practice of violence becomes rather easier [6]. Since social networks creates the dilemma of being somewhere and also not really being there, individuals may normalize violence by continually being exposed to loss of values in this hazy reality As violence heightens, more restrictions on freedoms are imposed, which in turn brings about a vicious circle.

Aim and Objectives

The aim of this thesis is to develop novel Deep Convolution Neural Networks system to perfectly identify and classify negative aspects in social networks when an individual or a people/group share/post an abusing images on an individual or a people/group based on common language, race, sexual preferences, religion, or nationality, and notifying them that they are doing wrong as per law of any country with respect to Social Networks. By ensuring these services, we aim at helping an individual or a people/group to overcome the distrust in engaging through Social Networks with others over the Internet and increasing their confidence in Novel Classifying System Using Deep Convolution Neural Network.

In order to achieve this aim, the objectives of this thesis are as follows.

- Proposed an efficient Novel Classifying System.
- Developed a system to extract images from Twitter to know the Purpose behind the usage of social networking sites.
- Designed a system to identify the right sense of conversation of Images in social networks based on common language, race, sexual preferences, religion, or nationality using Deep Convolution Neural Network.
- Designed and developed a fair system to monitor 24 X 7 and identify the right sense of conversation of images in social networks using Deep Convolution Neural Network.

Methodology

The proposed method in this thesis is divided into four main parts: (1) data acquisition, (2) data preprocessing, (3) features extraction and fusion, and (4) pattern classification algorithm. First, collect/extract images from Twitter accounts of some of our friends to know the purpose behind the usage of social networking sites and preprocess the images. Then, the images are extracted by Deep Convolution Neural Network, and these features are merged with the images feature. Finally, the pattern recognition Softmax tool is used for constitution recognition as positive or negative.

Design and Development of a Novel Classifying System: The goal of novel classifying system design is a set of test case inputs that provide consistent coverage across the test space at a known depth. This results a set of test cases that focus on driving the functionality independent of the implementation. A deep CNN with softmax model creation can divide as three steps.

1. Define the scope of the model.
2. Identify the attributes of images and enumerate the values.
3. Apply data using deep CNN with softmax tool and classify the data as normal or abuse.

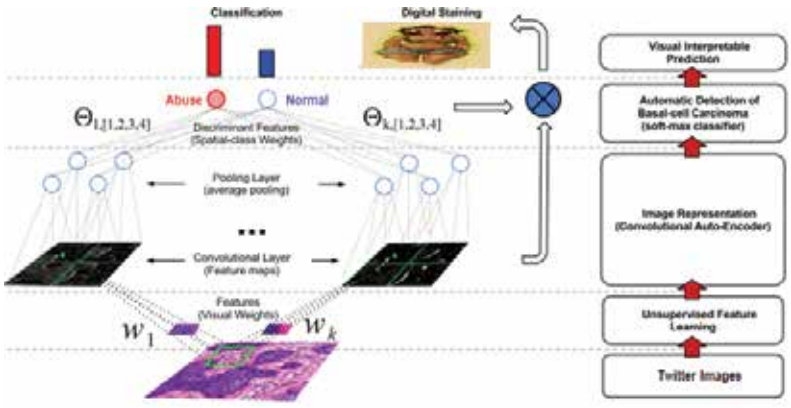


Figure 1: Deep Convolution neural network architecture for social networks image representation Classification

In Figure 1, Automatic image detection and visually interpretable prediction results analogous to digital stain identifying images regions that is most relevant for classifying into Normal or Abuse in social networks.

Case Study and Results

As part of the research work, we took many case studies to know the Purpose behind the usage of social networking sites by an individual or a group, improving the functional coverage and effectiveness of the social networking by identifying and classifying in using the social networking at that instance of time by an individual or a group. One of them was developing a system to extract images from Twitter to know the Purpose behind the usage of social networking sites. The other was designed and developed a system to identify the right sense of conversation of images in social networks based on common language, race, sexual preferences, religion, or nationality using Deep Convolution Neural Network. Another was designed and developed a fair system to monitor 24 X 7 and identify the right sense of conversation of images in social networks using Deep Convolution Neural Network.

Deep Convolutional Neural Network Algorithm: Convolutional neural networks are deep artificial neural networks that are used primarily to classify images (e.g. name what they see), cluster them by similarity (photo search), and perform object recognition within scenes. They are algorithms that can identify faces, individuals, street signs, tumors, platypuses and many other aspects of visual data.

Convolutional networks perform optical character recognition (OCR) to digitize text and make natural-language processing possible on analog and hand-written documents, where the images are symbols to be transcribed. CNNs can also be applied to sound when it is represented visually as a spectrogram. More recently, convolutional networks have been applied directly to text analytics as well as graph data with graph convolutional networks.

Max Pooling/Downsampling with CNNs: The next layer in a convolutional network has three names: max pooling, downsampling and subsampling. The activation maps are fed into a downsampling layer, and like convolutions, this method is applied one patch at a time. In this case, max pooling simply takes the largest value from one patch of an image, places it in a new matrix next to the max values from other patches, and discards the rest of the information contained in the activation maps. Only the locations on the image that showed the strongest correlation to each feature (the maximum value) are preserved, and those maximum values combine to form a lower-dimensional space. Much information about lesser values is lost in this step, which has spurred research into alternative methods. But downsampling has the advantage, precisely because information is lost, of decreasing the amount of storage and processing required.

Activation functions: So what does an artificial neuron do? Simply put, it calculates a "weighted sum" of its input, adds a bias and then decides whether it should be "fired" or not (yeah right, an activation function does this, but let's go with the flow for a moment).

So consider a neuron.

$$Y = S(\text{weight} \times \text{input}) + \text{bias}$$

Now, the value of Y can be anything ranging from -inf to +inf. The neuron really doesn't know the bounds of the value. So how do we decide whether the neuron should fire or not (why this firing pattern? Because we learnt it from biology that's the way brain works and brain is a working testimony of an awesome and intelligent system) .

The first thing that comes to our minds would be ReLu function.

ReLu: First, comes the ReLu function, $A(x) = \max(0,x)$. The ReLu function is as shown above. It gives an output x if x is positive and 0 otherwise. At first look this would look like having the same problems of linear function, as it is linear in positive axis. First of all, ReLu is nonlinear in nature. And combinations of ReLu are also non linear!. Great, so this means we can stack layers. It is not bound though. The range of ReLu is [0, inf]. This means it can blow up the activation. ReLu is less computationally expensive than tanh and sigmoid because it involves simpler mathematical operations. That is a good point to consider when we are designing deep neural nets.

Softmax classification Function: The softmax classification function is often placed at the output layer of a neural network. It's commonly used in multi-class learning problems where a set of features can be related to one-of-K classes. For example, in the CIFAR-10

image classification problem, given a set of pixels as input, we need to classify if a particular sample belongs to one-of-ten available classes: i.e., cat, dog, airplane, etc. Its equation is simple, we just have to compute for the normalized exponential function of all the units in the layer. In such case,

$$S(fyi) = efyi \sum jefj \; S(fyi) = efyi \sum jefj$$

Intuitively, what the softmax does is that it squashes a vector of size KK between 00 and 11. Furthermore, because it is a normalization of the exponential, the sum of this whole vector equates to 11. We can then interpret the output of the softmax as the probabilities that a certain set of features belongs to a certain class.

Conclusion

Social media is supposed to contribute to the maintenance of societies where democracy and multiplicity prevail could be an effective means for structuring, directing and internalizing the given ideology. Although the internet or social media are supposed to create a public sphere emancipating individuals, the fact that the social media networks are under control and surveillance refute the paper that those virtual media are really open forums. Besides, the content incorporating violence does not only produce negative effects on the users but also makes them somewhat dysfunctional.

Nevertheless, unconscious or uncontrolled use of the power of social media may lead to the spread of filthy/abuse images, infringement of personal rights, psychological attacks, symbolic violence, broadcasting private visions without the consent of the interested parties, harassment and insult along with the circulation of malevolent views and information on the Internet.

In this paper, we accomplish image recognition by using deep learning algorithm. We mainly apply the algorithm of deep convolution neural network to excavate the deep information of multi-layer network in the process of face recognition. And we also utilize the algorithm to make parallel computing on the cloud platform for accelerating the process of image recognition, analyzing theoretical acceleration ratio, and experimental verification. Experimental results show that we have achieved good results. Of course, the parallelism we do is coarse-grained, and there are still many modules that can be fine-grained in the algorithm.

Acknowledgement

The authors are grateful for the Computer Science, Bharathiar University, India, and Guru Nanak Institutions Technical Campus, India.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

Ethical Clearance: Ethical clearance is taken from advisory committee, Computer Science, Bharathiar University, India.

REFERENCES

1. Umberson D, Karas Montez J. Social relationships and health: A flashpoint for health policy. Journal of health and social behavior. 2010 Mar;51(1_ suppl):S54-66.
2. Utz S, Beukeboom CJ. The role of social network sites in romantic relationships: Effects on jealousy and relationship happiness. Journal of Computer-Mediated Communication. 2011 Jul 1;16(4):511-27.
3. Abdel-Hamid O, Mohamed AR, Jiang H, Penn G. Applying convolutional neural networks concepts to hybrid NN-HMM model for speech recognition. In2012 IEEE international conference on Acoustics, speech and signal processing (ICASSP) 2012 Mar 25:pp. 4277-4280.
4. Bhaskar MP, Reddy EM. Efficient Machine Learning Approach for identifying Disease-Treatment Semantic Relations from Bio-Medical Sentences. International Journal Of Computational Engineering Research (ijceronline. com) Vol. 2012 Sep;2:1425-9.
5. Kereliuk C, Sturm BL, Larsen J. Deep learning and music adversaries. IEEE Transactions on Multimedia. 2015 Nov;17(11):2059-71.
6. Umberson D, Crosnoe R, Reczek C. Social relationships and health behavior across the life course. Annual review of sociology. 2010 Aug 11;36:139-57.

Identification and Molecular Phylogenetic Relationship of Selected Medicinal Plants-Ethano Medicinal Importance

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ABSTRACT

Introduction: Correct identification of medicinally essential plant species is priceless for effective utilization for food and treatment.

Aim: The aim of the work is to in fere the Phylogenetic relationships of three medicinal crops sequence and to find out the crucial macro and micro morphological characters for diagnostic purposes.

Method: The sequences (Moringa oleifera, Allium cepa L, Brassica juncea) of the three taxa of out species group have been extracted from the national center for Biotechnology, know-how dwelling web page.

Conclusion: The evolutionary historical past was inferred with the aid of utilizing the neighbor joining approach. The morpho-anatomical characteristics are considered as valuable diagnostic factors for authentication of M. Oleifera. It can be concluded that genus Moringa is a monophyletic crew which are intently related as treated previously in present taxonomic programs.

Keywords: *Phylogenetic analysis, Clustalw, Evolution*

Introduction

Identification of foremost medicinal plant species is a complex undertaking and it desires expert taxonomists. At present 391000 vascular plant species are recognized to science of which about 94% are flowering plants[1]. Nevertheless, colossal quantities of plant species are yet to be identified. About 2000 species are being described every year. As a result, constrained number of species has been recognized by way of traditional identification and classification methods [2]. These medicinal plant species are normally gathered by using the nearby untrained collectors established on the indigenous advantage. During the gathering approach, typically the intently resemblance of undesirable species are additionally collected and sold with the equal name. Consequently, it is critical to acquire proper species with the help of proficient taxonomists from exclusive regions of the country. Moreover, suitable identification and classification would be useful to preserve the threatened or endangered plant species that seem decreasing day by day worldwide specifically in developing country like Pakistan [3].

Moringa oleifera is a multi-purpose plant that has been utilized for enormous variety of competencies that makes use of science by the historic Romans, Greeks and Egyptians [4]. It is cultivated as the source of nutritious leaf, vegetables, high quality of seed oil, pharmacologically active compounds and water clarification agents [5]. Morphological and anatomical characters of plants had been utilized by many authors in plant identification [6]. The major characteristics of the leaf venation pattern of a species are genetically constant by delivering the basis for the use of the leaf venation as taxonomic tool [7]. Leaf epidermal studies have revealed that stomata can provide valuable taxonomic and systematic proof in both living and fossil plants and also play a significant role in framing hypotheses about early angiosperm evolution [8].

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The onion (*Allium cepa L.)* is an herbaceous plant belonging to the family Alliaceae order Asparagales composed of 795 species in 20 genera [9]. The Brazilian production of onion in 2010 was 1.7 million tones, with an increased productivity of 17.4 t ha-1 to 24.9 t ha-1 within the last decade, though the development in the planted area during this period was reasonably small (5.9%), from 66,515 ha in 2000 to 70,464 ha in 2010 [10]. Yellow and purple onion are grown in Northeast Brazil; the former used to be offered in the late 1940s in the regions of Cabrobo and Belem do Sao Francisco and is predominantly produced in the Sao Francisco Valley [11]. Great variants in morphological and physiological traits have been available in onion vegetation, which is related to a high rate of cross-pollination. Additionally, extreme selection has aimed to modify the onion characteristics of shape, color retention, scales, bulb size, productiveness, harvest storage, tolerance to pests and infections, adaptation to distinctive soil and climatic variations [12].

Mustard (*Brassica juncea*), a species of the genus *Brassica* belonging to the family Brassicaceae, is an agriculturally and economically important crop generally cultivated in Asia and Europe). All species of mustard are polyploids (AABB), with the chromosome number 2n = 36. China possesses the richest mustard assets, which include greater than a 1000 cultivators distributed everywhere in the country and are generally used as a vegetable and for producing cooking oil [13]. On the lengthy evolutionary period imposed by nature and people, chinese mustard has evolved from the original dwarf style into varieties possessing more variations in root, leaf, stem and seed stalk types. Morphologically, categorized chinese mustard into 16 varieties, which can be largely accepted within the classification of chinese mustards, including *B. Juncea var. Megarrhiza, B. Juncea var. Crassicaulis, B. Juncea var. Gemmifera, B. Juncea var. Tumida, B. Juncea var. Rugosa, B. Juncea var. Foliosa, B. Juncea var. Leucanthus, B. Juncea var. Multisecta, B. Juncea var. Longepetiolata, B. Juncea var. Linearifolia, B. Juncea var. Strumata, B. Juncea var. Latipa, B. Juncea var. Involuta, B. Juncea var. Capitata, B. Juncea var. Multiceps,* and *B. Juncea var. Utilis*.

This article describes about the medicinal plants, *Moringa oleifera, Allium cepa L, Brassica juncea* species which are multiple aligned in Clustalw omega and construct Dendogram and analysis of Phylogenetic evolutionary relationship among these different species.

Methodology

Sequence Retrived: The medicinal plant amino acid (protein sequence) sequences are retrieved from NCBI (National Center for Biotechnology Information).

Clustalw Omega (Multiple Sequence Alignment): Clustalw Omega is a new multiple sequence alignment program that uses seeded guide trees and HMM profile-profile methods to generate alignments between three or more sequences. For the alignment of two sequences, substitute pair is used in sequence alignment tools.

Simple Phylogeny: The first steps are usually where the user sets the software input (Amino acid sequences, NCBI database). Within the following steps, the user has the possibility to change the default instrument parameters. The last step is consistently the tool submission step where the user can specify a title related to the outcome and an e-mail address for electronic mail notification. Utilizing the submit button will simply submit the specified information within the form to launch the tool on the server.

Input Alignment

Input Window: Phylogeny utilizing an alignment can directly enter into the input field in a supported format. Alignment formats supported incorporate Clustal, FASTA and MSF. Partially formatted or unaligned sequences will not be accepted. Adding a return to the end of the sequence could aid the simple Phylogeny tool to recognize the input. By directly making use of data from word processors yield unpredictable results as hidden/control characters.

File Upload: Phylogeny uses an alignment uploaded as a file. Alignment file formats supported comprise Clustal, FASTA and MSF. Partly formatted or unaligned sequences are not accepted usually. Adding a return to the end of the sequence may help the simple Phylogeny tool to understand the input. By directly using data from word processors yield to unpredictable results as hidden/control characters.

Set Parameters

Tree Format: This determines the outputs that the Simple Phylogeny tool produces.

Table 1: Output of the Simple Phylogeny tool

Format	Description	Value
Default	Newick/PHYLIP format tree file	phylip
Clustal	Clustal format file in addition to the PHYLIP tree	nj
Distance Matrix	Distance matrix file in addition to the PHYLIP tree	dist
NEXUS	NEXUS format file in addition to the PHYLIP tree	nexus

Distance Correction: This controls whether simple Phylogeny makes an attempt to correct multiple substitutions on the same site. That is advised to be set 'on' for extra divergent sequences and has the effect of stretching branch lengths. For more divergent sequences the distances are not able to be reliably corrected.

Exclude Gaps: With this option enabled columns, the place of the sequences within the input have a gap that is probably be excluded, forcing the alignment to make use of best positions where information can be integrated from all sequences.

Clustering System: This makes use of the neighbour-joining algorithm to assemble trees from the distance matrix. It makes use of the rapid UPGMA tree construction algorithm.

Submission

Job Title: It is viable to identify the tool result by using giving it a name. This title will be related to the results and would show up in the most graphical representations of the results.

Email Notification: Running a tool is usually an interactive approach, the results are delivered immediately to the browser when they become available. Depending on the tool and its input parameters, this may occasionally take really a very long time. It is feasible to be notified through electronic mail when the job is completed by using effectively ticking the field "Be notified through e mail". An electronic mail with a link to the results might be sent to the email address specified in the corresponding text box. E-mail notifications require valid email addresses.

Results and Discussion

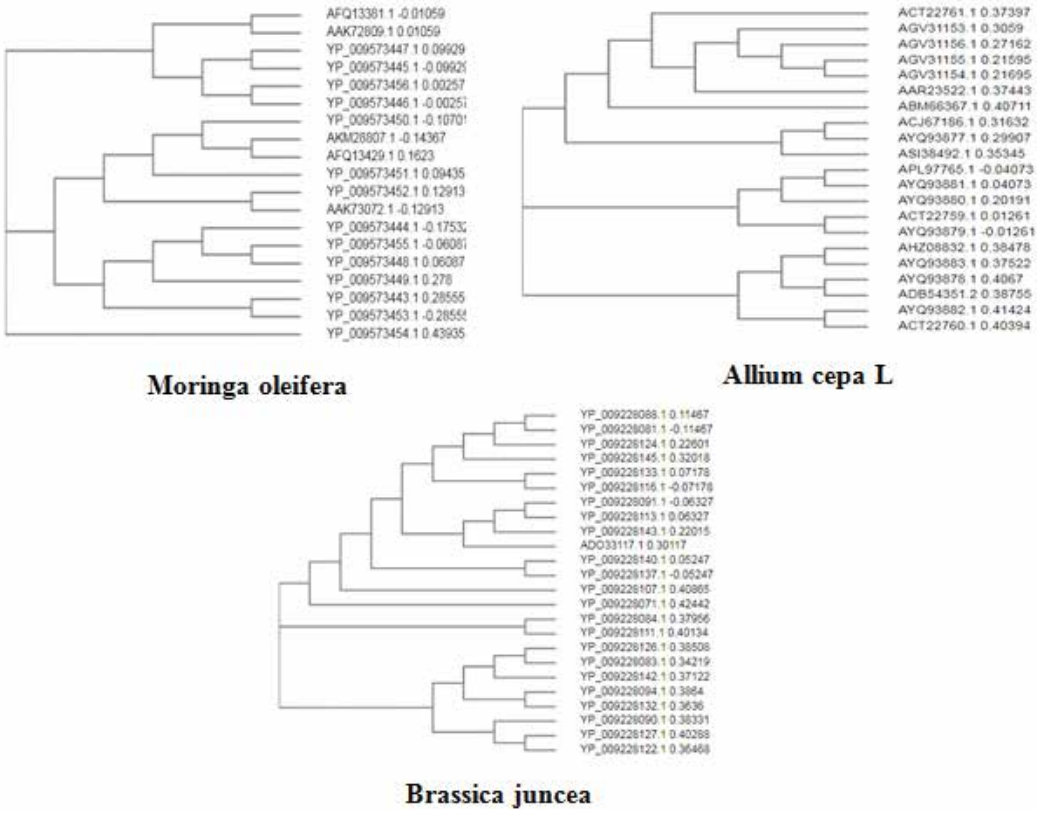


Figure 1: Graphical representation of Phylogenetic tree constructed from 20 sequences of *Moringa oleifera*, *Allium cepa L* and *Brassica juncea*

Graphical representation of Phylogenetic tree constructed from 20 sequences (Various Medicinal Plants) with the hypothetical root of straight line denoted 100% sequence similarity and branch length denoted non-sequence similarity. Dendogram is generated using Neighbor-joining method. This results show evolutionary relationship between the medicinal plant species.

Conclusion

This study is the first of its kind to assess molecular markers based identification and classification of a significant set of medicinal plants. The obtained cladogram based on these three medicinal plants sequence (*Moringa oleifera, Allium cepa L, Brassica juncea*) data is by the use of neighbor-joining method. Comparative analysis of these three medicinal plants are carried out and realized that *Moringa oleifera* is a monophyletic group. *M. Oleifera* and *M. Peregrina* are closely related as treated previously in current taxonomic systems. Further applications studies will be carry on future perspective associated to *Moringa oleifera*. Almost all parts of the plant have been consumed as food and used in traditional medicine for the mitigation of inflammatory-mediated ailments such as cardiovascular and gastrointestinal diseases. The leaves and seeds of plant have been reported for its antitumor, hypotensive, cardioprotective, wound healing activities and used for eye diseases. MO leaves contains sulfur-containing amino acids in higher levels. The extracts can be used as the source of sulphur for the synthesis quantum dot synthesis for widespread applications specifically in nano medicine where they are employed in drug and gene delivery systems, biomedical engineering, tumor detection, bio labeling, bio detection, MRI contrast enhancement, sensors, bio labeling, imaging of living cells and tissues.

Acknowledgement

This work is supported by Department of Nanotechnology, Noorul Islam Center for Higher Education.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

Ethical Clearance: Ethical clearance is taken from advisory committee, Department of Nanotechnology, Noorul Islam University.

REFERENCES

1. Altschul SF, Madden TL, Schäffer AA, Zhang J, Zhang Z, Miller W, Lipman DJ. Gapped BLAST and PSI-BLAST: a new generation of protein database search programs. Nucleic acids research. 1997 Sep 1; 25(17):3389-402.
2. Arnheim N, Krystal M, Schmickel R, Wilson G, Ryder O, Zimmer E. Molecular evidence for genetic exchanges among ribosomal genes on nonhomologous chromosomes in man and apes. Proceedings of the National Academy of Sciences. 1980 Dec1;77(12):7323-27.
3. Block E, Dane AJ, Thomas S, Cody RB. Applications of direct analysis in real time mass spectrometry (DART-MS) in Allium chemistry. 2-Propenesulfenic and 2-propenesulfinic acids, diallyl trisulfane S-oxide, and other reactive sulfur compounds from crushed garlic and other Alliums. Journal of agricultural and food chemistry. 2010 Mar 15; 58(8):4617-25.
4. Carpenter KJ. Stomatal architecture and evolution in basal angiosperms. American Journal of Botany.2005Oct; 92(10):1595-615.
5. Chase MW, Fay MF. Barcoding of plants and fungi. Science. 2009 Aug 7; 325(5941):682-93.
6. Group CP, Hollingsworth PM, Forrest LL, Spouge JL, Hajibabaei M, Ratnasingham S, van der Bank M, Chase MW, Cowan RS, Erickson DL, Fazekas AJ. A DNA barcode for land plants. Proceedings of the National Academy of Sciences. 2009 Aug 4; 106(31):12794-97.
7. Muluvi GM, Sprent JI, Odee D, Powell W. Estimates of outcrossing rates in Moringa oleifera using Amplified fragment length polymorphism (AFLP). African Journal of Biotechnology. 2004; 3(2):145-51.
8. Olson ME. Combining data from DNA sequences and morphology for a phylogeny of Moringaceae (Brassicales). Systematic Botany. 2002 Jan; 27(1):55-74.
9. Roth-Nebelsick A, Uhl D, Mosbrugger V, Kerp H. Evolution and function of leaf venation architecture: a review. Annals of Botany. 2001 May 1; 87(5):553-66.

10. Seghezzo L. Anaerobic treatment of domestic wastewater in subtropical regions. 2004.

11. Sharma A, Sehrawat SK, Singhrot RS, Ajinath TE. Morphological and chemical characterization of Psidium species. Notulae Botanicae Horti Agrobotanici Cluj-Napoca. 2010 Jun 15; 38(1):28-32.

12. Shinwari ZK, Jan SA, Khalil AT, Khan A, Ali M, Qaiser M, Zahra NB. Identification and phylogenetic analysis of selected medicinal plant species from pakistan: dna barcoding approach. Pak. J. Bot. 2018 Apr 1; 50(2):553-60.

13. Tamura K, Dudley J, Nei M, Kumar S. MEGA4: molecular evolutionary genetics analysis (MEGA) software version 4.0. Molecular biology and evolution. 2007 May 7; 24(8):1596-99.

Accuracy of Out of Field Photon Dose Calculations by a Treatment Planning System

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ABSTRACT

Introduction: Present study was conducted to compare 2D array detector and Eclipse Treatment Planning System for out-of-field photon dose measurement among patients with pharyngeal cancers treated with Volumetric Modulated Arc Therapy.

Aim: To compare 2Darray Detector and Eclipse treatment planning system for the out of field photon dose measurement among Head and Neck cancer patients treated with Volumetric Modulated Arc Therapy.

Method: Verification plan was created for each treatment plan in Eclipse treatment planning system using the analytical anisotropic algorithm [AAA] with the 2-D array ionization chamber. All the plans were done using 6MV photon energy. Doses were measured along the +X and +Y axes at 5,8,10 and 12 cm distance away from the isocenter. All measurements were performed on a Varian Clinac iX linear accelerator and the results were cross-compared with the fluence measurements obtained at the same points using 2D 729 array detector combined with Octavius 4D phantom. Evaluation of the 2-D array measurements was done using PTW Verisoft software

Result: Good agreement observed between the calculated and measured doses. The deviation increases as the distance increases. A maximum deviation of 28.6% along the Y-axis and 5.1% along X-axis. Out of field dose found to be slightly higher in Nasopharyngeal cancers compared to other pharyngeal cancers due to its large volume.

Conclusion: Study shows good agreement between the measured and calculated Out of field dose.

Keywords: *VMAT, 2D array, SORT IT, out-of-field photon dose*

Introduction

Modern radiotherapy treatment approaches like Volumetric Modulated Arc Therapy (VMAT), 3D-Conformal Radiation Therapy (3D-CRT) and Intensity-Modulated Radiation Therapy (IMRT) are capable of confirming a focused radiation beam within a defined target volume. Despite the high conformity with the current methods, unwanted doses are delivered to untargeted regions of the patient's body outside the primary beam which was referred to as out-of-field doses. They are composed of photons and neutrons at high treatment energies. These arise due to leakage from the linear accelerator treatment head, scatter from collimation devices and scatter from within the patient's body itself [1]. Although the doses delivered out of the field are small relative to the primary-field doses, it can still have long-term adverse effects such as cancer [2]. Therefore, it is useful to measure the out of field dose delivered during radiation therapy. A longer observation of the correlation between out of field doses and secondary malignancy can generate clear idea on the effect of out of field doses. Stathakis et al conclude in his study the OCTAVIUS-4D system has some unique characteristics that can potentially improve the patient-specific pre treatment IMRT QA data collection and analysis [3].

The treatment planning systems (TPS) generates dose distributions as per the measured beam profile and output factors, in accordance with the models generated using statistical methods [4, 5]. It is well accepted that the accuracy of dose prediction by the TPS, away from the treatment field is quite low [6, 7]. So in this study, the accuracy of out of field dose prediction by Eclipse-AAA algorithm, in Volumetric Arc Therapy (VMAT) was compared with the reconstructed doses generated by the OCTAVIUS-4D system. It is also accepted, it includes an uncertainty generated by the dose reconstruction, execution uncertainties, and geometrical missing since this study expecting a correlation between the executed and measured out of field doses,[8,910,11].

Even though new improvements in the Radiation therapy treatment increased the survival rates; on the other hand, these prolonged survivors are raised concern about the secondary cancer risk. It is generally accepted that there is an uncertainty associated with the out of field dose calculated. Due to their limitation of projection into the 3D Dose distribution, the present study is attempted with a 2Darray detector and 4D phantom. In most of the studies the treatment planning system accuracy in calculating the out of field dose had been questioned. Also if we use TPS as the input for secondary cancer risk calculation, there should not have any uncertainty. All these make study important.

Materials and Method

Fifty-one patient diagnosed with pharyngeal cancer and planned for Volumetric Modulated Arc Therapy (VMAT) using the Eclipse treatment planning system was selected for the study. The key study variables include the out of field photon dose (in Gray) using two equipments: (i) 2D array detector with 729 ion chamber and 4D Octavius phantom and (ii) treatment planning system (Eclipse version 10.0) at 5, 8, 10 and 12 cm distances from the field centre along X and Y axes as shown in Figure 1. Other variables collected include age and sex of the patient and site of cancer.

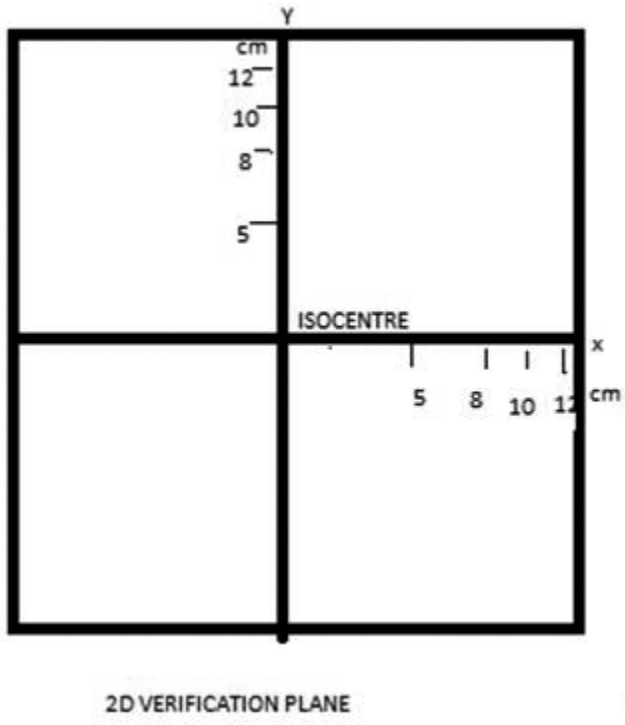


Figure 1: Schematic diagram (not to scale) Measurement plane for pharyngeal cancer planned for Volumetric Modulated Arc Therapy (VMAT)

Collection of Data: Verification plan was created for each treatment plan in Eclipse treatment planning system (version10.0) using the analytical anisotropic algorithm [AAA]) with the 2-D array ionization chamber and the 4D Octavius phantom. All the plans were done using 6MV photon energy.[12, 13, 14]. In conventional radiation therapy treatments, out-of-field organs are defined by the field border. However, for modern radiation therapy techniques like Intensity Modulated Radiation Therapy (IMRT) and Volumetric Modulated Arc Therapy (VMAT)

where fields are defined by modulated beam intensities, it is difficult to definitively define a field border [15, 16]. In the present study, the out of field organs are defined by considering isodose coverage and measuring the distance from the isocenter. Doses were measured along the +X and +Y axes. Measurements were taken at 5,8,10 and 12 cm distances away from the isocenter(centre of the planning target volume) along the above- said axis in the treatment planning system [17,18]. All measurements were performed on a Varian Clinac iX linear accelerator equipped with a millennium 120 leaf collimator (Varian oncology systems, Palo Alto, CA) and the results were cross- compared with the fluence measurements obtained at the same points using 2Darray 729 detectors combined with Octavius 4D phantom as shown in Figure 2 and Figure 3. Evaluation for the 2-D array measurements was done using PTW VeriSoft software by keeping the passing criteria as 3mm Distance to agreement(DTA), 3% Dose Difference(DD), for 95% of the evaluated dose points [19,20].

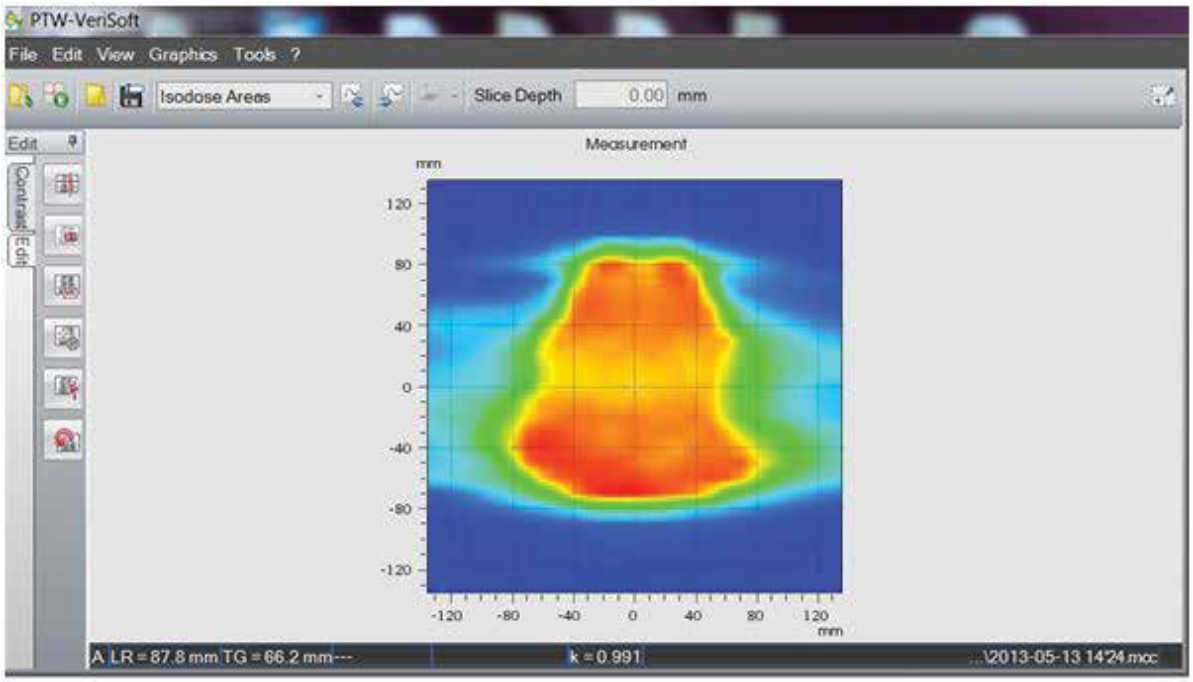


Figure 2: Fluence from Radiotherapy Treatment Planning Systems Measurement of patients diagnosed with pharyngeal cancer and planned for Volumetric Modulated Arc Therapy (VMAT)

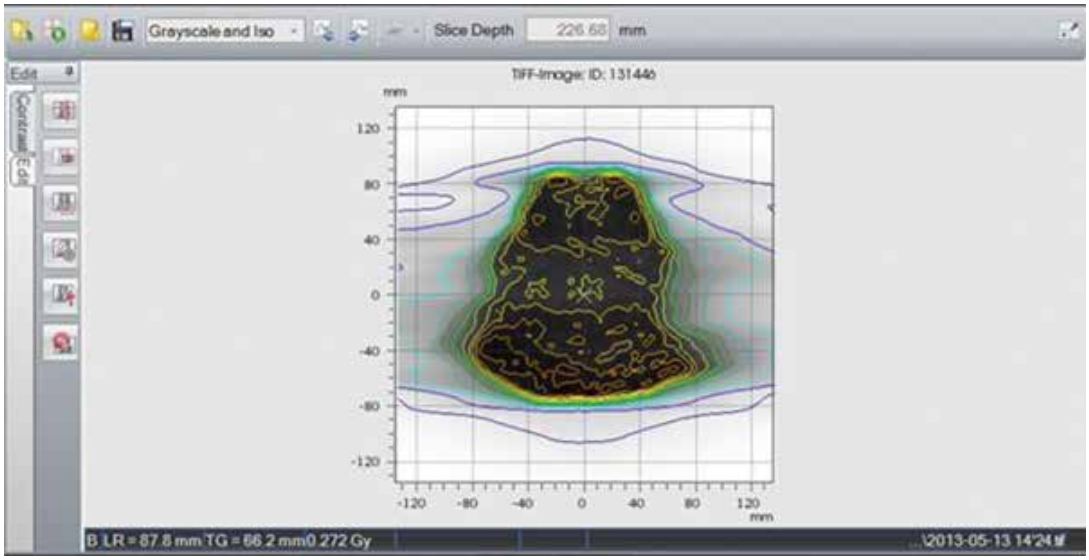


Figure 3: Fluence from 2D array Measurement of patients diagnosed with pharyngeal cancer and planned for Volumetric Modulated Arc Therapy (VMAT)

Measuring Devices

Octavius 4D phantom with a 2D array detector: The Octavius 4D system comprises the Octavius detector 729 arrays and the Octavius 4D phantom. The Octavius detector 729 (PTW, Freiburg, Germany) is a two-dimensional detector array with 729 equally spaced ionization chambers with a distance of 1 cm (centre to centre) and covering an area of 27 × 27 cm2. Each chamber has a size of 0.5 × 0.5 × 0.5 cm3. The physical dimensions of the Octavius detector 729 are 2.2 cm (thickness) × 30.0 cm (width) × 42.0 cm (length) with the effective reference point located 0.75 cm below the surface of the array. Plan verification is done using PTW-VeriSoft software (version 6.0.2.8). The Verisoft software used with the 2Darray is based on the gamma index. This study has used the passing criteria of 3mm Distance to-Agreement and 3% Dose Difference with reference to the selected dose. The gamma index combines dose difference and distance difference to calculate a dimensionless metric for each point in the evaluated distribution. The Octavius4D phantom acquires and stores the 2D array measurements as a function of gantry angle. A 3D dose is reconstructed for each gantry angle and sum of the different angular contributions reconstructed to obtain the total dose.

Treatment Planning System: Volumetric Modulated Arc Therapy or Rapid Arc is a treatment technique in which dose is delivered over a single gantry rotation with dynamically variable Multileaf Collimator(MLC) positions, dose rate and gantry speed. Patient-specific pre-treatment quality assurance for Rapid Arc plans will be analyzed for patients with pharyngeal cancers. Verification plan will be created for each treatment plan in Varian Eclipse Treatment Planning System version 10.0 using Anisotropic Analytical Algorithm (AAA).

Data Analysis and Statistics: Data were entered into EpiData entry version 3.1 and analyzed using EpiData analysis version v2.2.2.182 (EpiData Association, Odense, Denmark). Mean (standard deviation) was used to summarize doses of radiation at varying distances from the field edge. Out of field dose was compared across both methods: the TPS and the 2D array detector using a t-test or Kruskal-Wallis test depending on the distribution of the data.

Ethics Considerations: Ethics approval to conduct the study was obtained from the institutional review board (IRB) and institutional ethics committee (IEC) of Malabar Cancer Centre. Additional ethics approval was also obtained from the Ethics Advisory Group of the International Union against Tuberculosis and Lung Disease (The Union), Paris, France. The present study does not involve any human participant.

Results

Table 1 shows the mean and standard deviation for each of the calculated (μcalc ± σ) and measured (μmeas ± σ) doses at varying distances from the isocenter along the positive X and Y axis. At all distances, the calculated and measured doses were found to being in good agreement. From the table, it is observed that the deviation increases as the distance increases. A maximum deviation of 28.6% along the Y-axis and 5.1% along X-axis was observed at 12 cm. Table 2 shows that the out of field dose (both measured and calculated) is significantly associated with the site of cancer, highest in nasopharyngeal cancer. Figure 4 shows the variation of out of field dose with the distance from the isocenter. The plot clearly indicates that at distances near the isocentre both the 2D array measured dose and TPS calculated dose are in good agreement, whereas there is some variation as we move further away from the isocenter.

Table 1: Mean measured doses (μmeas ± σ) and mean TPS-calculated doses (μcalc ± σ) along both X and Y axes and at varying distances from the isocentre of patients diagnosed with pharyngeal cancer and planned for Volumetric Modulated Arc Therapy (VMAT)

Axis	Distance from isocentre (cm)	Count	μmeas ± σ (2D array detector)	μcalc ± σ (TPS)	Difference (%) [(μcalc-μmeas)/μmeas] *100
X	5	51	1.12 ± 0.29	1.14 ± 0.25	1.8
X	8	51	0.69 ± 0.23	0.70 ± 0.23	1.4
X	10	51	0.50 ± 0.15	0.52 ± 0.14	4.0
X	12	51	0.39 ± 0.12	0.41 ± 0.13	5.1
Y	5	51	1.42 ± 0.25	1.42 ± 0.24	0
Y	8	51	1.01 ± 0.46	1.05 ± 0.44	3.9
Y	10	51	0.44 ± 0.41	0.46 ± 0.39	4.5
Y	12	51	0.14 ± 0.09	0.18 ± 0.17	28.6

σ stands for standard deviation; TPS=Treatment Planning System; μmeas and μcal are expressed in cGray

Table 2: Association of demographic and clinical characteristics of pharyngeal cancer patients with the measured and calculated TPS dose and planned for Volumetric Modulated Arc Therapy (VMAT)

Characteristics	µmeas	p-value	µcalc	p-value
Sex				
Male (2)	0.73	0.36	0.74	0.50
Female (1)	0.67		0.70	
Site of cancer				
Nasopharynx	0.82	<0.001	0.84	0.002
Hypopharynx	0.61		0.65	
Oropharynx	0.75		0.75	

TPS = Treatment Planning System; µmeas and µcal are expressed in cGray

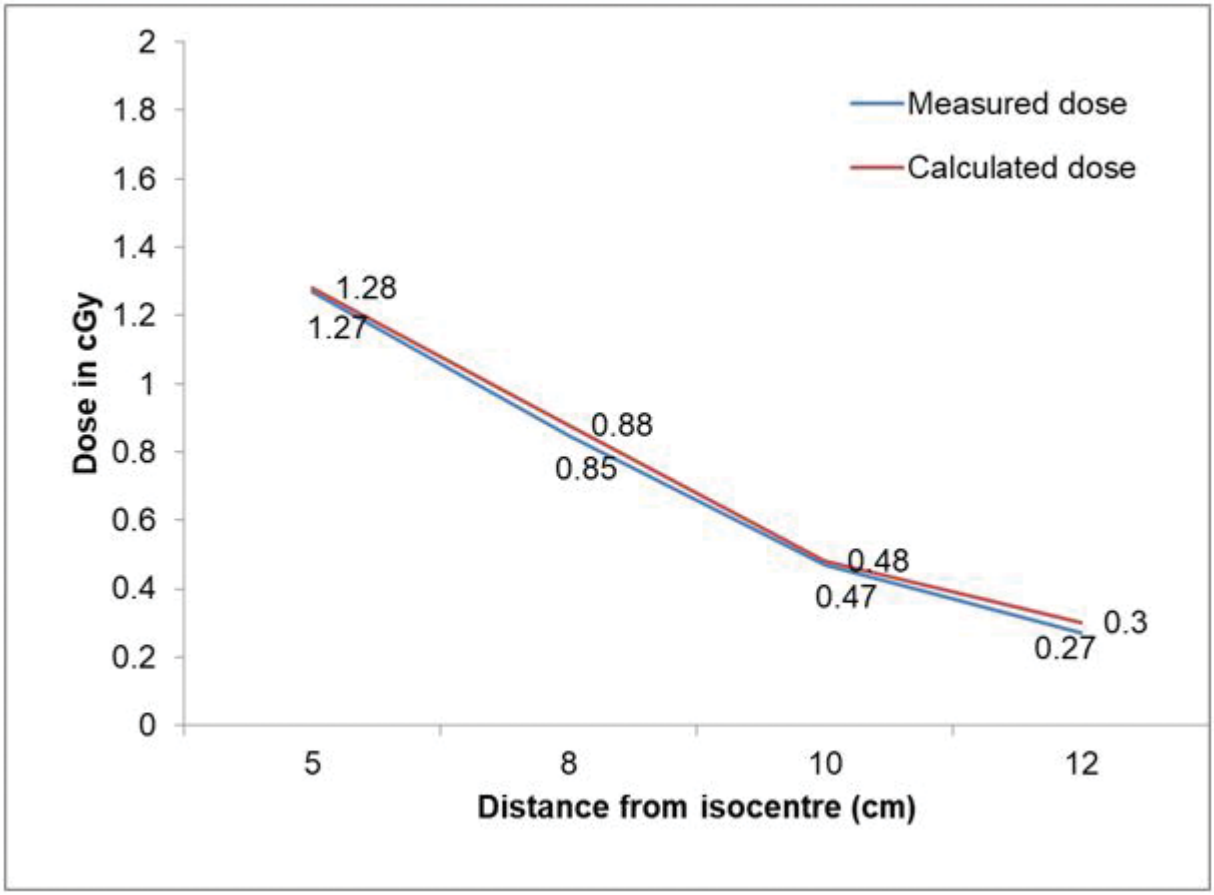


Figure 4: Variation of out of field dose with the distance from the isocentre of patients diagnosed with pharyngeal c ancer and planned for Volumetric Modulated Arc Therapy (VMAT).

Discussion

In this study, we quantified the accuracy of the out-of-field dose calculated by the Eclipse TPS (version 10.0 using AAA algorithm) for a clinical treatment delivered with a Varian Clinac iX linear accelerator. The results show that in comparison with measured data, the calculated dose is in good agreement, although the small difference was observed at large distances (12 cm). This study showed that the TPS variation increased with increasing distance from the isocenter with a maximum of 28.6% at 12 cm distance from the isocenter along the Y-axis. A study by Fogliata et al on the accuracy of the AAA algorithm also showed good agreement with the measured doses [20]. Our study result go well with Fogliata et al results;but there is a clear indication for dose variation as the distance increases from the field edge.

In the present study, we have used 2Darray detector with passing criteria of 3mm 3% which shows good agreement with TPS obtained values. A 2D array consists of 729 ion chamber detectors. Detector characteristics will affect the measurement; like low resolution results in dose points in those regions appearing to have an artificially lower dose than the TPS dose. Energy response and detector position and size are crucial for measurement accuracy in the intensity modulated treatment deliver. After 10cm distance from isocenter, there is a slight variation for the measured and calculated values which may due to the stringent Multileaf collimator movements.

The out-of-field dose was highest in nasopharyngeal cancers probably due to the large volume of cancer compared to the other two cancer types. Out of field doses increases with large field size due to increase in the scattered doses.

Conclusion

2Darray detector shows good agreement between the measured and calculated out of field dose. The limitation of the study using 2D array detector is for the out of field distance to be measured because the available maximum field size of the detector being 27x27 cm^2. Also, since we have opted 2Darray detector for the comparison study, it is difficult to compare with the other TPS studies which have used TLDs and films. The results were specific to the Eclipse TPS version 10.0 (AAA algorithm) and Varian Clinac iX with 2Darray. The amount of out-of-dose with a TPS and linac combination also depends on the particular algorithm used, the commissioning data and the manufacturer. Further research is needed to examine several commercially available TPS and Linac combinations. Considering the limitations of the measurement distance with a 2Darray detector, further studies must be conducted to evaluate the out of field calculation accuracy of treatment planning systems.

Acknowledgement

This research was supported through an operational research course, that was jointly developed and run by Academy for Public Health, Kozhikode, Kerala, India; Malabar Cancer Centre (MCC), Thalassery, Kerala, India: and The Centre for Operational Research, International Union Against Tuberculosis and Lung Disease, France.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

Ethical Clearance: Ethical clearance is taken from advisory committee, Academy for Public Health, Kozhikode, Kerala, India.

REFERENCES

1. Taylor ML, Kron T. Consideration of the radiation dose delivered away from the treatment field to patient in radiotherapy. Journal of medical physics. 2011 Apr 1;36(2):59.
2. Sungkoo C, Seong Hoon KI, Chan Hyeong KI, Jang Guen PARK JH. Secondary cancer risks in out-of-field organs for 3-D conformal radiation therapy. Prog. Nucl. Sci. Technol. 2011; 1:512-24.
3. Stathakis S. Ionization chamber array for patient-specific VMAT, Tomotherapy and IMRT QA. InJournal of Physics: Conference Series 2010 (Vol. 250, No. 1, p. 012029). IOP Publishing
4. Howell RM, Scarboro SB, Kry SF, Yaldo DZ.The Accuracy of out-of-field dose calculations by a commercial treatment planning system. Physics in medicine and biology. 2010 Nov 12;55(23):6999.
5. Huang JY, Followill DS, Wang XA, Kry SF. Accuracy and sources of error of out-of-field dose calculations by a commercial treatment planning system for intensity-modulated radiation therapy treatments. Journal of Applied Clinical Medical Physics. 2013 Mar 4;14(2).
6. Jang SY, Liu HH, Mohan R. Underestimation of low-dose radiation in treatment planning of intensity-modulated radiotherapy. International Journal of Radiation Oncology* Biology* Physics. 2008 Aug 1;71(5):1537-46.
7. Van den Heuvel F, Defraene G, Crijns W, Bogaerts R. Out-of-field contributions for IMRT and volumetric modulated arc therapy measured using gafchromic films and compared to calculations using a superposition/convolution based treatment planning system. Radiotherapy and Oncology. 2012 Oct 31;105(1):127-32.
8. Webster GJ, Rowbottom CG, Mackay RI. Development of an optimum photon beam model for head and neck IMRT. Journal of Applied Clinical Medical Physics. 2007 Nov 8;8(4).

9. Feng Z, Wu H, Zhang Y, Zhang Y, Cheng J, Su X. Dosimetric comparison between jaw tracking and static jaw techniques in intensity-modulated radiotherapy. Radiation Oncology. 2015 Jan 27;10(1):28.

10. Kry SF, Vassiliev ON, Mohan R. Out-of-field photon dose following removal of the flattening filter from a medical accelerator. Physics in medicine and biology. 2010 Mar 19;55(8):2155.

11. Kaderka R, Schardt D, Durante M, Berger T, Ramm U, Licher J, La Tessa C. Out-of-field dose measurements in a water phantom using different radiotherapy modalities. Physics in medicine and biology. 2012 Jul 27;57(16):5059.

12. Low DA. Gamma dose distribution evaluation tool. InJournal of Physics-Conference Series 2010 Nov (Vol. 250, No. 1, p. 012071).

13. Low DA, Dempsey JF. Evaluation of the gamma dose distribution comparison method. Medical physics. 2003 Sep 1;30(9):2455-64.

14. Code of practice: OCTAVIUS 4D How to start (Eclipse). Technical Note, D913.200.02/02.

15. Teoh M, Clark CH, Wood K, Whitaker S, Nisbet A. Volumetric modulated arc therapy: a review of current literature and clinical use in practice. The British journal of radiology. 2011 Nov;84(1007):967-96.

16. Fogliata A, Nicolini G, Vanetti E, Clivio A, Cozzi L. Dosimetric validation of the anisotropic analytical algorithm for photon dose calculation: fundamental characterization in water. Physics in medicine and biology. 2006 Feb 21;51(6):1421.

17. Fogliata A, Clivio A, Vanetti E, Nicolini G, Belosi MF, Cozzi L. Dosimetric evaluation of photon dose calculation under jaw and MLC shielding. Medical physics. 2013 Oct 1;40(10).

18. Robinson D. Inhomogeneity correction and the analytic anisotropic algorithm. J Appl Clin Med Phys 2008;9:112-22.

19. Rana SB. Dose prediction accuracy of anisotropic analytical algorithm and pencil beam convolution algorithm beyond high- density heterogeneity interface. South Asian journal of cancer. 2013 Jan 1; 2(1):26.

20. Lu L. Dose calculation algorithms in external beam photon radiation therapy. International Journal of Cancer Therapy and Oncology. 2013 Nov 22;1(2).

Evaluating the Biological Potential of Phyto-compounds from *Myristica fragrans* Seeds

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ABSTRACT

Introduction: Bioactive compounds from herbal plants possess a wide range of pharmaceutical activities and one among them is Myristica fragrans (Nutmeg).

Aim: The present study involves extraction of potential phyto chemicals from the seed part of Myristica fragrans and to explore its biological activities.

Method: Different solvents such as aqueous, acetone, ethyl acetate and chloroform were attempted to extract the Phytochemical from the seed. Among them, high yield of the extract was obtained with an aqueous solvent. Preliminary screening tests confirmed the presence of several Phytochemical in the seeds extracted with different solvents.

Result: The analysis of GC-MS represents a variety of potential bioactive products that was extracted from ethyl acetates such as tetradecanoic acid, N-hexadecanoic acid, and oleic acid, Benzene, 1,2,3-Trimethoxy-5-(2-Propenyl), 2-Hydroxy-4-Isopropyl-7-Methoxytropone that to identify anticancer compounds present in the active seed extract.

Conclusion: The analysis of Fourier Transform Infrared Spectrometer instrument and spectra obtained for the Myristica fragrans was interpreted with Characteristics IR absorption frequencies of Hydroxyl functional groups and carbonyl containing functional group.

Keywords: *Myristica fragrans bioactive compounds Thin Layer Chromatography (TLC) Gas Chromatography Mass Spectrometry (GCMS) Fourier Transform Infrared Spectroscopy (FTIR)*

Introduction

Nutmeg family (*Myristicaceae*) involves numerous species i.e. 18 genera and 300 species; these numerous species are broadly available in tropical rain forest across the globe[1, 2]. Steeves, 2011, states, generally this kind of nutmeg plant consists natural and ethno botanical significances and among the more established group presence in Angiospermae, which comprises of newly advanced species [3, 4]. Recognizable proof of nutmeg is expected to alleviate impurities, replacement, and falsification of natural products of herb, as world health organization states that falsification of naturally grown herbs content is a risk to user's protection [5, 6].

The *Myristica* genus is available in India and South-east Asia to Northern Australia and also the presence in the Islands known as Pacific. In this genus, *M. fragrance, M. beddomeii* and *M. malabarica* species are reported to be widely distributed in India [7, 8]. One of the delegates from this family is *Myristica fragrans* was derived from Indonesia (Mollucas and North Sulawesi). Due to its potential medicinal activities, nutmeg is extensively famous in Europe and Indian countries [9,10].The ritual practice of utilization of nutmeg helps to treat cholera, psychosis, rheumatism arthritis, diarrhea, nervousness,

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nausea, and anxiety, furthermore it is also used as alternative medicine for aphrodisiac, abortifacient [11,12,13], memory enhancer, antidiarrhoeal [14], mitigating and anticancer drug [15]

The present investigation prefers nutmeg for this study, because of their antimicrobial property has not been extensively assessed [16, 17, and 18]. This impact may be the presence of active dynamic Phytochemical like alkaloids, carotenoids, Flavonoids, ligands, phenols, and terpenoids, in the natural herbal source plants [19, 20, 21]. Therapeutic plants utilized for treatment enclose a large scope of the in gradient which may be utilized to treat infectious harmful disorders; hence medical microbiologist and clinical chemist have shown extraordinary interest for screening Therapeutic plants for modern therapeutics treatment [22].

Myristica fragrans is an important plant contains essential oil and nutmeg butter from its bark and leaves, which have been acclaimed to have a few medical advantages. The secondary metabolites of essential oil are made up of volatile compounds such as terpenoids, lipids, ketones, oxygenated derivatives and phenols [23]. *Encyclopædia Britannica* has announced that pinene, camphene, and dipentene as the significant constituents of *Myristica fragrans* essential oil (7 - 14%) [24]. *Myristica fragrans* consist a large amount of essential oil, which was used for carminatives and in herbal medical practice [25]. Many researchers have differently reported that seed of *Myristica fragrans* contain alkyl derivatives of benzene (Myristicin, elemicin, safrole, and so forth.), alpha-pinene, beta-pinene, myristic acid, trimyristin, terpenes [26], myrislignan and macelignan [27].

The present study focuses on phyto chemical extraction from seed part of *Myristica fragrans*, separation of the phyto chemicals by chromatographic techniques, characterization of bioactive compounds with GC-MS and FTIR.

Materials and Method

Sample Collection: The fresh fruit samples of *Myristica fragrans* was collected; shade-dried and powdered using the mechanical grinding machine. The finely powdered sample was used for the experimental study.

Solvent Extraction of Phyto Chemicals: The seed powder of *Myristica fragrans* was dissolved in different solvents (acetone, chloroform, ethyl acetate, and aqueous [hot and cold]) and the phytoconstituents were extracted by Soxhlet extraction. After extraction, the samples were dried under reduced pressure at controlled temperature (40-50°C) using rotary evaporator.

The yield of the plant extract with different solvents: The percentage (%) of the extractive seed powder sample yield was calculated by the formula, the percentage of yield extract= [W1/W2] x 100 Where W1 represents the mass of seed powder in grams after extraction. The total weight of mass taken for extraction denotes W2.

Preliminary screening of phyto chemicals: 100mgof seed extract powder was taken and suspended in solvents such as aqueous, acetone, ethyl acetate, and chloroform respectively was analyzed by preliminary screening for the presence of phyto chemical constituents-alkaloids, terpenoids, steroids etc.

Thin Layer Chromatographic (TLC) analysis: The TLC method was performed by Badheka et.al., The 20x20 cm glass plated was coated with silica gel with a thickness of 1 mm type (60F254) was used as stationary phase. The solvent system used mobile phase such as toluene, ethyl acetate, acetic acid and methanol with different ratios of 7.5:1.5, 0.5, and 0.5. The dissolved seed extract sample in the solvent was spotted in a silica coated plate and then placed in the mobile phase. When the mobile phase reached 15 cm, remove the plate from the mobile phase and allow them to dry at room temperature. The identified spots were scratched and washed by diethyl ether in order to remove impurities. Then dissolved spots were transferred to Eppendorf tube and then centrifuge at 3000rpm for 20min at 45ºC. After centrifugation, collect the supernatant and evaporate the solvent by rotary evaporator. Finally, the retention factor (R_f) of the sample was calculated using the formula known as the distance moved from the sample/distance moved by the following solvent.

GC-MS analysis: GC-MS (GC Clarus 500 Varian, USA) was performed for the seed extract of *Myristica fragrans* from the ethyl acetate were analyzed for the presence of various bioactive products. The auto sampler AOC-20I of system and gas chromatograph were interfaced to a mass spectrophotometer instrument utilizing the supporting conditions: Column Elite-1 combined silica capillary column with 30mm×0.25mm I.D ×1 µ M df, which is made out of 100% Dimethyl polysiloxane, programming in impact mode of electron at 70 eV; helium (99.999%)

was utilized as transporter gas at a steady stream of 1ml/ min and 0.5 µ l of sample was injected in column(part proportion of10:1), injector temperature was maintained at 250°C and temperature of iron maintained at 280°C. The temperature of the oven was operated at 110 °C (isothermal for 2 min), with an expansion of 10 °C/min, to 200 °C, at that point 5 °C/min to 280 °C, finishing with a 9 min isothermal at 280 °C. Mass spectra were taken at 70 eV; following interval scans 0.5 seconds and fragments from 45 to 450 Da.

FTIR: The IR spectra of the ethyl acetate extract of *Myristica fragrans* seeds were obtained from 400 to 4000cm^{-1} wavelength using infrared spectrophotometer (Bruker, AlphaT, Germany).

FTIR spectra of *Myristica fragrans seeds*: Ethyl acetate extract of the *Myristica fragrans* seeds showed presence of hydroxyl groups (OH)at 3227 cm^{-1}; alkane groups(C-H) at 2920 and 2856 cm^{-1}. Fig 4 shows that A small peak corresponding to carbonyl stretch(C=O) was observed at 1730cm^{-1}. The peak at 1692 cm^{-1}represented amide I group(C=C).Peak recorded at 1509 cm^{-1}representsnitro compounds (N-O). Similarly peaks recorded at 1459 cm^{-1}and 1076 cm^{-1}were attributed to aromatic (C=C) and alcohol (C-O) groups. The results are found to be similar with the IR spectra of aril and mace of *Myristica fragrans* extracted with methanolic solvent (Ajith Kumar et al., 2016).

Results and Discussion

Extraction of plant yield with different solvents: The percentage yield of the extract was quantified and represented in Table 1. Among all the four solvents used in the study, aqueous extract was observed to produce a high yield. This is followed by acetone and ethyl acetate. Chloroform produced a very low yield.

Table 1: Yield of the seed extracts of *Myristica fragrans* with different solvents

Yield (% w/w)	Type of Extract
19.85	Aqueous
13.50	Acetone
6.79	Ethyl Acetate
1.97	Chloroform

Preliminary phytochemical screening of the *Myristica fragrans* seeds: The results of the preliminary phytochemical screening carried out with four different solvents revealed the presence of a wide range of phyto chemicals Table 2. Mayer's test showed the absence of alkaloids in the seed extracted with different solvents. The presence of the different phytochemicals present in the seeds of *Myristica fragrans* confirmed by the different preliminary tests is represented in Table 2.

Table 2: Preliminary tests evaluated with different solvents for the confirmation of various phyto constituents in seed extract of *Myristica fragrans*

Name of the preliminary tests	Indication of Phytochemical	Various solvent extract			
		Aqueous	Acetone	Ethyl Acetate	Chloroform
Mayer's test	Alkaloids	-	-	-	-
Salkowski test	Terpenoids	+	+	+	+
Shinoda test	Flavonoids	+	-	+	+
Sodium hydroxide test	Coumarins	+	+	+	+
Liebermann Burchard test	Steroids	-	+	-	-
Foam test	Saponins	+	+	+	+
Gelatin test	Tannins	+	+	+	+
Ferric chloride test	Phenols	+	+	+	+
Keller-Killiani's test	Cardiac glycosides	+	+	+	+
Turbidity test	Resins	-	-	+	+
Ninhydrin test	Protein	+	+	+	+

Thin Layer Chromatographic (TLC) analysis: The TLC method was performed and result is shown in figure 1. The 20x20 cm glass plated was coated with silica gel with a thickness of 1 mm type (60F254) was used as stationary phase. Fig 1 shows that the solvent system used mobile phase such as toluene, ethyl acetate, acetic acid and methanol with different ratios of 7.5:1.5, 0.5, 0.5. The dissolved seed extract sample in the solvent was spotted in a silica coated plate and then placed in the mobile phase. When the mobile phase reached 15 cm, remove the plate from the mobile phase and allow them to dry at room temperature. The identified spots were scratched and washed by diethyl ether in order to remove impurities. Then dissolved spots were transferred to Eppendorf tube and then centrifuge at 3000rpm for 20min at 45ºC. After centrifugation, collect the supernatant and evaporate the solvent by rotary evaporator. Finally, the retention factor (R_f) of the sample was calculated using the formula known as the distance moved from the sample/distance moved by the following solvent.



Fig. 1: Thin Layer Chromatographic plate of the *Myristica fragrans* seed extract

GC-MS analysis of the *Myristica fragrans* seeds: GC-MS analysis of the ethyl acetate fractions of the seed extract of *Myristica fragrans* seeds showed in figure 2 and 3 and the presence of different acids such as tetradecanoic acid, N-hexadecanoic acid, and oleic acid along with other derivatives as in Table 3.

Table 3: GC-MS analysis of the ethyl acetate extracts of *Myristica fragrans* seeds

S.No	Retention Time(Rt)	Compound Name	Molecular Formula	Molecular weight
1	14.443	Benzene, 1,2,3-Trimethoxy-5-(2-Propenyl)-	$C_{12}H_{16}O_3$	208
2	16.569	Tetradecanoic Acid	$C_{14}H_{28}O_2$	228
3	17.304	Tetradecanoic Acid	$C_{14}H_{28}O_2$	228
4	18.645	N-Hexadecanoic Acid	$C_{16}H_{32}O_2$	256
5	20.095	Oleic Acid	$C_{18}H_{34}O_2$	282
6	24.157	Carbazole, 2,4,7-Trimethylnh	$C_{15}H_{15}N$	209
7	24.332	Thiazolo[3,2-A]Benzimidazol-3(2h)-One, 2-(2-Fluorobenzylideno)-7,8-Dimethyln	$C_{18}H_{13}ON_2S$	324
8	24.462	Phenol, 4-[2,3-Dihydro-7-Methoxy-3-Methyl-5-(1-Propenyl)-2-Benzofura	$C_{20}H_{22}O_4$	326
9	24.572	2-Hydroxy-4-Isopropyl-7-Methoxytropone	$C_{11}H_{14}O_3$	194
10	24.662	3(2h)-Benzofuranone, 4,6-Dimethoxyo	$C_{10}H_{10}O_4$	194
11	25.012	2-Hydroxy-4-Isopropyl-7-Methoxytropone	$C_{11}H_{14}O_3$	194
12	25.608	Phenol, 2,6-Dimethoxy-4-(2-Propenyl)-	$C_{11}H_{14}O_3$	194
13	25.668	2-Hydroxy-4-Isopropyl-7-Methoxytropone	$C_{11}H_{14}O_3$	194
14	30.635	Urs-12-En-3-Ol, Acetate, (3.Beta.)-	$C_{32}H_{52}O_3$	468

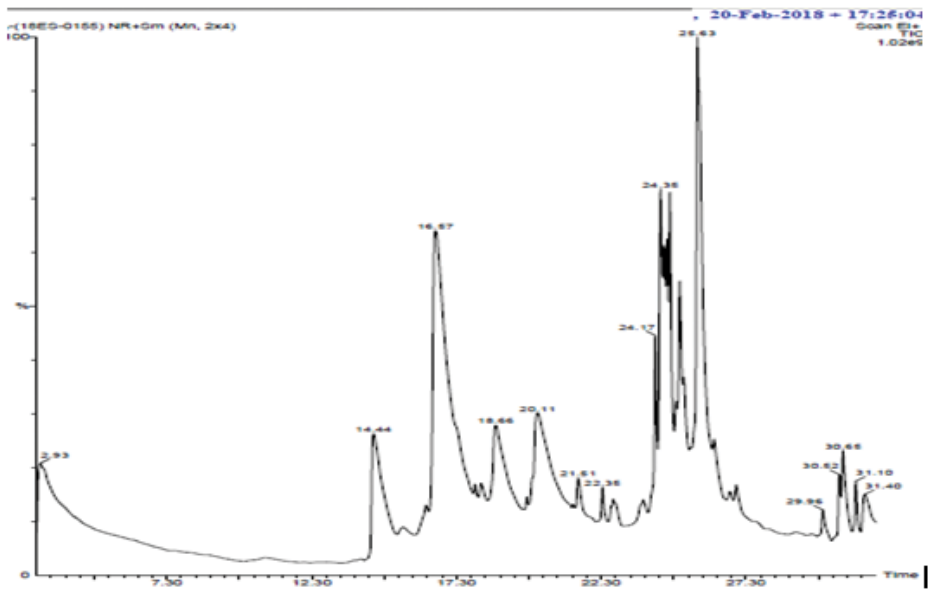


Fig. 2: GC-MS chromatogram and molecular structures of potential bioactive compounds identified in the ethyl acetate fraction of *Myristica fragrans* seed extract

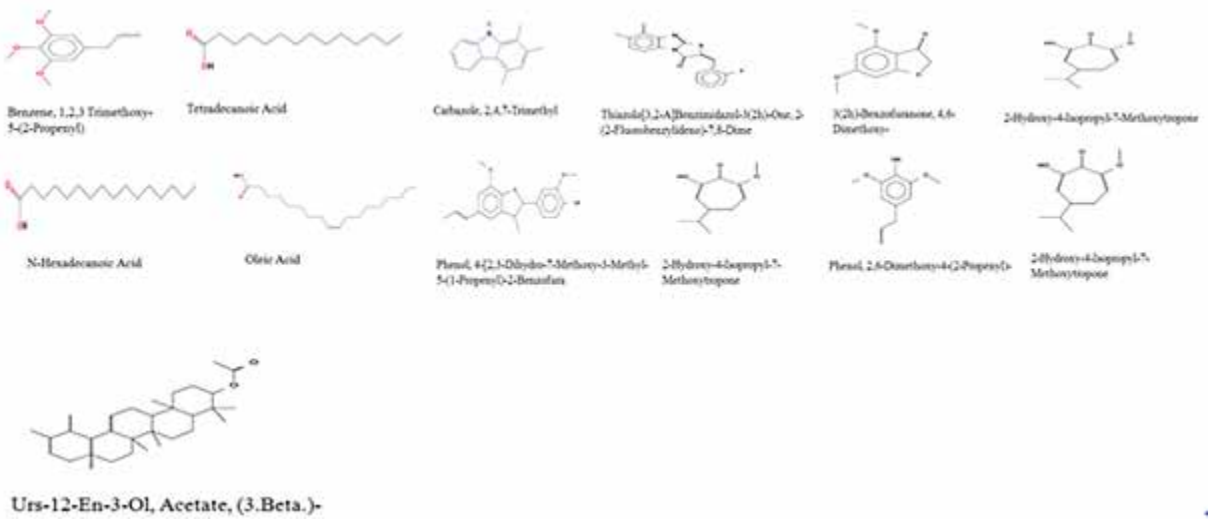


Fig. 3: FTIR spectra of *Myristica fragrans* seeds

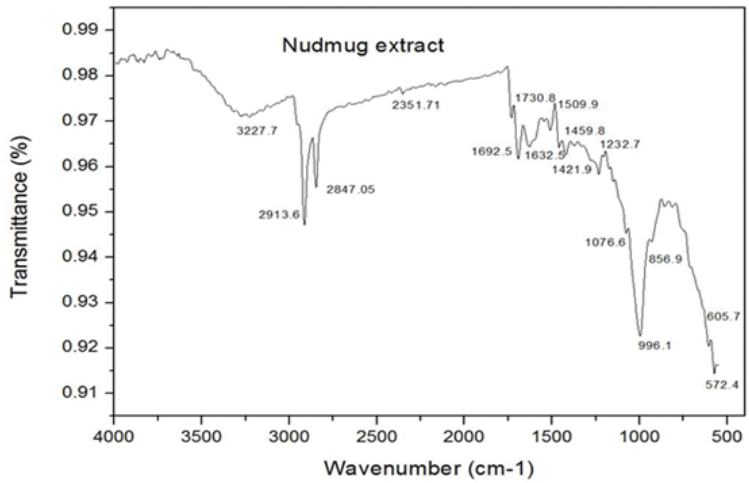


Fig. 4: FTIR spectra of ethyl acetate extract of the *Myristica fragrans* seeds

Conclusion

The seed portion of the *Myristica fragrans* screened by preliminary phyto chemical screening tests confirmed the presence of a variety of potential bioactive compounds. Furthermore the seed extracts were subjected to GC-MS analysis and recognized tetradecanoic acid, N-hexadecanoic acid, and oleic acid, Benzene, 1, 2, 3-Trimethoxy-5-(2-Propenyl), 2-Hydroxy-4-Isopropyl-7-Methoxytropone as major compounds. FTIR shown in figure 4 is used to identified the functional groups are analyzed in the seed. The presence of these compounds may be responsible for the anticancer activity.

Acknowledgement

This work was supported by Noorul Islam Center for Higher Education, Department of Nanotechnology.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

Ethical Clearance: Ethical clearance is taken from advisory committee, Department of Nanotechnology, Noorul Islam University.

REFERENCES

1. Abdulkareem IH. A review on aetio-pathogenesis of breast cancer. J Genet Syndr Gene Ther. 2013;4(142):2.
2. Ahmad S, Latif A, Qasmi IA. Aphrodisiac activity of 50% ethanolic extracts of Myristica fragrans Houtt.(nutmeg) and Syzygium aromaticum (L) Merr. & Perry.(clove) in male mice: a comparative study. BMC Complementary and Alternative Medicine. 2003 Dec;3(1):6.
3. Al-Jumaily EF, Al-Amiry MH. Extraction and Purification of Terpenes from Nutmeg (myristica fragrans). Al-Nahrain Journal of Science. 2012 Sep 1;15(3):151-60.
4. Al-Jumaily EF, Al-Amiry MH. Extraction and Purification of Terpenes from Nutmeg (myristica fragrans). Al-Nahrain Journal of Science. 2012 Sep 1;15(3):151-60.
5. Chung JY, Choo JH, Lee MH, Hwang JK. Anticariogenic activity of macelignan isolated from Myristica fragrans (nutmeg) against Streptococcus mutans. Phytomedicine. 2006 Mar 13;13(4):261-6.
6. Duarte RC, Fanaro GB, Koike AC, Villavicencio AL. Irradiation effect on antifungal potential Myristica fragrans (nutmeg) essential oil, a preliminary study.
7. Grover JK, Khandkar S, Vats V, Dhunnoo Y, Das D. Pharmacological studies on Myristica fragrans--antidiarrheal, hypnotic, analgesic and hemodynamic (blood pressure) parameters. Methods and findings in experimental and clinical pharmacology. 2002 Dec 1;24(10):675-80.
8. Ibrahim KM, Naem RK, Abd-Sahib AS. Antibacterial activity of nutmeg (Myristica fragrans) seed extracts against some pathogenic bacteria. Al-Nahrain Journal of Science. 2013 Jun 1;16(2):188-92.
9. Jaiswal P, Kumar P, Singh VK, Singh DK. Biological effects of Myristica fragrans. Annual review of biomedical sciences. 2009 Dec 1;11.
10. Levitsky DO, Dembitsky VM. Anti-breast cancer agents derived from plants. Natural products and bioprospecting. 2015 Feb 1;5(1):1-6.
11. Levitsky DO, Dembitsky VM. Anti-breast cancer agents derived from plants. Natural products and bioprospecting. 2015 Feb 1;5(1):1-6.
12. Newmaster SG, Grguric M, Shanmughanandhan D, Ramalingam S, Ragupathy S. DNA barcoding detects contamination and substitution in North American herbal products. BMC medicine. 2013 Dec;11(1):222.
13. Olajide OA, Ajayi FF, Ekhelar AI, Awe SO, Makinde JM, Alada AA. Biological effects of Myristica fragrans (nutmeg) extract. Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives. 1999 Jun;13(4):344-5.
14. Periyasamy A, Mahalingam K. Phytochemical screening and antimicrobial activity from five Indian medicinal plants against human pathogens. Middle East Journal of Scientific Research. 2010;5(6):477-82.
15. Pillai S, Mahmud R, Lee WC, Perumal S. Anti-parasitic activity of Myristica fragrans Houtt. essential oil against Toxoplasma gondii parasite. APCBEE Procedia. 2012 Jan 1;2:92-6.

16. Qiu Q, Zhang GY, Sun XM, Liu X. Study on chemical constituents of the essential oil from Myristica fragrans Houtt. by supercritical fluid extraction and steam distillation. Zhong yao cai Zhongyaocai Journal of Chinese medicinal materials. 2004 Nov;27(11):823-6.

17. Raghavan S. Handbook of spices, seasonings, and flavorings. Boca Raton: CRC.

18. Shafiei Z, Shuhairi NN, Md Fazly Shah Yap N, Harry Sibungkil CA, Latip J. Antibacterial activity of Myristica fragrans against oral pathogens. Evidence-Based Complementary and Alternative Medicine. 2012;2012.

19. Shareef M, Ashraf MA, Sarfraz M. Natural cures for breast cancer treatment.

20. Sharma G, Sharma AR, Kurian M, Bhavesh R, Nam JS, Lee SS. Green Synthesis Of Silver Nanoparticle Using Myristica Fragrans (Nutmeg) Seed Extract And Its Biological Activity. Digest Journal of Nanomaterials & Biostructures (DJNB). 2014 Jan 1;9(1).

21. Sonavane GS, Sarveiya VP, Kasture VS, Kasture SB. Anxiogenic activity of Myristica fragrans seeds. Pharmacology Biochemistry and Behavior. 2002 Jan 1;71(1-2):239-44.

22. Steeves RA. An intrageneric and intraspecific study of morphological and genetic variation in the Neotropical Compsoneura and Virola (Myristicaceae) (Doctoral dissertation).

23. Steven G Ne, Subramanyam R. Testing plant barcoding in a sister species complex of pantropical Acacia (Mimosoideae, Fabaceae). Molecular ecology resources. 2009 May;9:172-80.

24. Tallei Te, Kolondam Bj. Dna barcoding of Sangihe Nutmeg (Myristica fragrans) using matK gene. HAYATI Journal of Biosciences. 2015 Jan 1;22(1):41-7.

25. Wang Y, Yang XW, Tao HY, Liu HX. GC-MS analysis of essential oils from seeds of Myristica fragrans in Chinese market. Zhongguo Zhong yao za zhi Zhongguo zhongyao zazhi= China journal of Chinese materia medica. 2004 Apr;29(4):339-42.

26. Yang XW, Huang X, Ahmat M. New neolignan from seed of Myristica fragrans. Zhongguo Zhong yao za zhi Zhongguo zhongyao zazhi China journal of Chinese materia medica. 2008 Feb;33(4):397-402.

27. Zaidi SF, Yamada K, Kadowaki M, Usmanghani K, Sugiyama T. Bactericidal activity of medicinal plants, employed for the treatment of gastrointestinal ailments, against Helicobacter pylori. Journal of Ethnopharmacology. 2009 Jan 21;121(2):286-91.

Evaluating the Biological Applications of *Myristica fragrans* Seeds for Bactericidal and Cytotoxic Effects

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ABSTRACT

Introduction: Bioactive compounds from herbal plants possess a wide range of pharmaceutical activities and one among them is Myristica fragrans (Nutmeg).

Aim: Antibacterial screening of the different solvent extracted phytoconstituents showed maximum growth inhibitory effect against E.coli and S. mutans. Agar well diffusion sensitivity testing method was adopted for this study.

Method: Acetone extract of the seeds also performed good bactericidal effect against the bacterial pathogens.

Result: MTT assay also demonstrated good cytotoxic effect against MCF-7 cell lines in a dose-dependent manner with inhibitory concentration (IC_{50}) achieved at 62.5 µg/mL.

Conclusion: Based on the findings of the study, seeds of Myristica fragrans could be exploited in developing potential bioactive pharmaceutical drugs for effective treatment of cancer.

Keywords: *Myristica fragrans Anti bacterial MTT assay Cytotoxicity*

Introduction

In the present scenario, the susceptibility of breast cancer is widely noticed by women. As per the data of 2018, the National Cancer Institute reported that 266,120 female are facing issues related to breast disease with mortality count of 40,920. This kind of report emphasizes the importance of breast tumor among the present population. There are a few components related with the breast cancer, for instance, sexual orientation, food diet, utilization of liquor, movement of the body, family ancestry, a way of lifestyle and endocrine features also including both exogenous and endogenous [1].

There are some other essential factors that lead to breast tumor growth, as non-threatening and mammographic concentrations. Though it is not clear, which factor is most vital in breast cancer pathogenesis [2.] Hence, breast malignancy for women has renewed over into the second premier reason for the passing. The chemotherapeutic agents utilized for its treatment are originated from the herb plant source, especially natural products, leaves, seeds, lichens, and fungi. These types of herbal plant sources play a significant role in supporting the health of humans. Today, people show more attention in natural remedies of herbal medicine containing natural bio-active compounds than chemically synthesized compounds [3].

Nutmeg family (*Myristicaceae*) involves numerous species i.e. 18 genera and 300 species; these numerous species are broadly available in tropical rain forest

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across the globe [4]. Steeves, 2011, states, generally this kind of nutmeg plant consists natural and ethno botanical significances and among the more established group presence in Angiospermae, which comprises of newly advanced species [5]. Recognizable proof of nutmeg is expected to alleviate impurities, replacement, and falsification of natural products of herb, as world health organization states that falsification of naturally grown herbs content is a risk to user's protection [6].

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The present investigation prefers nutmeg for this study, because of their antimicrobial property has not been extensively assessed [11]. This impact may be the presence of active dynamic Phytochemical like alkaloids, carotenoids, Flavonoids, ligands, phenols, and terpenoids, in the natural herbal source plants [12]. Therapeutic plants utilized for treatment enclose a large scope of the in gradient which may be utilized to treat infectious harmful disorders hence medical microbiologist and clinical chemist have shown extraordinary interest for screening Therapeutic plants for modern therapeutics treatment [13].

Myristica fragrans is an important plant contains essential oil and nutmeg butter from its bark and leaves, which have been acclaimed to have a few medical advantages. The secondary metabolites of essential oil are made up of volatile compounds such as terpenoids, lipids, ketones, oxygenated derivatives and phenols [14]. *Encyclopædia Britannica* has announced that pinene, camphene, and dipentene as the significant constituents of *Myristica fragrans* essential oil (7 - 14%) [15]. *Myristica fragrans* consist a large amount of essential oil, which was used for carminatives and in herbal medical practice [16]. Many researchers have differently reported that seed of *Myristica fragrans* contain alkyl derivatives of benzene (Myristicin, elemicin, safrole, and so forth.), alpha-pinene, beta-pinene, myristic acid, trimyristin, terpenes [17, 18], myrislignan and macelignan [19, 20].

Therapeutic drug specialists asserted that seed of *Myristica fragrans* can be utilized as carminative, astringent, hypolipidaemic, antithrombotic, antiplatelet total, antifungal, treatment of dyspepsia [21,22], muscle and joint weakness, stomach problem, kidney stone, liver detoxification, digestion, increase blood circulation [23,] respiration and it additionally has properties of anti-inflammatory diseases [24.] One of the reviews of [25] also stated, that chemically synthesized compound of *Myristica fragrans* has been deductively approved to treat hypolipidemic and hypocholesterolemic, antidepressant, aphrodisiac, antimicrobial, upper, antioxidant, memory-boosting, and hepatoprotective properties. [26, 27] also stated, that *Myristica fragrans* have used for antiparasitic abilities.[28, 29]

The present study focuses on phyto chemical extraction from seed part of *Myristica fragrans*, in-vitro assessment of the Phyto- extract by bactericidal and cytotoxic tests.

Materials and Method

Sample Collection: The fresh fruit samples of *Myristica fragrans* was collected; shade-dried and powdered using the mechanical grinding machine. The finely powdered sample was used for the experimental study.

The Antibacterial potential of various fractions of *Myristica fragrans* seeds: The solvent fractions of the extracted seeds of *Myristica fragrans* were estimated for the activity of antibacterial against bacterial strains such as *Escherichia coli*, *Streptococcus mutans*, *Staphylococcusareaus* and *Pseudomonas aeruginosa* by the agar diffusion methods. The bacterial cultures were swapped on the Petri plates surface contain Mueller Hinton Agar and then with the help of cork borer the holes were made. To those holes, 20 µl of each dissolved extracted solvent in DMSO was inoculated.10 µg of Ampicillin was utilized as the positive control and negative control as DMSO. The inoculated plates were incubated at 37ºC for 24 hours. Finally, the zones of inhibition formation were evaluated.

Cytotoxic effect of the *Myristica fragrans* seed extract by MTT assay: MCF 7 cell line was gathered from the National Center for Cell Sciences, Pune (NCCS). The acquired cells were saved in DMEM enhanced with 10% FBS, penicillin (100 U/ml), and streptomycin (100 µg/ml) in a humidified nature of 50 µg/ml CO2 at 37 °C. Cells (1 × 105/well) were plated in 24-well plates and maintained in an incubator at 37°C with 5% CO2 condition. At the point when the cell achieves the conjunction, various concentrations of the seed residues extending from 7.85 to 1000 µg/ml were inoculated and maintained in the incubator for 24 hours. The incubated sample was expelled from the well and washed with phosphate-buffered saline (pH 7.4) or DMEM without serum. 100µl/well (5mg/ml) of 0.5% 3-(4, 5-dimethyl-2-thiazolyl)- 2,5-diphenyl-tetrazolium bromide (MTT) was inoculated and maintained in incubator for four hours. After4 hours, 1ml of DMSO was added to all the wells. The absorbance at 570 nm was estimated with UV-Spectrophotometer utilizing DMSO as the blank solution. Cytotoxicity estimations were performed and the 50% inhibition (IC50) concentration was concluded graphically. (Mosmann, 1983). The viability of cell percentage was determined by the equation

Cell viability = Treated cell of A570/controlled cells of A570 X 100

Antibacterial activity of the various solvent extract of *Myristica fragrans* seeds: The antimicrobial activity of aqueous, acetone, ethyl acetate, chloroform, ethyl acetate extracts of the seed showed effective bacterial growth inhibition. Among the extracts tested ethyl acetate fraction of the seed showed a maximum inhibitory effect against the bacterial pathogens as in Figure 2 shows that the Maximum zone of inhibition of the ethyl acetate fractions was observed against E.coli (14 mm), *P.aeruginosa* (9 mm), against *S. mutans* (10 mm)and *S. aereus* (11 mm). Similarly, acetone extract of the seeds could be arranged in the following increasing order: *E.coli*> *P. aeruginosa*>*S.mutans*>*S. aereus*. Fig 1 shows that In brief, the maximum inhibitory effect against *S. aereus* was noticed in the acetone extract. Also, chloroform and aqueous extracts showed a bactericidal effect. However, chloroform extract did not show a bactericidal effect against *P. aeruginosa*. The aqueous extract also showed ineffectiveness against *P. aeruginosa* and *S. aureus* respectively. Similarly, aqueous extract of the seed at different concentrations was reported to show a potential bactericidal effect against *E.coli, Staphylococcus aureus, Bacillus and Streptococcus species* (Sylvester et. al., 2018). The zone of inhibition of the extract is represented in Figure 2.

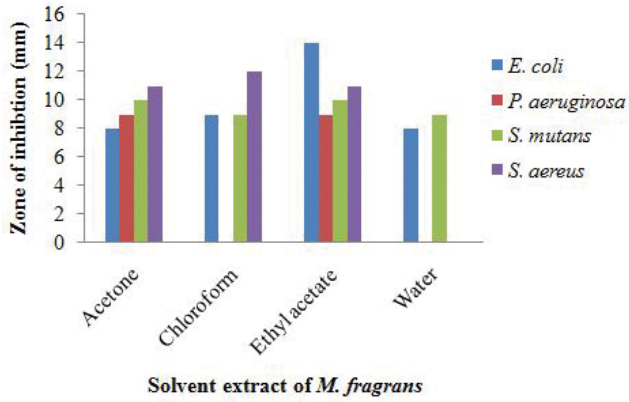


Fig. 1: Anti-bacterial effect of the different solvent fraction of *M. fragrans* seeds tested against bacterial pathogenic strains

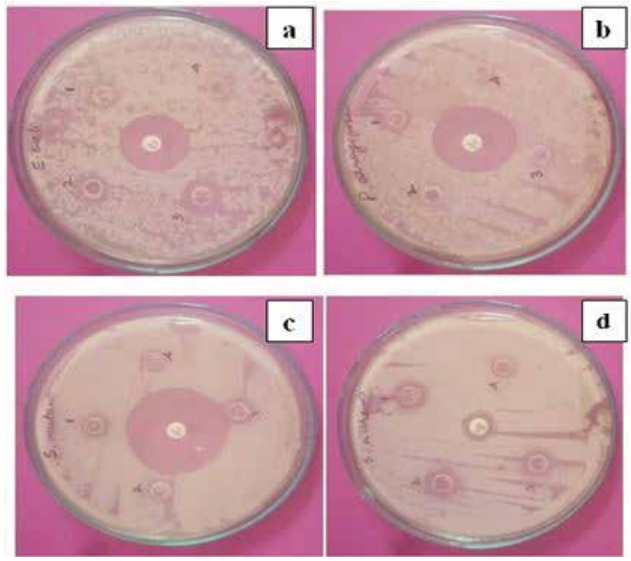


Fig. 2: Growth inhibition activity of the *M. fragrans seed extract* against (a)*E. coli*; (b) *Pseudomonas aeruginosa*; (c) *S. mutans* and (d) *S. aereus*.

Cytotoxic effect of the *Myristica fragrans* seed extract against MCF-7 cell lines: The cytotoxic effect of the seed extract against MCF-7was observed to be dose-dependent manner as in figure 3 and figure 4. The concentration of the extract at high concentration (1000 µg/mL) showed low percentage cell viability. In contrast, low concentration (7.8 µg/mL) tested showed high percentage cell viability. Comparison with the control cells, low percentage cell viability was observed at high dose concentration. The inhibitory concentration (IC_{50}) was calculated to be 62.5 µg/mL. An earlier study

on the Ethanolic extract of the *Myristica fragrans* seeds has proven cytotoxic effect against different cancer cell lines such as colon, liver, and ovary. Also, oil extracted from leaves of *Myristica fragrans* were reported to show an effective anticancer effect against MCF-7and A375 cell lines.

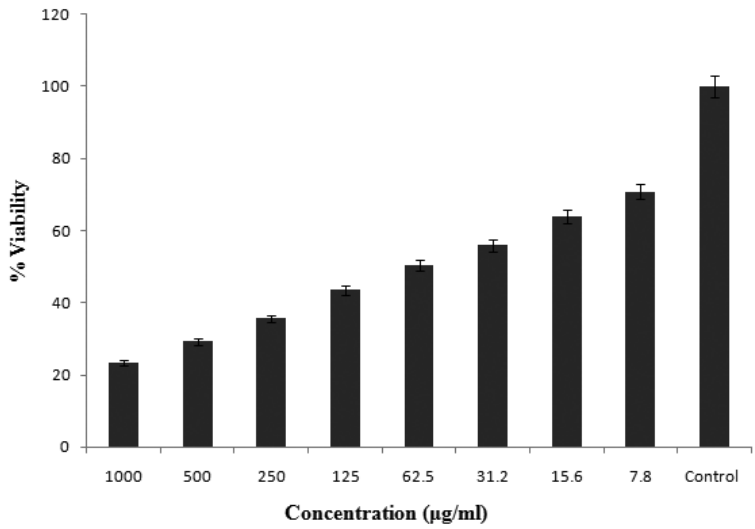


Fig. 3: Cytotoxic effect of the seed extract of *Myristica fragrans* against MCF-7 cell line

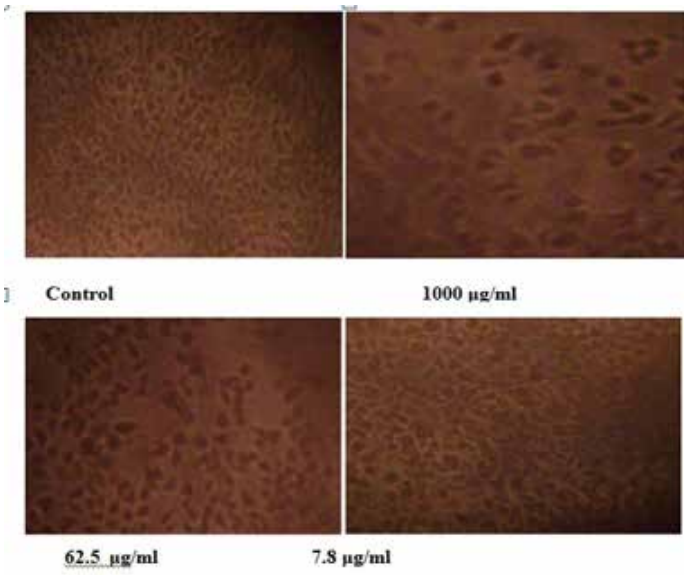


Fig. 4: Microscopic view of MCF-7 cell treated with different concentration of the *Myristica fragrans* seed extract

Conclusion

Plants have emerged as a credible source of new antimicrobials. This study evaluated the antibacterial and cytotoxic efficacy of the extracts of *Myristica fragrans*. The broad spectrum function of the solvent extract of *Myristica fragrans* seeds evaluated in terms of bacterial growth inhibition and cytotoxic effect against MCF-7 cells has proven its potentiality in preventing diseases. Hence it is concluded that *M. fragrans* seeds could be exploited further in the development of pharmaceutical drugs to treat different ailments.

Acknowledgement

This work was supported by Noorul Islam Center for Higher Education, Department of Nanotechnology.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

Ethical Clearance: Ethical clearance is taken from advisory committee, Department of Nanotechnology, Noorul Islam University.

REFERENCES

1. Abdulkareem IH. A review on aetio-pathogenesis of breast cancer. J Genet Syndr Gene Ther. 2013;4(142):2.
2. Chung JY, Choo JH, Lee MH, Hwang JK. Anticariogenic activity of macelignan isolated from Myristica fragrans (nutmeg) against Streptococcus mutans. Phytomedicine. 2006 Mar 13;13(4):261-6.
3. Olive KA, Agashe K, Amsler C, Antonelli M, Arguin JF, Asner DM, Baer H, Band HR, Barnett RM, Basaglia T, Bauer CW. Review of particle physics. Chinese physics C. 2014 Aug 1;38(9):090001.
4. Levitsky DO, Dembitsky VM. Anti-breast cancer agents derived from plants. Natural products and bioprospecting. 2015 Feb 1;5(1):1-6.
5. Al-Jumaily EF, Al-Amiry MH. Extraction and Purification of Terpenes from Nutmeg (myristica fragrans). Al-Nahrain Journal of Science. 2012 Sep 1;15(3):151-60.
6. Ibrahim KM, Naem RK, Abd-Sahib AS. Antibacterial activity of nutmeg (Myristica fragrans) seed extracts against some pathogenic bacteria. Al-Nahrain Journal of Science. 2013 Jun 1;16(2):188-92.
7. Grover JK, Khandkar S, Vats V, Dhunnoo Y, Das D. Pharmacological studies on Myristica fragrans--antidiarrheal, hypnotic, analgesic and hemodynamic (blood pressure) parameters. Methods and findings in experimental and clinical pharmacology. 2002 Dec 1;24(10):675-80.
8. Jaiswal P, Kumar P, Singh VK, Singh DK. Biological effects of Myristica fragrans. Annual review of biomedical sciences. 2009 Dec 1;11.
9. Sharma G, Sharma AR, Kurian M, Bhavesh R, Nam JS, Lee SS. Green Synthesis Of Silver Nanoparticle Using Myristica Fragrans (Nutmeg) Seed Extract And Its Biological Activity. Digest Journal of Nanomaterials & Biostructures (DJNB). 2014 Jan 1;9(1).
10. Shareef M, Ashraf MA, Sarfraz M. Natural cures for breast cancer treatment.
11. Newmaster SG, Grguric M, Shanmughanandhan D, Ramalingam S, Ragupathy S. DNA barcoding detects contamination and substitution in North American herbal products. BMC medicine. 2013 Dec;11(1):222.
12. Steven G Ne, Subramanyam R. Testing plant barcoding in a sister species complex of pantropical Acacia (Mimosoideae, Fabaceae). Molecular ecology resources. 2009 May;9:172-80.
13. Olajide OA, Ajayi FF, Ekhelar AI, Awe SO, Makinde JM, Alada AA. Biological effects of Myristica fragrans (nutmeg) extract. Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives. 1999 Jun;13(4):344-5.
14. Periyasamy A, Mahalingam K. Phytochemical screening and antimicrobial activity from five Indian medicinal plants against human pathogens. Middle East Journal of Scientific Research. 2010;5(6):477-82.
15. Pillai S, Mahmud R, Lee WC, Perumal S. Anti-parasitic activity of Myristica fragrans Houtt. essential oil against Toxoplasma gondii parasite. APCBEE Procedia. 2012 Jan 1;2:92-6.
16. Qiu Q, Zhang GY, Sun XM, Liu X. Study on chemical constituents of the essential oil from Myristica fragrans Houtt. by supercritical fluid extraction and steam distillation. Zhong yao cai= Zhongyaocai= Journal of Chinese medicinal materials. 2004 Nov;27(11):823-6.
17. Duarte RC, Fanaro GB, Koike AC, Villavicencio AL. Irradiation effect on antifungal potential Myristica fragrans (nutmeg) essential oil, a preliminary study.
18. Raghavan S. Handbook of spices, seasonings, and flavorings. Boca Raton: CRC.
19. Shafiei Z, Shuhairi NN, Md Fazly Shah Yap N, Harry Sibungkil CA, Latip J. Antibacterial activity of Myristica fragrans against oral pathogens. Evidence-Based Complementary and Alternative Medicine. 2012;2012.
20. Sonavane GS, Sarveiya VP, Kasture VS, Kasture SB. Anxiogenic activity of Myristica fragrans seeds. Pharmacology Biochemistry and Behavior. 2002 Jan 1;71(1-2):239-44.

21. Steeves RA. *An intrageneric and intraspecific study of morphological and genetic variation in the Neotropical Compsoneura and Virola (Myristicaceae)* (Doctoral dissertation).

22. Sylvester C Izah, Douye V Zige, Koru J Alagoa, EJ Uhunmwangho3 and AO Iyamu. Antibacterial Efficacy of Aqueous Extract of Myristica fragrans (Common Nutmeg). EC Pharmacology and Toxicology 6(4): 291-295,(2018).

23. Ahmad S, Latif A, Qasmi IA. Aphrodisiac activity of 50% ethanolic extracts of Myristica fragrans Houtt.(nutmeg) and Syzygium aromaticum (L) Merr. & Perry.(clove) in male mice: a comparative study. BMC Complementary and Alternative Medicine. 2003 Dec;3(1):6.

24. TALLEI TE, KOLONDAM BJ. DNA barcoding of Sangihe Nutmeg (Myristica fragrans) using matK gene. HAYATI Journal of Biosciences. 2015 Jan 1;22(1):41-7.

25. Wang Y, Yang XW, Tao HY, Liu HX. GC-MS analysis of essential oils from seeds of Myristica fragrans in Chinese market. Zhongguo Zhong yao za zhi Zhongguo zhongyao zazhi= China journal of Chinese materia medica. 2004 Apr;29(4):339-42.

26. Yang XW, Huang X, Ahmat M. New neolignan from seed of Myristica fragrans. Zhongguo Zhong yao za zhi Zhongguo zhongyao zazhi China journal of Chinese materia medica. 2008 Feb;33(4):397-402.

27. Zaidi SF, Yamada K, Kadowaki M, Usmanghani K, Sugiyama T. Bactericidal activity of medicinal plants, employed for the treatment of gastrointestinal ailments, against Helicobacter pylori. Journal of Ethnopharmacology. 2009 Jan 21;121(2):286-91.

28. Al-Jumaily EF, Al-Amiry MH. Extraction and Purification of Terpenes from Nutmeg (myristica fragrans). Al-Nahrain Journal of Science. 2012 Sep 1;15(3):151-60.

29. Al-Jumaily EF, Al-Amiry MH. Extraction and Purification of Terpenes from Nutmeg (myristica fragrans). Al-Nahrain Journal of Science. 2012 Sep 1;15(3):151-60.

Elevated Anticardiolipin Titer as a Stroke Factor in Young Patients in Kirkuk City

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ABSTRACT

Introduction: Stroke is a common cause of morbidity and mortality worldwide and it is the third leading cause of medical death in developed countries. Stroke can be classified into ischemic disease (80%) and hemorrhagic disease.

Aim: This study is conducted to assess the ACA titer as a stroke risk factor in young patients in Kirkuk city in Iraq.

Method: This study involved 2 study groups each one of them including 50 patients. The first group (cases) involved 50 patients diagnosed as having ischemic stroke by neurologist their ages was less than 45 years. In another group (control) , 50 patients involved admitted to the same hospital with no history of prior ischemic stroke. Sera collected from both groups and freezed up to -70ºC until Anticardiolipin were measured by using enzyme linked immunosorbent assay with standard commercial lab kit (BIOLABO).

Results & Conclusion: Ischemic stroke according to our findings is more prevalent in those patients with Hypertension with 66% of patients in comparison to 42% of control patients with P-value of 0.0001, diabetic patients with double percentage (72%) to those in control group (36%) with P-value of 0.0001.

Keywords: *Anticardiolipin, BIOLABO, Ischemic stroke, neuromedicine.*

Introduction

Stroke is a common cause of morbidity and mortality worldwide and it is the third leading cause of medical death in developed countries. Stroke can be classified into ischemic disease (80%) and hemorrhagic disease (20%). Ischemic stroke is the result of interruption of blood supply to a part of brain, so brain cells will die due to reduction of oxygen and nutrients supply, and as it is a medical emergency an early action is required to minimize brain damage and potential complications [1, 2].

Stroke occurs in older age more frequently than younger patients, as there are risk factors that play important role in stroke pathology, such as: diabetes mellitus, hypertension, hyperlipidemia, smoking and the aging process [3]. Although, stroke can occur uncommonly in young patients and can lead to serious disability to the victim. Recent studies showed an increased incidence of stroke in young adults [4, 5].

There are special factors that might predispose to stroke in young patients, such as inherited coagulopathies; i.e. Protein C and/or S deficiencies, factor III leaden[6]. A lot of studies revealed significant relationship between auto-antibodies and increased incidence of stroke [7, 8]. Cardiolipin antibodies (ACA) are autoantibodies produced by the immune system that mistakenly target the body's own cardiolipins, substances found in the outermost layer of cells (cell membranes) and platelets and can lead to a clot formation or thrombosis and occlusion of an artery or vein and this can lead to serious complications, such as cerebral infarction [9]. ACA antibodies are quite common in the general population and are not always associated with anti-phospholipids syndrome (APS). Studies indicate that there is a higher prevalence of IgM positives than IgG in the general

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population with these isotypes occurring in 9.4% and 6.5% of the population, respectively [10, 11]. This study is conducted to assess the ACA titer as a stroke risk factor in young patients in Kirkuk city in Iraq.

Materials and Method

This is a case-control study done in the period extending from November 2013 to April 2014 in neuromedicine department in Azadi teaching hospital in Kirkuk city in Iraq. This study involving 2 study groups each one of them includes 50 patients. The first group (cases) involved 50 patients diagnosed as having ischemic stroke by neurologist their ages was less than 45 years. In another group (control), 50 patients involved admitted to the same hospital with no history of prior ischemic stroke. Sera collected from both groups and freeze up to -70ºC until Anticardiolipin were measured by using Enzyme linked immunosorbent assay with standard commercial lab kit (BIOLABO).

Anticardiolipin IgM, IgG isotypes were measured, normal expected values were Negative with less than 15.0 MPL Units for IgM isotype and 15.0 GPL units For IgG isotype, 15.0 – 22.9 represented as low positive test, ≥23.0 is categorized as high positive test. Age, Gender, cigarette smoking, and history of chronic diseases such as hypertension, diabetes mellitus, atrial fibrillation, valvular heart disease and coronary arterial disease (defined as patient have ischemic heart disease by form of Myocardial infarction, Angina and percutaneous coronary intervention to revascularize stenosed diseased arteries) For variables with is continuous and distributed non normally Mann whitney test were used while those normally distributed continuous variables Student's unpaired t test were used. In all issues, $p<0.05$ was represented as significant. Fischers exact test and chi square test analysis were used to compare different variables to evaluate first order interaction between risk factors of stroke and anticardiolipin value as positive or negative. All analyses used methods of the Statistical Analysis System, version 6.12 (SAS Institute).

Results

Fifty patients with stroke of ischemic origin and 50 controls included in the study. Table 1 summarize demographic and clinical characteristics of patients and control groups, control were older than ischemic stroke patient with no significant correlation (P-value=0.33). Gender distribution showing significant correlation in regarding female sex in both groups (P-value=0.001). Ischemic stroke according to our findings is more prevalent in those patients with Hypertension with 66% of patients in comparison to 42% of control patients with P-value of 0.0001, diabetic patients with double percentage (72%) to those in control group (36%) with P-value of 0.0001,coronary arterial disease, valvular heart disease and rhythm disease such as atrial fibrillation seen to be more popular in those patients with ischemic stroke with no significant value in regarding to patients having coronary and valvular heart disease (P-value=0.11,0.21) and strongly associated with those patient presented with atrial fibrillation (P-value=0.0001). No significant different appears between both study groups regarding smoking as a risk factor although it is more prevalent in control group (46%) than those in ischemic stroke patients group (32%) (P-value=0.11), sera were collected from all patients in both study groups and serum anticardiolipin titer both for IgM and IgG antibodies measured. Titters are classified into three categories: negative, low titter and high titters. No significant correlation seen in comparison between negative results of both IgM, IgG antibodies between patients and control study groups (P-value:0.66 and 0.8), current study shows significant rise of both low and high positive titters of anticardiolipins among stroke patients group than those control non stroke patients group (P-value:<0.0001,<0.0001,0.001,<0.0001).

Table 1: Demographic and Clinical Characteristic of Stroke Patients and Controls

Parameter	Patients (n = 50)	Control (n = 50)	P-value
Age (mean ± SD)	38 ± 6.1	42 ± 2.2	0.33
Sex(M/F)	(16/34)	(22/28)	0.001
Hypertension	33(66%)	21(42%)	0.0001
Diabetes mellitus	36(72%)	18(36%)	0.0001
Coronary arterial disease	18(36%)	10(20%)	0.11
Valvular disease	6(12%)	2(4%)	0.21
Atrial fibrillation	14(28%)	1(2%)	0.0001
Current smocking	16(32%)	23(46%)	0.11

Table 2: Distribution of anticardiolipins titer among patients and control groups

Anticardiolipin titer	Patients (n = 50)	Control (n = 50)	P-value
Negative IgM	28(56%)	38(76%)	0.66
Low + IgM	12(24%)	8(16%)	<0.0001
High + IgM	10(20%)	4(8%)	<0.0001
Negative IgG	32(64%)	42(84%)	0.08
Low + IgG	10(20%)	6(12%)	0.001
High + IgG	8(16%)	2(4%)	<0.0001

Discussion

Stroke is a common medical emergency in which early diagnosis and management is required, otherwise serious complications and disabilities can occur. In addition to the well-known medical diseases that can predispose to stroke (as DM, HT, dyslipidaemia) there are other risk factors that can jeopardize the young patient to the risk of stroke, one of these is the autoantibodies, and specially the anticardiolipin autoantibodies as it can lead to a hypercoagulable state by interaction with the endothelial cells[12]. This leads to activation of endothelial type of cells, proinflammatory cytokines secretion mainly increased, tissue factor release, and profound activation of the coagulation cascade with formation of clot and an ischemic stroke [13, 14]. Screening for those with positive anti-cardiolipin antibodies and proper assessment of them to exclude anti-phospholipid antibodies syndrome and exclude the presence of other stroke risk factors and proper prophylaxis.

Conclusion

This study has showed that there is statistically significant relationship between the findings of positive titters of anticardiolipin auto-antibodies: IgM and IgG (low and high titters) in the participants and incidence of stroke. Although this auto-anti-antibody also present in the normal control participants, but that was in non-significant number, this finding agrees with many studies published before about this subject[15, 16, 17]. Our finding of the increased incidence of ischemic stroke in that patient with positive anticardiolipin autoantibodies without other risk factors for stroke like: DM, HT, dyslipidaemia, raises important issues, like routine screening for these auto-antibodies and the role of prophylaxis in those who are positive. Elevated anticardiolipin antibodies are seen to be as independent risk factors for ischemic stroke.

Acknowledgements

The authors are grateful for all the members of neurology and laboratory units in Azadi teaching hospital for their help and support in the completing this study.

Ethical Clearance: Taken from advisory committee, Azadi teaching hospital.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

REFERENCE

1. Nicki R Colledge, Brian R. walker, Stuart H. Ralston. Davidson's Principle & Practice of Medicine. 23th edition. Chirchill Livingstone 2017
2. Arend Armitage, Cecil'c Medicine. Saunders. 23th edition.2008 : 1122-1
3. Dan L. Longo, Antony S. Fauci, Dennis L. Kasper. Harrison's Principles Of Internal Medicine. Mc Graw Hill. 18th edition. 2012: 2202-2209.
4. Pareveen Kumar, Michael Clark KUMAR & CLARK Clinical Medicine. Elsevier Saunders. 6th edition. 2005 : 732-740.
5. Bimal H. Ashar, The John Hopkins Internal Medicine Board Reviw. Elsevier Saunders, Fourth edition, 2012 : 160 – 170.
6. Dzevdet S. Stroke in Young Adults : Epidemiology & Prevention. Vsc. Health Risk Manag. 2015; V11 : 157-164.
7. Tuhrim S, Rand JH. Elevated anticardiolipin antibody titter is a stroke risk factor in a multiethnic population independent of isotype or degree of positivity. Stroke. 1999 Aug;30(8):1561-5.

8. Ginsburg KS, Liang MH. Anticardiolipin antibodies and the risk for ischemic stroke and venous thrombosis.Ann Intern Med. 1992 Dec 15;117(12):997-1002.
9. Lien LM, Chen WH. High titer of anticardiolipin antibody is associated with first-ever ischemic stroke in Taiwan. Cerebrovasc Dis. 2006;22(4):225-30.
10. Weingarten K, Filippi C. The neuroimaging features of the cardiolipin antibody syndrome. Clin Imaging. 1997 Jan-Feb;21(1):6-12.
11. Tuhrim S, Rand JH, Wu X. Antiphosphatidyl serine antibodies are independently associated with ischemic stroke. Neurology. 1999 Oct 22;53(7):1523-7.
12. Vallabh Janardhan, Philip A. Wolf, Carlos S. Kase et al. Anticardiolipin Antibodies and Risk of Ischemic Stroke and Transient Ischemic Attack. The Framingham Cohort and Offspring Study. 2DStroke. 2004;35:736–741.
13. Stallworth CL, Brey RL. Antiphospholipid antibody syndrome. In: Bogousslavsky J, Caplan LR, eds. Uncommon Causes of Stroke. Cambridge, UK: Cambridge University Press; 2001:63–77.
14. Petri M. Epidemiology of the anti-phospholipid syndrome. J Autoimmun. 2000; 15: 145–151. CrossrefMedline
15. Ginsburg KS, Liang MH, Newcomer L, Goldhaber SZ, Schur PH, Hennekens CH, Stampfer MJ. Anticardiolipin antibodies and the risk for ischemic stroke and venous thrombosis. Ann Intern Med. 1992; *117*: 997–1002.
16. Ahmad E, Stegmayr B, Trifunovic J, Weinehall L, Hallmans G, Lefvert AK. Anticardiolipin antibodies are not an independent risk factor for stroke: an incident case-referent study nested within the MONICA and Vasterbotten Cohort Project. Stroke. 2000; 31: 1289–1293
17. Brey RL, Abbott RD, Curb JD, Sharp DS, Ross GW, Stallworth CL, Kittner SJ. β2-Glycoprotein 1–dependent anticardiolipin antibodies and risk of ischemic stroke and myocardial infarction: the Honolulu Heart Program. Stroke. 2001; 32: 1701–1706.

ODAP: The Natural Toxin Present in The Lathyrus Sativus (Grass Pea)

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ABSTRACT

Introduction: There are number of non-protein amino acids of plant origin considered as neuro-toxic source& pose serious health hazards both to human and animals.

Aim: This Research was designed to studythe natural toxin present in Lathyrus sativus (Grass Pea) that resulted from the neurotoxic amino acids in Lathyrus seeds which are very important because they are of immediate relevance to human health or diseases affecting domestic animals, and they have resulted in findings of several unusual and novel mechanisms of biosynthesis and metabolism.

Method: This research study the toxicity of ODAP and the incidence of neurolathyrism, estimate the concentration of ODAP in seeds, estimate qualitatively the presence of ODAP and DAP in Lathyrus seeds and estimate the protease activity in growing seedlings of Lathyrus.

Results & Conclusion: The results showed that ODAP had inhibitory effect on the growth of the microorganism Pseudomonas indica. However, it showed very little inhibition on E. coli and showed no effect on the others like Klebsiella, Pseudomonas aeruginosa, Staphylococcus aureus

Keywords: *Grass pea, Neurotoxin, ODAP, Lathyrus sativus*

Introduction

The number of amino acids present in proteins is limited to twenty, nevertheless the number of non-protein amino acids that exist in nature far exceeds this number. Further nature has restricted the presence of a large number to these amino acids selectively only to the plant kingdom. Man & domestic animals which are in constant search for new sources of food often have to depend on such plant sources. Plants have opted for such non-protein amino acids for various reasons, the most likely being protection from predators and environmental stresses. Occasionally man & domestic animals become the inadvertent victims of such defense system. It can also be considered as a cruel trick of nature to place in an otherwise valuable food plant, a chemical that has the potential to cause damage to those who are dependent on its consumption. A number of non-protein amino acids of plant origin fall into this category since they posses neuro-toxic properties & pose serious health hazards both to human & animals.Studies with neurotoxic aminoacids have been most rewarding for several reasons, such as

- They are of immediate relevance to human health or diseases affecting domestic animals.
- They have resulted in findings of several unusual & novel mechanisms of biosynthesis & metabolism in the host & victims respectively.
- They have provided insights into newer neurochemical mechanisms.
- They form the basis for rational approaches to therapeutic treatment of neuro-degenerative disorders.
- They have provided suitable animal models for neuro-degenerative disorders.

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Materials and Method

Protein Estimation: The total protein content of crushed seed powder as well as the crushed cotyledons was estimated by Lowry method under alkaline conditions using Folin's coloring reagent[1]. The total protein content in *Lathyrus* seeds, thus estimated was used as a confirmation for the presence of ODAP in the seeds and was also used in the calculation Protease activity in the geminating seeds[2].

Qualitative estimation of ODAP in the seed sample: With an idea to confirm the presence of ODAP in the seed sample of *Lathyrus,* electrophoresis and chromatography was performed[3].

Electrophoresis: The qualitative estimation for the presence ODAP and DAP in the seed extract was carried out using horizontal Paper Electrophoresis carried out on a Whatmann no 1 filter paper with a mobile phase of Pyridine: Acetic acid: Water in the ratio of 10: 100: 900,pH 3.6. The apparatus was set up at 400V and was run for 1.5 hours. The steps involved were:

1. Narrow strips of 25cm with Whatmann no.1 filter paper were cut carefully. 5 strips of the same size were prepared.
2. A line was drawn in the centre of the strip to indicate the place of loading.
3. One sample was added on to each of the strip.
4. In the first strip, standard ODAP (1mM) was added.
5. The second strip had Standard DAP.
6. The third had a mixture of DAP and ODAP.
7. The fourth and the last one had the crude seed sample.
8. These strips were then saturated in the mobile phase and were placed in the electrophoretic apparatus.
9. The anode and the cathode chambers were filled with the mobile phase buffer.
10. The apparatus was then set in a horizontal mode at 400V and was allowed to run for 1.5 hours.
11. After the run, the papers were carefully removed and dried. To the dried paper strips, Ninhydrin reagent was sprayed. Since ODAP and its derivatives are derivatives of Amino acids, we looked for the formation of Blue spots.
12. The Rf value of the crude seed extract was calculated and was compared with the standards.

Quantitative estimation of ODAP in the seed sample by OPT method: *Lathyrus sativus* seeds are known to cause the clinical condition of *Lathyrism* due to the presence of a compound called ODAP[3]. The quantitative estimation of this compound in the seeds will give us a vague idea of the occurrence of this incident in areas where this crop is used as a major staple food crop.

Seeds were collected from Bandhra region, India. The ODAP content was estimated by OPT[4]* method (o-phthaldehyde).

1. **Standard ODAP preparation:** 17.61mg of ODAP and about 15mg of $NaHCO_3$ were dissolved in 100ml of distilled water.
2. **Preparation of seed powder for the estimation of ODAP content:** 20mg of de-husked *Lathyrus sativus* seeds were weighed and powdered. To the powdered grain, 2ml of distilled water was added and kept in a boiling water bath for 30'. After cooling the contents, it was centrifuged at 3000 rpm for 3'using a microfuge. The supernatant was carefully collected and stored in the refrigerator till use.
3. **Quantitative estimation of ODAP:** The standard graph was constructed using a range of concentration of the standard ranging from 10µl to 100µl of standard (this accounts to a concentration range of 0.176 – 1.760 of standard ODAP). 20µl and 40µl of the seed sample was taken for its estimation. To all the test tubes, 200µl of 3N KOH was added and was incubated in a boiling water bath for 20'.Following the incubation and cooling, distilled water was added to all the test tubes such that the final volume is 1ml. This was followed by the addition of 2ml of OPT reagent. The contents were incubated at room temperature for 20' for the color to develop. The color developed was read at 420nm in a UV-Vis spectrophotometer.

Enzyme Assay: Lathyrism is a clinical condition where in there is an irreversible neurological degeneration, resulting in the paralysis of lower limbs[5]. This degeneration could be attributed to any kind of enzyme

activity that degrades the proteins of the nervous system. With this sole presumption in mind, enzyme assay[7] was performed to get an idea of the protease activity in *Lathyrus* seeds.

Lathyrus sativus seeds were grown for different time periods of 0, 2, 4, 6, days. The assay was performed using 1 % (w/w) Casein as the substrate. To 1ml of the substrate, 0.5 ml of Tris Hcl buffer (0.05M, pH 7.2) and 0.5ml of the crude enzyme (containing 2.8 mg of protein) solution was added and incubated at 37^0C at different time intervals of 0, 10, 20, 30 minutes.The reaction was stopped at the specified time intervals using 2ml of 10% Trichloroacetic acid. In case of the 0 minute time interval, TCA was added prior to the enzyme assay.

Addition of TCA results in the coagulation of un-reacted casein molecules, which can be removed by centrifugation. Post to centrifugation, 1ml of supernatant was collected, to which 5ml of 0.5M Na_2CO_3 and 0.5ml of 3X Folin's reagent was added. The contents were incubated at room temperature for 30' after which the absorbance was noted for all the test tubes at 720nm using a colorimeter.

Enzyme Activity by Trypsin: Trypsin is a type of protease that is secreted in the small intestine of animals that brings about the breakdown of proteins.A standard graph of tyrosine standards was constructed by taking a range of tyrosine standards from 0.11mM to 1.1mM. This was done by taking 1ml of appropriately diluted tyrosine standard solution to which 5ml of 0.5M Na_2CO_3 and 3X diluted Folin's reagent was added. The contents were incubated for 30' at room temperature.

Meanwhile, an enzyme assay was performed on Casein using tyrosine as the enzyme. To 1ml containing 1 % (w/w) of Casein, 0.5ml of 0.05M Tris Hcl buffer and 0.5ml of trypsin was added. The contents were incubated at 37^oC for 20'. The enzyme reaction was stopped by adding 2ml of 10% Trichloro acetic acid. This reagent coagulates all the un-reacted casein molecules which are removed by centrifugation. To 1ml of the supernatant, 5ml of 0.5M Na_2Co_3 and 3X diluted Folin's reagent was added. The contents were incubated at room temperature for 30'. The color developed was read at 720nm using a colorimeter.

Results

1. Estimation of Protein by Lowry Method

- 10X and 20X diluted seed powder sample showed an absorbance of 0.48 and 0.27 respectively at 720nm in a UV-Vis spectrophotometer.
- This absorbance corresponds to an average concentration of 29g of protein for 100g of the seed sample.

Table 1: Estimation of proteins

Estimation of Protein By Lowry's Method					
Standard	**Concentration**	**Reagent D**		**Folins reagent**	**OD at 720nm**
blank	0	4ml		0.4ml	0
0.1	10	4ml		0.4ml	0.139
0.2	20	4ml		0.4ml	0.349
0.4	40	4ml	incubation for	0.4ml	0.492
0.6	60	4ml	30min in	0.4ml	0.544
0.8	80	4ml	boiling water	0.4ml	1.557
1	100	4ml	bath	0.4ml	1.731
unknown					
Undiluted		4ml		0.4ml	1.812
10x		4ml		0.4ml	0.488
20x		4ml		0.4ml	0.27
50x		4ml		0.4ml	0.17

2. Qualitative Estimation of ODAP in the seed sample

Electrophoresis: The results showed that the seed sample had both the components, ODAP and DAP in it. This is shown by the presence of two bands on the strips. The purple color formed represents the presence of amino acids.

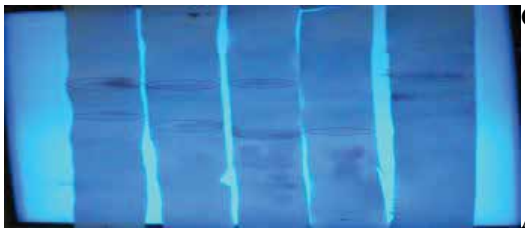


Fig. 1: Electrophoretic running of 5 spots under the voltage of 400V run for 1.5 hours

The spots were crude seed sample 1 (1), crude seed sample 2 (2), Mixture of ODAP and DAP (3), Standard DAP (4), Standard ODAP (5).

Chromatography: The standard ODAP seed was very concentrated (10mg/ml) because of which the resolution of the seed sample is not very clear. But upon a scrutiny, one can find two spots; one representing ODAP and the other representing DAP. There has been a replication of results of electrophoresis in Chromatography. This clearly indicates that the seed sample has both, DAP and OPAP.

3. Quantitative estimation of ODAP in the seed sample: 50X and 25X diluted sample showed an Absorbance of 0.149 and 0.151 respectively at 410nm in a UV-Vis spectrophotometer. Using these values when the ODAP content was calculated, it summed up to be a concentration of 0.49g %.

Table 2: Standardization of ODAP by OPT method

Standard	KOH		Water	OPT reagent	OD at 420nm
Blank	200ul		800ul	2ml	0
10ul	200ul	incubation for	790ul	2ml	0.097
20ul	200ul	20min in	780ul	2ml	0.163
40ul	200ul	boiling water	760ul	2ml	0.331
80ul	200ul	Bath	720ul	2ml	0.437
100ul	200ul		700ul	2ml	0.412
unknown					
20ul	200ul		780ul	2ml	0.149
40ul	200ul		760ul	2ml	0.151

4. Enzyme assay

- Trypsin digested casein assay showed an absorbance of 0.16 which corresponds to a concentration of 90.2µM. The enzyme had an activity of 28.5 Enzyme Units.
- The enzyme activity of protease from *Lathyrus* seed at 20' showed varied activity and it has been tabulated in the table below. The maximum activity was seen in the dry sample when compared to the seedlings, which is 20.9 Enzyme Units.
- The enzyme activity was calculated using the formula: **µ**moles of Tyrosine equivalents released x Volume of enzyme assay/Incubation time x Colorimetrically measured volume x Enzyme volume

Table 3: Standardization of Tyrosine

Standardization of Tyrosine					
tyrosine	**water**	**Na2CO3**	**folins reagent**		**OD at 720nm**
0.1ml	0.9ml	5ml	0.5ml		0.02
0.2ml	0.8ml	5ml	0.5ml	incubation	0.04
0.4ml	0.6ml	5ml	0.5ml	at room temp	0.08
0.6ml	0.4ml	5ml	0.5ml	for 30 min	0.14

Conted…

0.8ml	0.2ml	5ml	0.5ml		0.15
1ml	0	5ml	0.5ml		0.2
unknown					
1ml	0	5ml	0.5ml		0.16

Results of Toxic Activity of Odap on Microbes

LB Agar Medium

1. **E.Coli:** A slight inhibition zone at (125 µg of ODAP) was seen, which indicates that the ODAP can inhibit the growth of E. Coli.

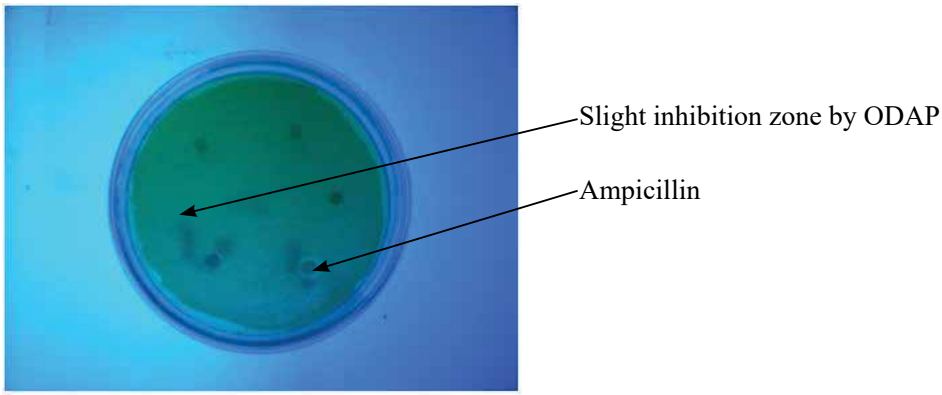


Fig. 2: Growth of E.Coli

2. **Pseudomonas aeruginosa:** No inhibition zone was observed at any concentration of ODAP. A clear inhibition zone was observed with ampicillin.
3. **Pseudomonas indica:** No inhibition zone was observed at any concentration of ODAP. A clear inhibition zone was observed with ampicillin.

LB Broth Medium:

Table 4: Growth of E.Coli, Pseudomonas indica and Pseudomonas aeruginosa in broth medium

Serial Number	Sample	Volume of LB Broth (ml)	Volume of Inoculums'(µl)	Volume of ODAP (µl)	Concentration of ODAP (µg/ml)	Optical Density at 600 nm
1.	Blank	5 ml	None	None	0.00	0.00
2.	Control	5 ml	50 µl	None	0.00	1.70
3.	*E.Coli 1*	5 ml	50 µl	5 µl	50 µg/ml	1.51
4.	*E.Coli 2*	5 ml	50 µl	10 µl	100 µg/ml	1.50
5.	*E.Coli 3*	5 ml	50 µl	15 µl	125 µg/ml	1.49
Pseudomonas indica						
1.	Blank	5 ml	None	None	0.00	0.00
2.	Control	5 ml	100 µl	None	0.00	1.62
3.	*Ps.in 1*	5 ml	100 µl	5 µl	100 µg/ml	0.42
4.	*Ps.in 2*	5 ml	100 µl	10 µl	200 µg/ml	0.01
Pseudomonas aeruginosa						
1.	Blank	5 ml	None	None	0.00	0.00
2.	Control	5 ml	100 µl	None	0.00	1.50
3.	*Ps.ag 1*	5 ml	100 µl	µl	100 µg/ml	1.52
4.	*Ps.ag 2*	5 ml	100 µl	10 µl	200 µg/ml	1.48

Discussion

The disease nuerolatyhrism is thought to affect only a small percentage of human population, which is often less than 5%, even in those areas where *Lathyrus* is used as the sole staple food crop. It is very interesting to know that the same component in the seeds that can cause paralysis in mice, chicks etc have very less impact on human beings. Another interesting study is the effect of *Lathyrus* extract on the growth of microorganisms. At a concentration of 7µg/ml, 50% inhibition was seen on the cultures of *E. coli*[7]. Another probable reason could be a random mutation in these strains of bacteria that have helped them to overcome the toxicity of ODAP. If this intuition is true then one can extend this same study to find out the product of metabolism that has an inhibitory effect on ODAP. This can further be extended to use this as a curative product for neurolathyrism. A comparative study of protease activity in some toxic and non toxic seed can reveal if there is a relationship between toxicity and proteolytic activity (either enhanced or reduced). Since we had the constraint of time and the pressure of semester academics, we could limit our project to just a few aspects of ODAP. Given an opportunity, we would like to extend our research on the above mentioned notes.

Conclusion

The seeds of *L.sativus* showed the maximum concentration of 0.49 g% and it was found that they have both, ODAP & DAP. Maximum protease activity was seen in the dry seed powder which was 20.9 Units as compared to 28.5 Units of Trypsin. It was also shown that ODAP had inhibitory effect on the growth of the microorganism *Pseudomonas indica.* However, it showed very little inhibition on *E. coli* and showed no effect on the others like *Pseudomonas aeruginosa..* However, the exact mechanism of either their inhibition or non inhibition is not known yet.

Acknowledgements

The authors are grateful to all the members of University of Al - Qadisiyah for support in the completing this study.

Ethical Clearance: Taken from advisory committee, University of Al-Qadisiyah.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

REFERENCES

1. Peterson GL. A simplification of the protein assay method of Lowry et al. which is more generally applicable. Analytical biochemistry. 1977 Dec 1;83(2):346-56.
2. Rao SL, Adiga PR, Sarma PS. The isolation and characterization of β-N-oxalyl-L-α, β-diaminopropionic acid: a neurotoxin from the seeds of Lathyrus sativus. Biochemistry. 1964 Mar 1;3(3):432-6.
3. Xie GX, Qiu YP, Qiu MF, Gao XF, Liu YM, Jia W. Analysis of dencichine in Panax notoginseng by gas chromatography–mass spectrometry with ethyl chloroformate derivatization. Journal of pharmaceutical and biomedical analysis. 2007 Feb 19;43(3):920-5.
4. Ludolph AC, Hugon J, Dwived MP, Schaumburg HH, Spencer PS. Studies on the aetiology and pathogenesis of motor neuron diseases: 1. Lathyrism: clinical findings in established cases. Brain. 1987 Feb 1;110(1):149-65.
5. Cupp-Enyard C. Sigma's non-specific protease activity assay-casein as a substrate. JoVE (Journal of Visualized Experiments). 2008 Sep 17(19):e899.
6. Tsou CL. Cytochrome c modified by digestion with proteolytic enzymes: 1. Digestion. Biochemical Journal. 1951 Aug;49(3):362.
7. Dwivedi MP. The grass pea, treat and promise. Proceedings of the International Network for the Improvement of Lathyrus sativus and the Eradication of Lathyrism. 1989:1-26.

Safety Disposal of Electrophoresis Gels and PCR Contaminate with Ethidium Bromide and Alternative Methods

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ABSTRACT

Introduction: Electrophoresis gel is commonly used in molecular biology laboratories for the identification of nucleic acid (DNA or RNA) and proteins. This gel will typically be agarose-based.

Aim: The safety disposal of electrophoresis gels and PCR contaminate with ethidium bromide and alternative methods.

Method: The DNA/proteins can be stained by adding the dye to the sample before electrophoresis and the gel can be placed in a dye solution after electrophoresis completed. Waste disposal requirements will vary on the dye used and the methodology used to stain the cells.

Results & Conclusion: Ethidium Bromide, Acridine Orange, SYBR Green I, SYBR Green II, SYBR Gold, Gel Star dyes have been determined to have mutagenic properties. The gel that cast with these dyes in them, unwanted dye stock solutions and all contaminated debris must be collected for disposal by the HWMU. Gels that undergone electrophoresis and staining were destained.

Keywords: *Agarose, Disposal, Electrophoresis, Waste.*

Introduction

Electrophoresis gel is commonly used in molecular biology laboratories for the identification of nucleic acid (DNA or RNA) and proteins. This gel will typically be agarose-based. This electrophoresis process utilized an organic fluorescence dye or inorganic such as Silver (which is an EPA regulated material) to stain DNA or proteins[1]. Waste of the DNA identification process must be managed and disposed in a manner to protect public health and the environment. To ensure safe, prudent disposal as well as reduce the amount of Hazardous Waste material[2]. This can be accomplished by choosing less toxic materials and work practical methods that minimize thquantity of waste generated as well as the toxicity of the waste material itself. In cases where safer materials or work practices cannot be employed, waste collection methods and regulatory agency requirements are to be followed.

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Materials and Method

There are a number of different protocols and alternative dyes used in the preparation of electrophoresis gels. Gels can be cast with or without dyes. The DNA/proteins can be stained by adding the dye to the sample before electrophoresis; the gel can be placed in a dye solution after electrophoresis has been completed. Waste disposal requirements will vary on the dye used and the methodology used to stain the cells. The electrophoretic waste of the DNA or proteins product identification process must be managed and disposed in a manner that is consistent with the commitment it has to protect public health and the environment. The following provides lab managers with the proper procedures for managing and disposing electrophoresis-associated gel wastes.

Ethidium Bromide, Acridine Orange, SYBR Green I, SYBR Green II, SYBR Gold, GelStar dyes have been determined to have mutagenic properties[3]. The gel that have been cast with these dyes in them, unwanted dye stock solutions and all contaminated debris must be collected for disposal by the HWMU. Gels that have undergone electrophoresis and staining have been distained where all excess dye has been washed out

the gel (the only dye left in the gel is a trace amount contained in DNA/protein sample material) can be discarded in the trash[4]. Contaminated "non-sharp" lab debris (e.g., gloves, towels, tubes, etc.) should be collected and disposed of the HWMU.

The buffer solutions that have been run through the approved filter should be checked under an appropriate light source for complete removal of the dyes, and if it passes (does not fluoresce), the liquid can be disposed of down the drain with a copious amount of water as long as it contains no other materials that would cause it to be regulated as a Hazardous Waste.

Waste Management of Materials for Disposal is done through the Hazardous Waste Management Unit. The main wastes are Chemicals (room 0114), Risk waste: Blood, cells, viruses and bacteria, sharp or pointed objects (room 0116), Biological waste: Dead experimental animals, etc. (room 0116/freezer room in the waste area), Radioactive waste (room 0115) and chemicals. The safety data sheet will tell you whether the waste is to be classified as hazardous waste. In addition it will provide information about the necessary protective equipment and about any protective devices that must be used.

All waste must be packaged and labelled properly. If possible, use the original packaging if this is suitable. Containers must be in good condition, and caps must be screwed on well. Avoid using packaging material that can be confused with household products – for example coffee jars, soft-drink bottles and the like. The university purchases plastic cans for hazardous waste, labels for marking waste, and polystyrene boxes that can be used to protect glass bottles against impact. These are kept in the waste area in the basement.

Each substance/substance compound must be clearly labelled with: contents (name of chemical and approximate composition), date, name, department and telephone number. If the contents are not known, the container must be labelled "Content not known". Chemical waste, used oil and batteries must be placed in Room 0114 in the basement of Domus Medica. Volatile substances must be place in the innermost part of the waste room with suction removal. The waste must be put on the shelves, away from the floor. Explosive chemicals must not be put in 0114 room. Contact the HSE Coordinator for the disposal of explosives. The room must be kept locked at all times. Hazardous waste is collected by Ragn Sells AS.

Risk and Biological Waste: When handling 'risk waste', adequate protective equipment and, if relevant, protective devices must be used. Read the safety data sheet for information. Risk waste and biological waste can include: biological material, sharps and cutting equipment, substances that may be carcinogenic/ mutagenic and cytostatics[5]. All waste must be packaged and labelled properly. 'Risk waste' is packaged in yellow plastic containers that are labelled with a completed declaration form for risk waste. Yellow plastic containers and declaration forms are available in the waste department in the basement. Yellow toxic waste containers must be placed in the basement of Domus Medica, room number 0116. The room must be kept locked at all times. Risk- and biological waste is collected by Ragn Sells AS.

Radioactive Waste: When handling radioactive waste, adequate protective equipment and if relevant protective devices must be used, such as closed hoods. Read the safety data sheet for more information. All radioactive waste needs to be clearly marked with a label for radioactive waste. These are available in the waste department. Radioactive waste, which is also 'risk waste' and biological waste, must also be packed into yellow plastic containers and be marked with a label for radioactive waste. This also applies to waste that has previously been radioactive but that has become inactive. Please use bequerel as a unit for activity. All radioactive waste, as well as waste that has previously been radioactive, must be logged when it is placed in the waste room. The log is kept inside of room 0115. The waste must be placed in the basement of Domus Medica, Room 0115. The room must be kept locked at all times.

For a pickup, an empty replacement pail will be provided at the time of the collection if needed. Collection and disposal of chemically contaminated sharps (needles, Pasteur pipettes, etc.) must be collected in an approved sharps shelter (NOT RED – use the white/translucent or yellow). It must be labelled (Hazardous Waste – Chemically Contaminated Sharp). Any biohazard labels should be removed or completely defaced.

Procedure for Disposal: All DNA, plasmids etc. must be handled as toxic waste. All pipette tips, tubes etc. that have been used for DNA work must be disposed of in yellow toxic waste containers. Agaro seals with EtBr and SYBR-safe/SYBR-green etc. are disposed of in yellow toxic waste containers. Contaminated glass

equipment must be rinsed well before being put ready for washing. Kits: waste must be handled in accordance with the HSE data sheet that comes with the kit. Small volumes of isopropanol and ethanol waste must be collected in Eppendorf tubes and disposed of in yellow toxic waste containers. Larger volumes must be handled as hazardous waste. Used running buffer must be handled as an absorption medium. Used absorption media must be disposed of in yellow toxic waste containers. Read the safety data sheet that comes with the absorption medium. Examples of absorption media are activated carbon, activated charcoal, C3014-500G, untreated, granular, 20-60 mesh, destaining bags, cat. No: 730-0997 and BondEX 50 Set (5), product code M740703.

Handling GMO (Genetically Modified Organisms) waste: Waste from GMO must be handled as biological waste and regarded as toxic waste. This applies to both solid and liquid waste. Waste from GMO in class 3 and class 4 must be inactivated before it is placed in yellow toxic waste containers. Inactivation takes place by autoclaving for one hour at 121 degrees, or by using Virkon 1-3% or 5% hypochlorite.

SYBR® Safe, GelRed, GelGreen, and EvaGreen dyes determined to be nonmutagenic dyes in testing by independent licensed testing laboratories.All gels and contaminated "non-sharp" lab debris (gloves, towels, etc.) that are processed using this dye can be discarded in the trash.Spent running buffer solutions and destaining solutions that contain the dyes can either be collected and disposed of through the HWMU or collected and run through an approved filter device[6]. The buffer solutions that have been run through the approved filter should be checked under the appropriate light source for complete removal of the dyes, and if it passes (does not fluoresce), the liquid can be disposed of down the drain with a copious amount of water as long as no other materials are present that would cause the material to be a (Hazardous Waste). The filters that have been used up and are no longer effective must be disposed of through the HWMU.

Conclusion

Waste described in this document must be stored in the following manner: 32P is kept in plexiglass shielding containers, 51Cr and 125I are kept in lead containers and 35S, 3H and 14C can be stored without shielding. Mutagenic or Toxic product of (PCR) and Contaminated "Non-Sharp" Lab Debris (e.g., gloves, pads, tubes, etc.) are placed into a plastic container 5 gallon bucket (optimal of volume of waste generated). This container should have a plastic bag as an inner liner. The container must be closed at all times except when immediately adding or removing wastes from the container. Contact the Hazardous Waste Management Unit (HWMU) if you need a 5 gallon bucket to collect your waste. Labelled the container's which waste constituents are present in the pail (e.g., "Hazardous Waste - Ethidium Bromide Contaminated Gels, Gloves, Paper"). Sharp items (e.g., needles, Pasteur pipettes, Tips, etc) are to be placed into the containers or 5-gallon pails. The gel that cast with these dyes in them, unwanted dye stock solutions and all contaminated debris must be collected for disposal by the HWMU.

Acknowledgements

The authors are grateful for University of Babylon, Iraqi Ministry of Education for providing necessary laboratory facilities.

Ethical Clearance: Taken from advisory committee, University of Babylon.

Source of Funding: Self

Conflict of Interest: No conflicts of interest declared.

REFERENCE

1. La Montagne MG, Michel Jr FC, Holden PA, Reddy CA. Evaluation of extraction and purification methods for obtaining PCR-amplifiable DNA from compost for microbial community analysis. Journal of Microbiological Methods. 2002 May 1;49(3):255-64.
2. Neumaier M, Braun A, Wagener C. Fundamentals of quality assessment of molecular amplification methods in clinical diagnostics. Clinical Chemistry. 1998 Jan 1;44(1):12-26.
3. Karge WH, Schaefer EJ, Ordovas JM. Quantification of mRNA by polymerase chain reaction (PCR) using an internal standard and a nonradioactive detection method. InLipoprotein Protocols 1998: 43-61.
4. Hengen PN. Methods and reagents: disposal of ethidium bromide. Trends in biochemical sciences. 1994 Jun 1;19(6):257-68
5. Armour, Margaret-Ann. Hazardous Laboratory Chemicals Disposal Guide, 3rd Edition.
6. Evenson, WE, Boden, LM, Muzikar, KA, and O'Leary, DJ. 1H and 13C NMR Assignments for the Cyanine Dyes SYBR Safe and Thiazole Orange. The Journal of Organic Chemistry 2012 77: 10967-10971.

Enhancement in Segmentation of Brain Tumors on MRI Using Region Growing Algorithm

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ABSTRACT

Background/Objectives: In radiation oncology applications, the detection and segmentation of assorted necrotic and tumor tissue next to the adjacent vessels is a demanding situation. The MRI illustration produces an elevated fluctuate images indicative of usual in addition to unusual tissues that aid to discriminate the overlap into fringe of each tissue.

Method/Statistical Analysis: All habitual seed judgment methodologies might suffer through the difficulty but no development of tumor is there as well as if any small white part or grey part is present there. Segmentation of images by means of multifaceted structures such as magnetic resonance images of brain is tricky using common methods. The region based lively contour models are extensively used in segmentation of brain tumor.

Findings: If the boundaries of tumor is blunt, then the segmentation results are inaccurate i.e. segmentation could be above or beneath that may happen because of primary stage of the tumors. Here a scheme of tumor recognition based on texture of the MRI and the detected tumor is then segmented automatically using automatic seeded region growing technique and is proposed to detach the asymmetrical from the regular neighboring tissue to obtain an authentic detection of concerned and non-concerned area that facilitate the surgeon to discriminate the affected area accurately.

Improvements/Applications: The methods used in this paper are texture analysis and automatic seeded region growing technique and is implemented on MRI of brain to identify the tumor margins in 2D MRI for dissimilar cases.

Keywords: *Brain tumor segmentation, MR Image, region growing, necrotic tissue segmentation, enhancing cell, radio surgery, radiotherapy.*

Introduction

Segmentation of brain tissues within gray matter[2]white matter [3], and tumor [4] on medicinal images is difficult in the radiation oncology application. The brain tumor contour is an upcoming vital step in spatially localizes radiotherapy (e.g., Cyber knife) [6], [7] that are normally completed physically on contrast-enhanced T1-weighted MRI images in contemporary medical observation. This kind of T1 MR Images are taken over behind the administration of a distinction agent (gadolinium), element of the tumor and blood vessels, wherever the dissimilarity will pass the blood-brain barrier are found as hyper intense areas. There are completely different attempt for brain tumor segmentation that utilize as mix multimodalities, single modality and use priors noninheritable from population atlases. Modalities that provide vital data information concerning tumor and edema that embrace insertion Imaging, Diffusion Imaging give minor resolution images difference with T1 or T2 weighted arrangements. The first reason to utilize multimodality images like T2 weighted MRI is to segment infiltration/edema areas that are usually not detectable in T1 images.

These techniques combine region developing and boundary detection designed for magnetic resonance (MR) brain image segmentation. Initializing through a straightforward area growing algorithm that generate an above segmented image apply a complicated merging

process and region growing that handles convoluted image structures. Boundary information is subsequently incorporated to accurate also to substantiate region boundaries. Texture based automated seed segmentation is enforced at this point. The outcome of this method should be precise as well as proficient for MR brain image segmentation.[5] The involuntary segmentation of medical images serve because pc aided diagnosis and quantification studies are the key step in imaging applications for registration of a variety of modalities. Image segmentation with multifarious structures like magnetic resonance image of the brain complicate the use in universal principle technique. Region-based technique frequently not succeed to yield the predictable composition due to the complexity of choosing an affordable starting "seed".

Brain resonance images (MRI) of tumor segmentation may be a difficult method. The Region Growing formula may be a conventional region-based methodology designed for medical image segmentation.

Background

Seeded Image Segmentation: An un-directed graph is given by means of vertices v Є V and edges e Є E, a weighted graph assign as wij to every edge eij between the vertices vj and vi.[1] Vertices are equivalent to the image pixels and also the edge weights are similarity measures between neighboring pixels dependent on image features (e.g., intensities) in image segmentation[7]. Every vertex vi has an attribute xi, that is a marker of the possibility of a label model for back ground and foreground label. With the background B and foreground F seeds are provided via the user. In absolute solution, the vertices having value xi <0.5 as background and xi ≥ 0.5 are marked as foreground. This procedure has proceeded in anticipation of all pixels are allocated to an area.

Region Growing in Image Segmentation: Seeded region growing require seeds as complementary key. The segmentation consequence relates ahead the selection of seeds. Blare inside the image might create seeds to survive imperfectly placed. Un-seeded area emergent may be a personalized set of an algorithm that doesn't need specific seeds. In area growing, the homogeneity[8] condition, as its demand depends in addition on image arrangement property that isn't regard to the client. Highly developed emergent algorithmic program follows homogeneity criterion consequently from the distinctiveness of the area to be divided. The technique is totally based on a duplicate that describe homogeneity and basic outline properties of the region. Parameters of the homogeneity perception are evaluated from sample location within the region. These locations are selected one after another during a random walk starting at the seed position, and therefore the homogeneity condition is updated frequently[9]. These approaches develop into comprehensive, completely automatic with entire segmentation technique through the use of the pixels among the insignificant gradient length within the undivided image section as seed position. The strategy practiced was meant for segmentation scheduled experiment images and structures in MR and CT images. The method to frequently work is the hypotheses model on homogeneity as well as section characteristics are definite. Additionally, the model is straightforward and tough, therefore with an exact amount of divergence from model constraints and influential certain segmentation outcome.

A single region A1 is chosen in the pixel does not considerably impact ultimate segmentation. Each iteration consider the adjacent pixels similarly as the seeded region growing. It is not the same as seeded region growing as the least amount δ is lesser than a pre-described threshold T and then brought to the relevant region Aj. The pixel is measured substainly different from all existing regions Ai and a new region An+1 is formed with this pixel. One alternative of this method is based on pixel intensities. The mean and scatter of the area and power of the pixel is utilized to calculate a test statistic. If the test statistic is insufficient, the pixel is then added to the region and the region's mean and scatter are computed once more. Once the pixel is redundant[10], it can be used to form an additional new section. The Region Growing algorithm is a standard region-based technique for medicinal image segmentation. The most important approach is to begin with n seed points vi, i = 1..n, of voxels. From these seed points, region develop with the help of each seed and adjacent voxels which have comparable properties primarily based on pre-defined criteria. In this progressive rising manner n regions Ri, i = 1..n, will be formed. The comparison criteria to judge a voxel as part of the region Ri is recognized according to the image property. In this execution, let x be a neighbor voxel to several voxel belonging to the region Ri. If the Euclidean space concerning the voxel x and the seed point vi is fewer than a threshold θ then

the voxel x is incorporated to the region Ri. To finish the region of interest is expected for merging each grown region i=1..n of Ri.

Method

In this portion, the necrotic regions in brain tumors and the whole segmentation plan to segment the increasing cells is explained in detail. In the given workspace Segmentation is a method of determining a pattern or object. MRI is examined as a workspace in this project. In this place, tissues abnormality are detected. Really, the MRI produce a good contrast image showing all parts exactly, yet while a problem of segmenting also there. In this situation, anatomical structure observation is an important work of the physiologist. But this route may take more time and the other subsequent results such as volume[11] calculation generate incorrect measurement results when original segment result is incorrect.

Additionally, users never want to choose the seed point manually. so human interaction also not here. In this present study, our expectation is that the brain tumor structure may be of any significant shape and it is grown in impressive size.

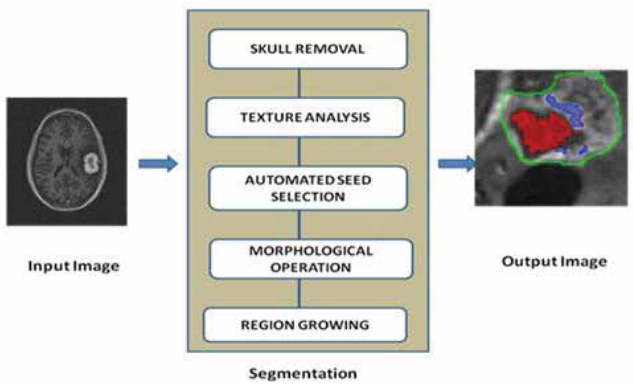


Fig. 1: Block diagram of brain tumor segmentation on MRI using Region Growing method

A. Input Image: The input representation here is the magnetic resonance image of brain. The main reason to utilize MR images such as T2 weighted MRI is to segment edema/infiltration area which is normally not recognizable in T1 images. *Skull Part Removal*

This skull removal process is a kind of pre-processing procedure to produce desirable results. Skull is external component of brain neighboring for the elimination of its non-cerebral tissues.

1. At the first store, the number of columns and rows and determine the size of the image in individual variables.
2. Execute iteration for all rows and half of the columns.
3. Progress half of image convert black pixels from white pixels by fixing the gray value to zero.
4. The above steps are continued for the residual row and column.

B. Texture Analysis: Magnetic resonance images consist of little microscopic information that may not assess visual and texture analysis method and provide a way for getting the information. Texture is of various forms like fine or rude, rough or soft, irregular or regular. A small number of patterns are extremely complicated that they can be specifically explained with texture[12] and can be simply visualized. Texture analysis on the images is performed by the use of the statistical method of the second order that applies gray level co-occurrence matrix and gray level run length measures. Parameters of run length are taken in 135, 45, 90 and 0 directions. Throughout the normalization of gray level, intensities of image were delivered from [$\mu+3\alpha$, $\mu-3\alpha$]. At last, corresponding to allotment, the image abnormality is identified.

C. Automated Seed Selection

1. Transfer specified colored image to the gray image.
2. In the beginning, count the amount of pixels with smaller intensities than hundred along with larger intensities above hundred and keep in individual values.
3. Discover the dissimilarity among each variable where variation is slight, then go to step 4, otherwise transfer the image to negative, yet once more fix as strength of exterior portion of brain to 0 and move toward step 4.
4. Switch the gray image towards binary image

D. Morphological Operation: Morphology primarily deal with outline and construction of tumor. This carry out object removal, noise exclusion, etc. For similar function these operations are applied to improve tumor margin and eliminate the distraction of image pixels

structuring component broaden the previous boundary of the image. The value in these stuffing pixels varies for dilation as well as erosion operations.

E. Seeded Region Growing: Input here is the outcome following morphological procedure. The automatic[15] seeded region growing technique next to the edge detection technique is applied here for identifying mixed necrotic and enhancing tissues in the given MRI. This step for segmentation checks adjoining pixels in primary "seed points" and concludes if the adjacent pixel were supplied to that spot.

Iteration procedure is identical to common data clustering algorithms. Major objective of segmentation is the separation of image as regions. Various segmentation techniques such as "Thresholding" accomplish the target by focusing borders among the region. In region-based segmentation[16], shaping of area is done straightforwardly. Ten samples of brain MRI is used for experimenting with it. This uses linked neighbor region growing technique has been implemented and the results are observed. The Region-Based Segmentation formula is:

(a) $U^{n}_{i=1} R_i = R_0$

This means that the segmentation should be absolute and each pixel ought to be in the area, where R_i is a linked region.

(b) $R_i \cap R_j = \phi$

Equation (b) denotes that the area have to be dislodge so that a clear partition from each other can be recognized.

(c) $P(R_i) = TRUE_{For\ i=1, 2,\ldots,n}$

Means a pixel may fit in to the area which satisfy the situation that gray level of pixel is in the array of region.

(d) $P(R_i U R_j) = FALSE$

Shows regions R_i and R_j are dissimilar in the logic of predicate P.

F. Necrotic Segmentation: Quantification of the necrotic areas inside tumor is an vital problem in processing of the tumor growth. Belated radiation necrosis usually occurs in three months or further after the treatment[18], is a main risk linked with stereotactic radio surgery. Necrosis of the tumor can take place as a consequence of the radio surgery as well as by the tumor progress itself like in gliomas.

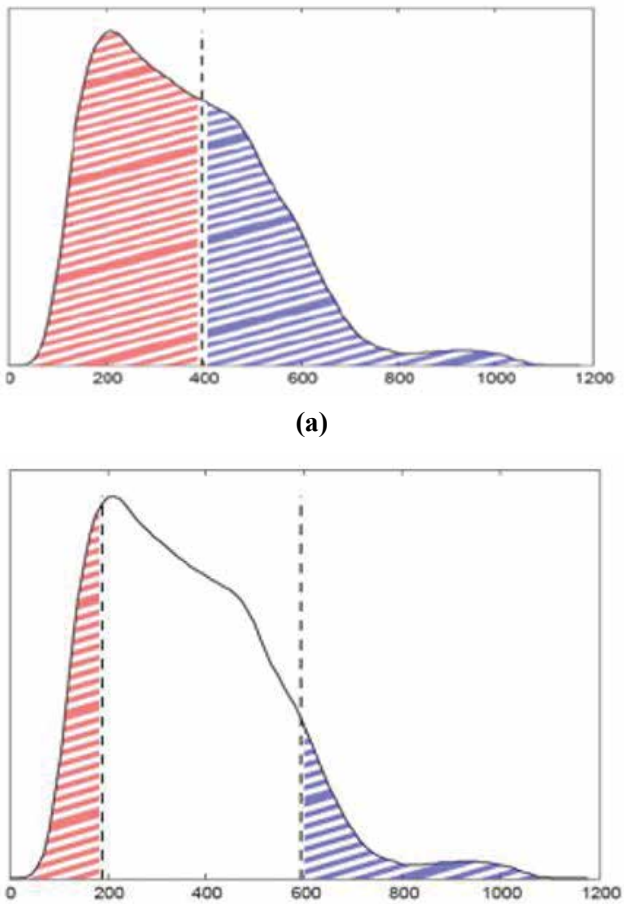


Fig. 2: (a) Segmentation with a single threshold. (b) Necrotic and enhanced thresholds to determine initial seeds

Necrotic class physically arises in segmentation by multi modality intensity[17] classifiers owing to diverse intensity uniqueness. However, the aim of these revise is to enumerate the necrotic and improved portion of the tumor via solely contrast enhanced T1weighted MRI of brain.

Table I : Comparison of Manual and Automatic Brain Tumor Segmentation

Sl. No.	Analysis	Manual Segmentation	Automatic Segmentation
1.	User Interaction	More	Very less
2.	Iteration	More	Less
3.	Accuracy	High	Low
4.	Time Consuming	Yes	No
5.	Shortest Path Problem	Exists	Reduced

Results

We have implemented our work and a group of ten imagery are used to execute all operations. The presence of necrotic tissues is found in the tumor and the observed results for those images are incorporated in the subsequent observation table:

Table II: Results of Brain Tumor Segmentation

Sl. No.	Image No.	Abnormality	Necrotic Tissues
1.	a	Present	Absent
2.	b	Present	Absent
3.	c	Present	Absent
4.	d	Present	Absent
5.	e	Present	Absent
6.	f	Present	Absent
7.	g	Present	Absent
8.	h	Present	Present
9.	i	Present	Present
10.	j	Present	Present

Conclusion

This type of budding segmentation method forrn necrotic and enhancing cell segmentation of brain tumor on MRI and promising to establish abnormality present in the image or not. This is a novel, healthy, rapid and entirely automatic algorithm for necrotic segmentation. This algorithm requires no preceding information or guidance procedure. Both the homogeneous texture appearance and spatial features of MRI were effectively locate the seed points and segmentation outcome obtained are extremely perfect to a great extent. So this technique gives improved outcome compared to various methods. The upcoming effort is to diminish the entire implementation time and to work with segmentation of necrotic tissues to find the accurate size of necrotic and tumor cells.

Ethical Clearance: Taken from working department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Hamamci A, Kucuk N, Karaman K, Engin K, Unal G. Tumor-cut: segmentation of brain tumors on contrast enhanced MR images for radiosurgery applications. IEEE transactions on medical imaging. 2012 Mar;31(3):790-804.
2. Warfield SK, Zou KH, Wells WM. Simultaneous truth and performance level estimation (STAPLE): an algorithm for the validation of image segmentation. IEEE transactions on medical imaging. 2004 Jul;23(7):903.
3. Kotani K, Tsuzaki K, Taniguchi N, Sakane N. Correlation between reactive oxygen metabolites & atherosclerotic risk factors in patients with type 2 diabetes mellitus. The Indian journal of medical research. 2013 Apr;137(4):742.
4. Angelini ED, Clatz O, Mandonnet E, Konukoglu E, Capelle L, Duffau H. Glioma dynamics and computational models: a review of segmentation, registration, and in silico growth algorithms and their clinical applications. Current Medical Imaging Reviews. 2007 Nov 1;3(4):262-76.M. Prastawa, E. Bullitt, S. Ho, and G. Gerig, "A brain tumor segmentationframework based on outlier detection," Med. Image Anal., vol.8, no. 3, pp. 275–283, 2004.
5. Fujita N, Tsujii S, Kuwata H, Kurokawa R, Matsunaga S, Okamura S, Mashitani T, Furuya M, Kitatani M, Ishii H. Predictor variables and an equation for estimating HbA1c attainable by initiation of basal supported oral therapy. Journal of Diabetes Investigation. 2012 Apr;3(2):164-9.
6. Surendar A. Role of Microbiology in the Pharmaceutical & Medical Device. International Journal of Pharmaceutical Research. 2018 Apr 10;10(3).
7. Kathad HK, Shah RM, Sheth NR, Patel KN. In vitro antioxidant activity of leaves of Garuga pinnata Roxb. International Journal of Pharmaceutical Research. 2010;2(3):9-13.
8. Sandhya jain, dr vikas jain, radha sharma. Pharmacovigilance system and the future challenges in India-A Perspective. IJPRT. (2018), [cited April 24, 2019]; 8(2): 27-31.
9. Falguni tandel, pratima more. Stability indicating hplc method for simultaneous estimation of nicotinamide and salicylic acid. Ijprt. (2018), [cited april 24, 2019]; 8(2): 43-47.

10. Devvret, kumud pant, ashish thapliyal, neema tufchi. In Silico Docking analysis of Mycobacterium tuberculosis potential targets AftB and EmbA with selected phytochemicals. IJPRT. (2017), [cited April 24, 2019]; 7(2): 15-22.

11. Y. Boykov and M.-P.Jolly, "Interactive graph cuts for optimalboundary and region segmentation of objects in n-d images," in *Proc.ICCV*, 2001, pp. 105–112.

12. L. Grady, "Random walks for image segmentation," in *IEEE Trans.Pattern Anal. Mach. Intell.*, Nov. 2006, vol. 28, no. 11, pp. 1768–1783.

13. C. Couprie, L. Grady, L. Najman, and H. Talbot, "Power watersheds:A new image segmentation framework extending graph cuts, randomwalker and optimal spanning forest," in *ICCV*, 2009, pp. 731–738.

14. A. Sinop and L. Grady, "A seeded image segmentation framework unifyinggraph cuts and random walker which yields a new algorithm," in*ICCV*, 2007, pp. 1–8.

Design of a Prototype System to Determine Ammonia Concentration in Exhaled Human Breath in the Diagnosis of Kidney Failure

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ABSTRACT

Background: The air exhaled contains many types of gases and are the indicators of different and various types of disease. These various types of disease are diagnosed by measuring the concentration of the different gases exhaled by breath. Ammonia gas is represented as the biomarker for the kidney failure patients. Kidney failure is a disease which is determined by extremely high ammonia content in human breath and they have disturbed urea balance.

Aim and Objective: The work focuses on developing a breath analyser system to detect the concentration of ammonia level for the patients who are suffering from kidney failure. The aim is to diagnose the kidney failure based on the ammonia concentration exhaled in the human breath.

Materials and Method: The material used in our study to develop a prototype are arduino board, ammonia gas sensor and TFT LCD display. In this study, 20 patients with kidney failure and 20 healthy volunteers were enrolled. The breath samples were collected from each participant by instructing them to blow through the mouth piece.

Results: The creatinine level and blood urea level of kidney failure patients are 7.93 ± 4.50 mg/dL and 160.72 ± 81.85 mg/dL. The range of breath ammonia level for kidney failure patients is 347.6 ± 84.87 ppb and for normal volunteers is 86.35 ± 12.94 ppb.

Conclusion: The results of our current study shows that the gas analyser detected more amount of ammonia in the breath of dialysis patients compared to healthy volunteers.

Keywords: *Breath analysis, Ammonia gas, Biomarker, Kidney failure, Ammonia gas concentration.*

Introduction

The human breath is a mixture of oxygen, nitrogen, carbon dioxide, water and inert gases. They also have a trace of various components of volatile organic compounds (VOC). The volatile organic compounds reflect physiological and pathological biochemical processes in our body and they are transported via blood stream and they are exhaled through lungs[1]. For diagnosing different types of disease, the analysis of human breath plays a main role. The volatile organic compounds can be measured, identified and analysed using a breath analyser for the early diagnosis of diseases. When compared to other body fluids like blood and urine, the collection of breath sample is safe. The VOC's can be identified by few analytical techniques such as Proton transfer-Mass spectrometry (PTR-MS), Gas chromatography (GC)[2], Ion mobility spectrometry (IMS)[3].

Ammonia gas is represented as the biomarker for the kidney failure. The ammonia present in the humans are maintained via urea cycle and the excess amount of ammonia is converted to urea and excreted through urine[4,5].There is a standard method to evaluate ammonia

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by measuring the ammonia levels in blood. But the blood ammonia leads to certain potential errors in processing and collection. The blood samples collected cannot be preserved under room temperature for too long and they must be analysed immediately [6].

Kidneys help in filtering the waste products from blood[7]. The major role of kidney is to filter and produce urine and it purifies blood [8]. The urea levels are disturbed for a person who is suffering from kidney failure. So, the urea level is measured indirectly by measuring the ammonia level concentration in breath[9]. When the kidney losses their ability to function, kidney failure occurs. Kidney failure is also known as end stage renal disease (ESRD) and it is the last stage of chronic kidney disease (CKD). It is caused either by diabetes, uncontrolled hypertension [10]or dietary changes which leads to chronic disorders [11]. The irreversible loss of kidney function leads to kidney replacement therapy by transplant or dialysis [12]. The kidney failure stages can be achieved by measuring the blood urea nitrogen (BUN), creatinine [13], Glomerular filtration rate (GFR) [14]and albuminuria. This can be tested by few standard techniques like blood test, biopsy and urine test [15]. The end stage renal disease is diagnosed when the kidney damage gets worse and the filtration process does not take properly.

This work focuses on diagnosing kidney failure, by detecting the ammonia concentration level in exhaled breath. A prototype device was designed with ammonia sensor, Arduino board and TFT LCD (thin film transistor-liquid crystal display). This device is low cost, unique and immediately detects ammonia gas.

Materials and Method

A. Block Diagram

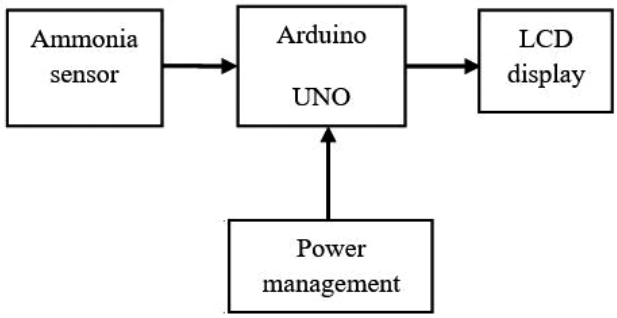


Fig. 1: Block diagram of the design of prototype device

For designing this prototype, both hardware and software implementation is required. Fig.1 shows the block diagram of the design of prototype device. Arduino UNO is connected along with the ammonia sensor and TFT screen. For software implementation, Arduino IDE is used. Arduino IDE helps to compile the code to Arduino board. Fig.2 shows the device setup of the prototype. The ammonia sensor is kept inside the glass chamber to isolate from the environment air. The prototype is powered to PC via USB and the results can either be seen in TFT screen or PC.



Fig. 2: Device setup

B. Materials

Arduino Board: The Arduino is an open source prototyping platform where both the hardware and software is highly approachable and very versatile. Arduino boards shown in fig.3 is based on ATmega 328 microprocessor and it is a micro-controller based board.



Fig. 3: Arduino UNO board

Arduino board have variety of digital input's and output's, analog input's and output's, serial interface and pulse width modulation (PWM) outputs which is shown in fig.4. They have a total of 6 analog

pins, 14 digital input/output pins, 16MHz crystal oscillator, a power jack, USB connection and a reset button. The programs are given to the board through PC via USB port. These programs can be easily updated and changed since the communication is operated by a standard serial protocol.

The power source for the Arduino UNO board is either by an external power supply or via USB connection. The 6 analog pins from A0 to A5, provides resolution of 10 bits to each pin and are used to fetch the signals from sensor. The 14 digital pins from pin 2 to 13 is used as input and output pins. Pin 0 and 1 are used to receive (RX) and transmit (TX) data. 3.3V and 5V pins are used as the output pins for Arduino board. The microcontroller present inside the board is considered as the brain of the Arduino board.

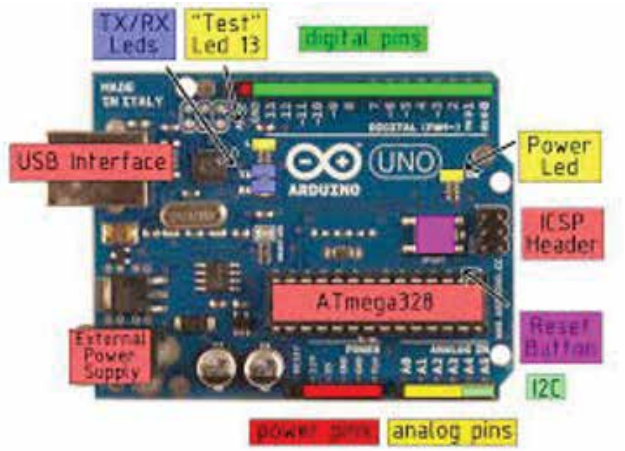


Fig. 4: Arduino board pins

Ammonia Gas Sensor: Gas sensors shown in fig.5, helps to indicate and measure the concentration of certain gases. MQ137 ammonia gas sensor is an electrochemical sensor which is used to measure the partial pressure of gas under atmospheric condition. This sensor gives fast response and is very sensitive to ammonia gas. The gas to be detected reacts with the sensitive layer which is on the top of the sensor. The sensitive layer is composed of tin oxide. This sensor can be used a both analog and digital sensor and the operating voltage is +5V.

TFT Screen: TFT screen shown in fig.6, is a type of LCD where thin film transistor technology is used. This type of technology is used because they provide good resolution and the image qualities can be improved. The special feature of this screen is that they can control individual RGB pixels to get a good and better resolution. This module is operated at a voltage of 3.3V and they have 2 modes- SPI mode and 8-bit mode. Only one mode can be used at a time. SPI mode is very easy to port to other microcontrollers and they can be used only when the speed is not the priority.

Software: The software used here is Arduino IDE (integrated development environment) software which is shown in fig.7 and it is a simplified version of C/C^{++}. This helps in signal processing and data processing. To upload the code, arduino board is connected to PC via USB port. Arduino IDE is divided into 3 main parts: Command area, Text area and Message window area. Command area is the place where we have the main menu items like file, edit, sketch, tool, help and verify icons. Text area is where the codes are written in a simplified version of C^{++} programming language. The message from the IDE is shown in the message window area.

C. Circuit Diagram

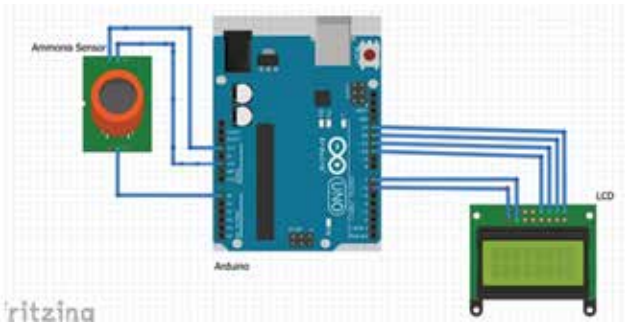


Fig. 8: Circuit diagram

Connect the sensor and the TFT LCD with Arduino board as shown in the fig 8. The 5V of the Arduino pin is connected to the Vcc of the sensor pin, GND is connected to the GND, A0 and D0 of the Arduino pin is connected to the A0 and D0 of the sensor pin. Upload the code to the Arduino board with the help of the Arduino IDE software. Leave the set-up powered for few minutes. This is known as heating time, during which the sensor warms up.

D. Methodology: 20 healthy samples (Normal volunteers) and 20 unhealthy samples (Dialysis patients) were chosen for the analysis. The subjects were asked to blow through the glass chamber so that it interacts with the sensor. The prototype device detected the breath ammonia concentration in parts per billion (ppb).

Results

The average age of normal volunteers was 38.33 ± 5.89 and dialysis patient was 55.1 ± 9.49. The average breath ammonia level was 86.35 ± 12.94 ppb for normal volunteers and 347.46 ± 84.87 ppb for dialysis patients. The gas sensor detected more ammonia concentration for dialysis patients than normal volunteers. For all the participants, serum creatinine level and blood urea level were measured.

Table I: Comparing the Normal Subjects with the Kidney Failure Patients Undergoing Dialysis Treatment

Features	Normal Subjects (n = 20)	Dialysis Patients (n = 20)
Age (years)	38.33 ± 5.89	55.1 ± 9.49
Height (cm)	154.73 ± 2.85	158.21 ± 4.28
Weight (kg)	61.13 ± 7.69	52.33 ± 6.66
Ammonia concentration (ppb)	86.35 ± 12.94	347.46 ± 84.87
Duration of dialysis (years)	-	7.11 ± 3.60
Creatinine level (mg/dL)	0.6 – 1.4	7.93 ± 4.50
Blood urea level (mg/dL)	10 - 50	160.32 ± 81.85

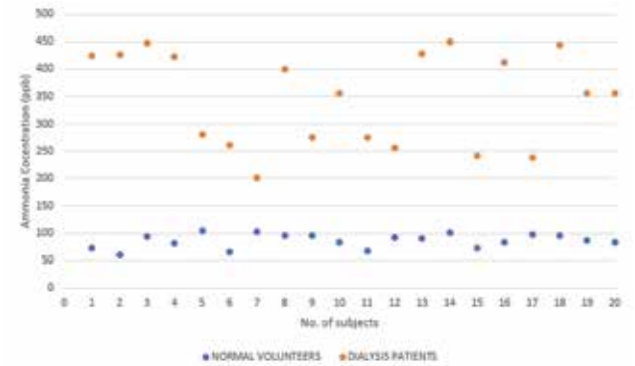


Fig. 9: Ammonia concentration for normal volunteers and dialysis patients

Discussion

Kidney failure has reached an advanced stage in many patients and they are unaware until it is severely affected. Ammonia is a volatile compound which is exhaled in large amounts in kidney failure when compared to normal controls. Ammonia is converted to urea in the liver through urea cycle in healthy individuals. The urea which is converted is transported through the bloodstream which is then excreted as urine by kidneys. The patients with kidney failure who is undergoing dialysis have a high amount of ammonia in their body because of the lower renal excretion of nitrogen compounds and they also have high levels of serum creatinine compared to healthy volunteers. So, designing a breath analyser could be a useful tool for measuring ammonia concentration in human breath.

A prototype device has been developed with the help of electro-chemical sensor which is capable of real time analysis of human breath ammonia. The electro-chemical sensor is capable of generating real time data.

Conclusion

The present study reports on an electrochemical sensor for detecting the ammonia level concentration level in breathing and on the design of a breath analyser prototype device. This device is a fast, inexpensive, convenient and non- invasive monitoring of exhaled human breath for disease diagnosis. The ideal breath ammonia monitoring prototype device is the one which is sensitive to ammonia gas and it is capable of detecting the concentration level with good accuracy and precision. The ammonia level concentration for different age groups where obtained and the results show that the concentration level ranges from 50 to 110 ppb for normal volunteers and 200 to 500 ppb for dialysis patients. The future research involves in developing a device which is capable of real time analysis.

Ethical Clearance: Taken from working department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Schubert JK, Miekisch W, Geiger K, Nöldge–Schomburg GF. Breath analysis in critically ill patients: potential and limitations. Expert review of molecular diagnostics. 2004 Sep 1;4(5):619-29.
2. Davies SJ, Španěl P, Smith D. Breath analysis of ammonia, volatile organic compounds and deuterated water vapor in chronic kidney disease and during dialysis. Bioanalysis. 2014 Mar;6(6):843-57.

3. Saidi T, Zaim O, Moufid M, El Bari N, Ionescu R, Bouchikhi B. Exhaled breath analysis using electronic nose and gas chromatography–mass spectrometry for non-invasive diagnosis of chronic kidney disease, diabetes mellitus and healthy subjects. Sensors and Actuators B: Chemical. 2018 Mar 1;257:178-88.

4. Schmidt FM, Vaittinen O, Metsälä M, Lehto M, Forsblom C, Groop PH, Halonen L. Ammonia in breath and emitted from skin. Journal of breath research. 2013 Feb 27;7(1):017109.

5. Bevc S, Mohorko E, Kolar M, Brglez P, Holobar A, Kniepeiss D, Podbregar M, Piko N, Hojs N, Knehtl M, Ekart R. Measurement of breath ammonia for detection of patients with chronic kidney disease. Clinical nephrology. 2017;88(7):14.

6. Spacek LA, Mudalel M, Tittel F, Risby TH, Solga SF. Clinical utility of breath ammonia for evaluation of ammonia physiology in healthy and cirrhotic adults. Journal of breath research. 2015 Dec 15;9(4):047109.

7. Chawla LS, Eggers PW, Star RA, Kimmel PL. Acute kidney injury and chronic kidney disease as interconnected syndromes. New England Journal of Medicine. 2014 Jul 3;371(1):58-66.

8. Ricci Z, Cruz D, Ronco C. The RIFLE criteria and mortality in acute kidney injury: a systematic review. Kidney international. 2008 Mar 1;73(5):538-46.

9. Mardikar S. Detection of Ammonia in Exhale Human Breath. IOSR Journal of Electronics and Communication Engineering. 2015;3(4):119-27.

10. Krishnan ST, Devadhasan JP, Kim S. Recent analytical approaches to detect exhaled breath ammonia with special reference to renal patients. Analytical and bioanalytical chemistry. 2017 Jan 1;409(1):21-31.

11. Kelly, J. T., Palmer, S. C., Wai, S. N., Ruospo, M., Carrero, J. J., Campbell, K. L., & Strippoli, G. F, Healthy dietary patterns and risk of mortality and ESRD in CKD: a meta-analysis of cohort studies. Clinical Journal of the American Society of Nephrology, 12(2) (2017), 272-279.

12. Marom, O., Nakhoul, F., Tisch, U., Shiban, A., Abassi, Z., & Haick, H, Gold nanoparticle sensors for detecting chronic kidney disease and disease progression. Nanomedicine, 7(5) (2012), 639-650.

13. Narasimhan, L. R., Goodman, W., & Patel, C. K. N, Correlation of breath ammonia with blood urea nitrogen and creatinine during hemodialysis. Proceedings of the National Academy of Sciences, 98(8) (2001), 4617-4621.

14. Vassalotti, J. A., Stevens, L. A., & Levey, A. S, Testing for chronic kidney disease: a position statement from the National Kidney Foundation. American journal of kidney diseases, 50(2) (2007) 169-180.

15. Bagshaw, S. M., Langenberg, C., & Bellomo, R, Urinary biochemistry and microscopy in septic acute renal failure: a systematic review. American Journal of Kidney Diseases, 48(5) (2006) 695-705

Enhancing Blood Cell Images using Denoising Filters for the Detection of Hematological Disorders

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ABSTRACT

Hematological disorders refer to the diseases caused with the changes in blood cells or blood system such as Leukemia, Anemia, Malaria and Azotemia. Preprocessing of blood cell images is very important step in the detection of these disorders. Hence after image acquis ion from hematologists and oncologists denoising and edge detection are to be done to enhance the image for segmentation of blood cell images and leukocytes, erythrocytes and thrombocytes. Because leukemia can be detected from leukocytes and malarial parasites can be detected from erythrocytes. In this paper we have applied few techniques such as Gabor filter, Gaussian filter, Prewitt filter, Sobel and Canny edge operators for the preprocessing purpose. We have compared the performance of these techniques based on their accuracy and resolution

Keywords: *parasites, smoothing, convolution, granularity and thresholding*

Introduction

Today this is seen a trivial task, with many image acquisition systems being readily available on the commercial market, covering a broad range of performance requirements[1] (high and low resolution, speed, color definition, etc.). Nevertheless, there are a number of general criteria that need to be met for images acquired for computer analysis, to ensure that the images acquired are as useful as possible[2]. These include: Global uniformity, local sensitivity,

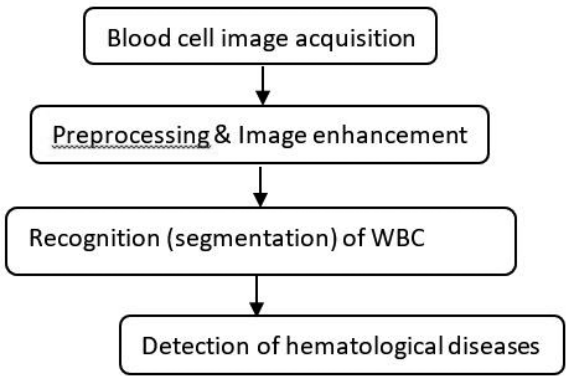


Figure 1: General Steps Involved in Detection of Leukemia

Pre-processing methods use a small neighborhood of a pixel in an input image to get a new brightness[3] value in the output image. As initialization, preprocessing is performed to remove the high frequency noise present in the image followed by edge detection. In order to perform this algorithm a blood cell image will be processed. The approach show that the basic effects of (2D) Gaussian filter are smoothing the image and wiping off the noise. Generally speaking, for a noise-affected image, smoothing it by Gaussian function[4] is the first thing to do before any other further processing, such as edge detection. The effectiveness of the Gaussian function is different for different choosing the standard deviation sigma of the Gaussian filter.

Edges characterize boundaries and are therefore a problem of fundamental importance in image processing. Edges in images are areas with strong intensity contrasts – a jump in intensity from one pixel to the next. Basic idea of canny[5] edge detector is to detect at the zero crossings of the second directional derivative of the smoothed image in the direction of the gradient where the gradient magnitude of the smoothed image being greater than some threshold depending on image statistics.

Gaussian Filter: The Gaussian smoothing operator is a 2-D convolutional operator that is used to `blur' images and remove detail and noise. In this sense it is similar to the median filter, but it uses a different kernel that represents[6] the shape of a Gaussian (`bell-shaped') hump.

The Gaussian distribution in 1-D has the form:

$$G(x) = \frac{1}{\sqrt{2\Pi\rho}} \ell \frac{-x^2}{2\sigma^2} \quad \ldots 1$$

where σ is the standard deviation of the distribution. It is also assumed that the distribution has a mean of zero *i.e.* it is centered about the line $x = 0$. The distribution is illustrated in the following Figure. 2

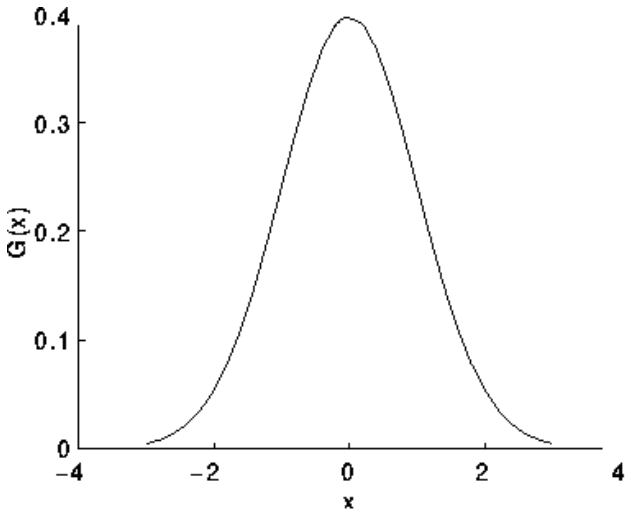


Fig. 2: One dimensional Gaussian distribution

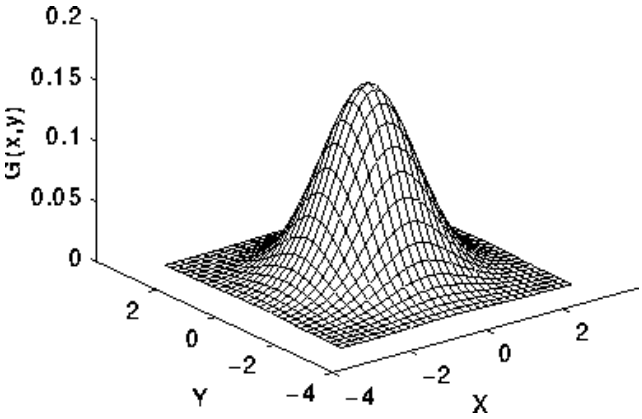


Fig. 3: Two dimensional Gaussian distribution

The idea of Gaussian smoothing[7] is to use this 2-D distribution as a `point-spread' function, and this is achieved by convolution. Since the image is stored as a collection of discrete pixels it is necessary to produce a discrete approximation to the Gaussian function before the convolution can be performed. In theory, the Gaussian distribution is non-zero everywhere, which would require an infinitely large convolution mask, but in practice it is effectively zero more than about three standard deviations from the mean, and so we can truncate the mask at this point.

In a perfect world, filter designers would only have to deal with time domain *or* frequency domain encoded information, but never a mixture of the two in the same signal. Unfortunately, there are some applications where both domains are simultaneously important. For instance, television signals fall into this nasty category. Video information is encoded in the time domain, that is, the shape of the waveform corresponds to the patterns of brightness in the image. However, during transmission the video signal is treated according to its frequency composition, such as its total bandwidth, how the carrier waves for sound & color are added, elimination & restoration of the DC component, etc. As another example, electro-magnetic interference is best understood in the frequency domain, even if the signal's information is encoded in the time domain. For instance, the temperature monitor in a scientific experiment might be contaminated with 60 hertz from the power lines, 30 kHz from a switching power supply, or 1320 kHz from a local AM radio station. Relatives of the moving average filter have better frequency domain performance, and can be useful in these mixed domain applications.

Motion Average Filter: An average filter averages a number of input samples and produces a single output sample. This averaging action removes the high frequency components present in the signal. Average filters are normally used as low pass filters. In recursive filtering algorithm, previous output samples also are taken for averaging. Simple averaging can be used to reduce the effects of noise. Suppose we have *n* measurements of a variable *x*.

X' is the mean or average of the *n* measurements calculated as:

$$X' = \frac{1}{n}\sum_{i-1}^{n} xi \quad \ldots 2$$

The magnitude of s is clearly dependent on the measurements xi which in practice is bounded, that it has lower and upper limits. However, s is also dependent on the number of measurements made, i.e. the number n. Thus for bounded values of xi, it can be deduced that the larger n is, the smaller s becomes. In other words, given a noisy but bounded measurement sequence, we can take a large number of readings of the variable and use its average to give a better estimate of its true value provided there is no systematic error or bias in the measurements.

The moving average filter and its relatives are all about the same at reducing random noise while maintaining[12] a sharp step response. The ambiguity lies in how the *rise time* of the step response is measured. If the rise time is measured from 0% to 100% of the step, the moving average filter is the best you can do, as previously shown.

In comparison, measuring the rise time from 10% to 90% makes the Blackman window *better* than the moving average filter. The point is, this is just theoretical squabbling; consider these filters equal in this parameter. A gating function which had been the basis of modular gating network was used to over the limitation of training data and to yield better result. Magnitude and phase information was derived from each vector.

The biggest difference in these filters is execution[8] speed. Using a recursive algorithm (described next), the moving average filter will run like lightning in your computer. In fact, it is the fastest digital filter available. The sum and differences of histograms of grey levels the neighboring pixels are obtained the signal corresponding to each pixel location was chosen as the random variable.

Multiple passes of the moving average will be correspondingly slower, but still very quick. In comparison, the Gaussian and Blackman filters are excruciatingly slow, because they must use convolution. Think a factor of ten times the number of points in the filter kernel (based on multiplication being about 10 times slower than addition). For example, expect a 100 point Gaussian to be 1000 times slower than a moving average using recursion

Unsharp Mask Filtering: The unsharp mask filter algorithm involves subtraction of an unsharp mask from the specimen[9] image. An unsharp mask is simply a blurred image that is produced by spatially filtering the specimen image with a Gaussian low-pass filter. This filter can be considered as a convolution operation on an image with a kernel mask that is a two-dimensional Gaussian function (g (x, y); as defined in Equation 3.8)**:**

$$G(x, y) = \frac{1}{2\sigma^2} e^{-}(x^2 + y^2)/2\sigma^2 \qquad \ldots 3$$

The size of the Gaussian kernel mask is a function of the parameter □, and the size of the kernel mask determines the range of frequencies that are removed by the Gaussian filter. In the tutorial, the Standard Deviation slider determines the value of □ in pixels. In general, increasing the size of the kernel mask causes the Gaussian filter to remove a greater number of spatial frequencies from the unsharp mask image.

The unsharp mask is then subtracted from the original image according to the equation:

$$F(x, y) = \frac{c}{2c-1} 1(x, y) - \frac{(1-c)}{2c-1} u(x, y) \qquad \ldots 4$$

In Equation 3, the function F **(**x, y) represents the brightness value of a pixel at the coordinate **(**x, y**)** in the filtered image, and I **(**x, y**)** and U **(**x, y**)** represent the brightness values of the corresponding pixels in the original and unsharp mask (blurred) images, respectively. The constant **c** controls the relative weightings of the original [13]and blurred images in the difference equation. In the tutorial, the Weighting Value slider can be used to control the value of **c** within the range of 1 (the zero percent position), to 5/9 (0.556) at the 400 percent filtering level. Similarly, the Standard Deviation slider determines the standard deviation (measured in pixels) of the Gaussian function utilized to generate the kernel mask.

The equation presented above (Equation 2) demonstrates that an unsharp mask filter operates by subtracting appropriately weighted parts of the unsharp mask from the original image. Such a subtraction operation enhances high-frequency spatial detail at the expense (attenuation) of low-frequency spatial information in the image. This occurs because high-frequency spatial detail removed from the unsharp mask by the Gaussian filter is not subtracted from the original image. In addition, low-frequency spatial detail that is passed by the Gaussian filter (to the unsharp mask) is almost entirely subtracted from the original image. This explains why increasing the size of the Gaussian filter mask usually causes the unsharp[14] mask filter to produce a sharper image.

One of the primary advantages of the unsharp mask filter over other sharpening filters is the flexibility of control, because a majority of the other filters do not provide any user-adjustable parameters.

Like other sharpening filters, the unsharp mask filter enhances edges and fine detail in a digital image. Because sharpening filters also suppress low frequency detail, these filters can be used to correct shading distortion throughout an image that is commonly manifested in the form of slowly varying background intensities. Unfortunately, sharpening filters also have the undesirable side effect of increasing noise in the

filtered image. For this reason, the unsharp mask filter should be used conservatively, and a reasonable balance should always be sought between the enhancement of detail and the propagation of noise

Laplacian Filter: The Laplacian of an image highlights regions of rapid intensity change and is therefore often used for edge detection. The Laplacian is often applied to an image that has first been smoothed with something approximating a Gaussian smoothening filter in order to reduce its sensitivity[15] to noise, and hence the two variants will be described together here.

The operator normally takes a single gray level image as input and produces another gray level image as output.

The Laplacian L (x, y) of an image with pixel intensity values I (x, y) is given by:

$$L(X, Y) = \frac{\partial^2 I}{\partial x^2} + \frac{\partial^2 I}{\partial y^2} \quad \ldots 5$$

The input image is represented as a set of discrete pixels. We have to find a discrete convolution kernel that can approximate the second derivatives in the definition of the Laplacian.

Gabor Filter: A **Gabor filter** is a linear filter whose impulse response is defined by a harmonic function multiplied by a Gaussian function. Because of the multiplication-convolution property, the Fourier transform of a Gabor filter's impulse response is the convolution of the Fourier transform of the harmonic function and the Fourier transform of the Gaussian function. Gabor filters are directly[10] related to Gabor wavelets, since they can be designed for number of dilations and rotations. However, in general, expansion is not applied for Gabor wavelets, since this requires computation of bi orthogonal wavelets, which may be very time-consuming.

Therefore, usually, a filter bank consisting of Gabor filters with various scales and rotations is created. The filters are convolved with the signal, resulting in a so-called Gabor space. This process is closely related to processes in the primary visual cortex. The Gabor space is very useful in e.g., image processing applications such as iris recognition. Relations between activations for a specific spatial location are very distinctive between objects in an image. Furthermore, important activations can be extracted from the Gabor space in order to create a sparse object representation. A Gabor function is a Gaussian function modulating a sinusoid.

Experimental Results and Comparison

Upon comparing the performance of Gabor, Gaussian, laplacian, moving average and unsharp filter based on the signal to noise ratio, we found that Gaussian filter provides the best performance toward the enhancement[11] of blood cell images to fulfill our objective of segmenting into white and red blood cells. Color constancy observation was essential because different images with different color characters were chosen and used. Calculation of area granularity, curved and convex region, and morphological properties of background and objects of interest were necessary to the choice of parameters for parasites and species recognition. The outputs are filters are given below.



Fig. 4: De-noised result of Gabor filter

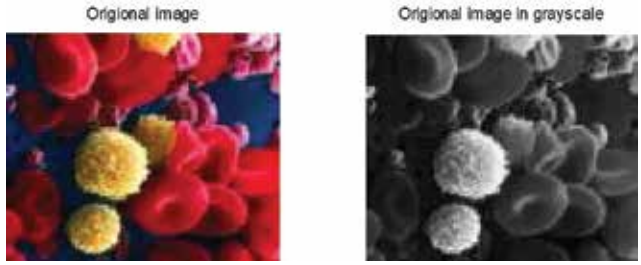


Fig. 5: Gray scale image of the blood cell sample

Table 1: Comparing of performance of denoising filters

Noise type	Laplacian	Moving average	Gabor	Gaussian
Salt and pepper	20.34	22.57	20.45	24.65
Speckle	19.56	19.69	22.56	24.87
Poison noise	21.42	20.04	19.78	19.41
Uniform noise	22.34	18.98	21.00	20.86
Raleigh noise	19.08	22.67	20.98	23.65
Erlang noise	20.09	21.76	19.87	21.89

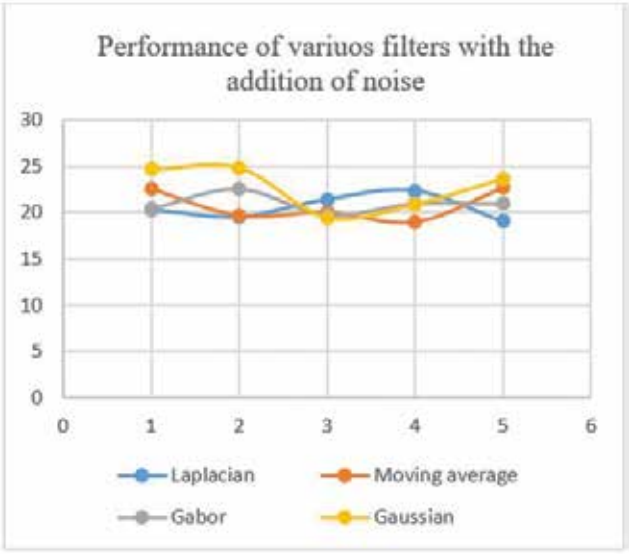


Fig. 6: Performance comparison of filters under various type of noise

Conclusion

The performance of the filters are compared based on PSNR [peak signal to noise ratio] After carefully analyzing the performance of the filters we found that Gaussian filter performs well in the presence of salt and pepper noise as well with the addition of Raleigh noise This noise is resolved, after thresholding, into contiguous white areas, which may be recognized by the system as pseudo-cells. Further noise is associated with non-compact blood cell contours. This results after thresholding, in contiguous cells (cells whose contour area is not compact). Moreover, cell's mean brightness and area will differ considerably from the predefined stored values, resulting in misclassification of the cell. The difficulties of the thresholding can be solved using **a** combined method. An enhanced image undergoes a threshold process called histogram entropy classification for enabling the detection of hematological diseases.

Ethical Clearance: Taken from working Department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Lee CS, Guo SM, Hsu CY. Genetic-based fuzzy image filter and its application to image processing. IEEE Transactions on Systems, Man, and Cybernetics, Part B (Cybernetics). 2005 Aug;35(4):694-711..
2. Jiang K, Liao QM, Dai SY. A novel white blood cell segmentation scheme using scale-space filtering and watershed clustering. InProceedings of the 2003 International Conference on Machine Learning and Cybernetics (IEEE Cat. No. 03EX693) 2003 Nov 2 (Vol. 5, pp. 2820-2825). IEEE.
3. Khan HA, Sobki SH, Alhomida AS. Regression analysis for testing association between fasting blood sugar and glycated hemoglobin in diabetic patients.
4. Hong JH, Cho SB, Cho UK. A novel evolutionary approach to image enhancement filter design: method and applications. IEEE Transactions on Systems, Man, and Cybernetics, Part B (Cybernetics). 2009 Dec;39(6):1446-57.
5. Jiang K, Liao QM, Dai SY. A novel white blood cell segmentation scheme using scale-space filtering and watershed clustering. InProceedings of the 2003 International Conference on Machine Learning and Cybernetics (IEEE Cat. No. 03EX693) 2003 Nov 2 (Vol. 5, pp. 2820-2825). IEEE.
6. Ferri M, Lombardini S, Pallotti C. Leukocyte classifications by size functions. InProceedings of 1994 IEEE Workshop on Applications of Computer Vision 1994 Dec 5 (pp. 223-229). IEEE.
7. Lohar V, Singhal S, Arora V. Research Article Prodrug: Approach to Better Drug Delivery. International Journal of Pharmaceutical Research. 2012;4(1):15-21.
8. Sobrevilla P, Montseny E, Keller J. White blood cell detection in bone marrow images. In18th International Conference of the North American Fuzzy Information Processing Society-NAFIPS (Cat. No. 99TH8397) 1999 Jul (pp. 403-407). IEEE.
9. Omale S, Auta A, Amagon KI, Ighagbon MV. Anti-Snake Venom Activity of Flavonoids From the Root Bark Extract of Parinari curatellifolia in Mice. IJPR. 1955 Apr.
10. Rezatofighi SH, Soltanian-Zadeh H, Sharifian R, Zoroofi RA. A new approach to white blood cell nucleus segmentation based on gram-schmidt orthogonalization. In2009 International Conference on Digital Image Processing 2009 Mar 7 (pp. 107-111). IEEE.

11. Tomasz Markiewicz and Stanislaw Osowski, "Automatic Recognition of the Blood Cells of Myelogenous Leukemia Using SVM", Proceedings of International Joint Conference on *Neural Networks*, August 2005.

12. Egmont Peterson & Schreiner, "Detection of Leukocytes with in contact with vessel wall from In Vivo Microscope recordings using Neural Network," *IEEE Transactions on Biomedical Engineering*, July 2000.

13. Vincenzo Piuri and Fabio Scotti, "Morphological classification of blood leukocytes using Artificial Neural Networks" Proceedings of the *IEEE International conference on Computational Intelligence,* July 2004.

Development of Gas Sensor Device for Primary Health Care Monitoring System

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ABSTRACT

At present many people are suffering from diabetes and cholesterol related diseases. Such disease can occur due to hereditary, food preferences or lifestyle of each individual. Primary checkup or test of such disease is essential in order to maintain the normal level for a person. Blood test are usually done but it is painful and time consuming, whereas testing using individual's skin gas is more reliable and less painful. Skin gas is emanated from skin in particular range for normal individual. But for patient with disease it either exceeds or precedes the particular skin gas level.

Keywords: *Cholesterol, diabetes, nitrous oxide, hydrogen sulphide, skin gas.*

Introduction

Gases are produced in small amount in body to carry out various biological functions. It is mostly used as a signaling molecule, relaxant of smooth muscle, regulation of metabolic activities [1].Hydrogen sulphide is produced in body in small amounts as a signaling molecule. It is a mucous membrane. In respiratory tract it acts as an irritant. It causes pulmonary edema with immediate or delayed effects after exposure to high concentration[2]. Acute exposure symptoms include nausea, headaches, disturbed equilibrium, tumors, skin and eye irritation. In human body this gas is produced from cysteine by enzymes such as cystathionine beta-synthase and cystathionine gamma- lyase. Hydrogen sulphide protects against cardiovascular disease by relaxing the blood vessels. Decrease in concentration of H2S in brain causes Alzheimer's disease. Whereas, increase in production of hydrogen sulphide causes several problems such as Down's syndrome, Type- 1 diabetes and Type-2 diabetes. In diabetes condition due to H2S beta cells of pancreas produce excess of H2S leading to damage of cells and reduced insulin production. It also slows down the metabolic rate of the body by binding with cytochrome oxidase[3]Another gas which is emanated from human skin is nitrous oxide which plays an important role in body functions. Nitrous oxide complicates its direct measurements because it's a high reactive molecule. It is produced at different locations of our body during metabolic reactions [5]. NO is naturally present in food and it helps in lowering the cholesterol level in body by preventing fat deposition in blood vessels. Certain foods that are rich in NO content are beetroot, nuts and seeds, green leafy vegetable, citrus fruits, meat, garlic, pomegranate, dark chocolate, watermelon and red wine[5]. Certain studies have shown that garlic has the ability to increase nitrous oxide levels in body which inturn lowers the blood pressure and has improved tolerance for physical activities such as exercise[6,7.] Another study showed that nitric oxide production increased with the intake of red wine [8]. Heart beat sensor consists of photodiode and IR light emitter. As the heart pumps blood the blood pressure inside increases which inturn rises the amount of infrared light emission from the emitter which gets reflected to detector. This helps us find of heart beat per minute [9].In temperature sensor increase in temperature causes change in resistance[10].Thus a compact device of these respective above sensor makes the work easier for practitioners and is a pain free method for patients who have to undergo a regular checkup.

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Materials Required:

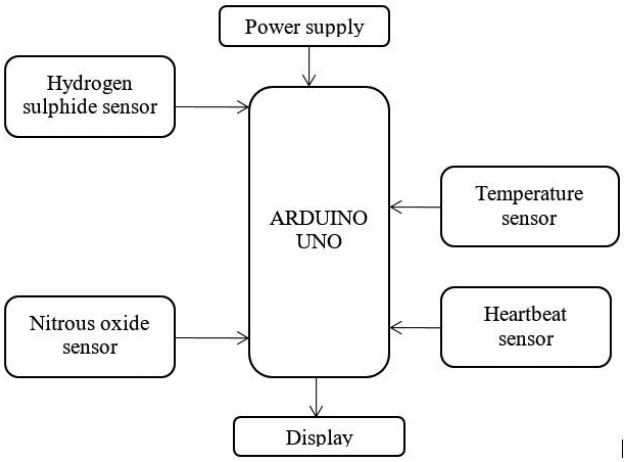


Fig. 1: Block diagram of device

Hardware Used:

(a) Gas Sensor: Gas sensor is used to detect the skin gas emanated from human body. It detects gas at certain voltage when the skin comes in contact with the heating filament of sensor[10]. The sensors are actually kept for pre- heating before the actual work starts. Whenever the sensor is introduced to the gas the concentration of digital pin go high[11] to a certain voltage. Analog pins can also be used instead of digital pins. The analog pins are read using microcontroller in which the values are directly proportional to gas concentration [12].

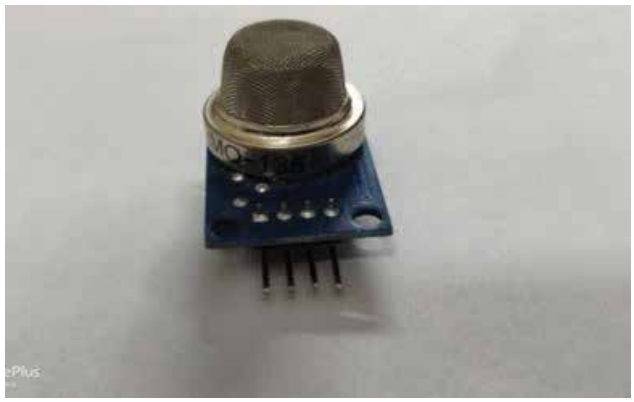


Fig. 2: Hydrogen sulphide gas sensor

(b) Heart Rate Sensor: Heart rate sensor has the principle of photo phlethysmography. In this the light is either transmitted of reflected which is absorbed by the blood which inturn is detected by the detector [13,14].The absorption of light depends on blood volume in tissue. The detector has an electrical signal as output.



Fig. 3: Heart rate sensor

(c) Temperature Sensor: Temperature sensor is based on resistance of material of the sensor. Temperature is proportional to resistance of the material. When the voltage increases it increases the temperature [15]. It generally produces high output voltage. It is more accurate when compared to thermistor.



Fig. 4: Temperature sensor

(d) Arduino UNO: Arduino is a simple microcontroller board along with software for the board. Arduino board shown in fig.6 is based on Atmega 328 microprocessor. Arduino interacts by taking inputs from a variety of switches or sensors, and controls various other physical outputs[18-20].

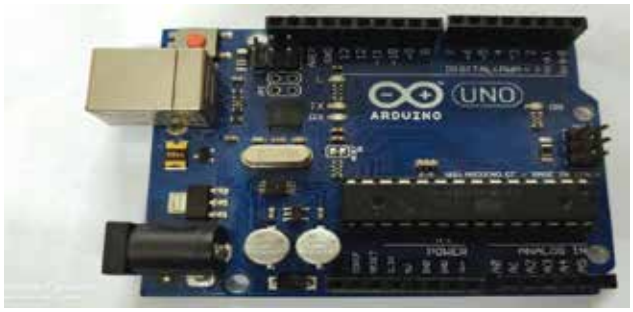


Fig. 5: Arduino UNO

Software Used:

(a) Arduino IDE: The software used is Arduino IDE (integrated development environment) software. This usually used for signal processing and data processing. In order to upload the code the Arduino board is connected to PC through an USB port. Arduino IDE has a command area, text area and message window area. Text area is where the codes can be written in simplified version of C structure programming language. The result from IDE is shown in message window area.

Results and Discussion

The age range of patients whose reading is noted are between 30 to 75 years old. However, irrespective of their age factor the readings are taken. The only factor taken into account is patients suffering from diabetes and cholesterol. The readings of diabetes patient is above the normal range and hence it determined the presence of disease condition of patient. For cholesterol patients the reading is not within the normal range and was below the range and thus this can be taken as a pre-clinical test for patients.

Table 1: Normal patients tested for cholesterol with nitrous oxide sensor

Subject	Age (years)	Heart rate (bpm)	Temperature (◦C)	Nitrous oxide (ppb)
1	47	77	38.5	35
2	39	93	39.3	41
3	52	110	37.6	26
4	45	80	38.5	44
5	32	94	35.4	36

Table 2: Cholesterol patients reading using nitrous oxide sensor

Subject	Age (years)	Heart rate (bpm)	Temperature (◦C)	Nitrous oxide
1	71	72	39.5	15
2	47	98	33.2	19
3	72	75	37.6	21
4	75	89	37.1	18
5	54	72	36.6	17
6	57	77	32.2	17

Table 3: Patients reading using hydrogen sulphide sensor

Subject	Age (years)	Heart rate (bpm)	Temperature (◦C)	Hydrogen sulphide (ppm)
1	53	75	37.6	27
2	54	72	36.1	23
3	64	98	37.1	21
4	51	72	33.2	21
5	75	77	38.0	29
6	67	85	37.2	22

Conclusion

The existing system is an industrial gas sensor which is used to detect leakages in industrial process and operation of machine. The increase in level may cause severe damage to human body, so it is mandatory to check the level of gas emitted in industry for the physical safety as well as the health safety of people working in the particular industry. These gas sensors with increased sensitivity and optimized threshold level can be used for clinical diagnosis of gases emitted from

one's body. Hence gases emanated through skin can be tested to detect the abnormal level in particular person who can have specific disease related to excessive or less level of gas in the body than the actual range.

Ethical Clearance: Taken from working department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCE

1. Tsuda T, Ohkuwa T, Itoh H. Findings of skin gases and their possibilities in healthcare monitoring. InGas Biology Research in Clinical Practice 2011 (pp. 125-132). Karger Publishers.
2. Jain SK, Bull R, Rains JL, Bass PF, Levine SN, Reddy S, McVie R, Bocchini Jr JA. Low levels of hydrogen sulfide in the blood of diabetes patients and streptozotocin-treated rats causes vascular inflammation?.
3. Szabo C. Roles of hydrogen sulfide in the pathogenesis of diabetes mellitus and its complications. Antioxidants & redox signaling. 2012 Jul 1;17(1):68-80.
4. Szabo C. Roles of hydrogen sulfide in the pathogenesis of diabetes mellitus and its complications. Antioxidants & redox signaling. 2012 Jul 1;17(1):68-80.
5. Kroll JL, Werchan CA, Rosenfield D, Ritz T. Acute ingestion of beetroot juice increases exhaled nitric oxide in healthy individuals. PloS one. 2018 Jan 25;13(1):e0191030.
6. Verma SK, Rajeevan V, Jain P, Bordia A. SHORT COMMUNICATION EFFECT OF GARLIC (ALLIUM SATIVUM) OIL ON EXERCISE TOLERANCE IN PATIENTS WITH CORONARY ARTERY DISEASE. Indian J Physiol Pharmacol. 2005;49(1):115-8.
7. Al-Qattan KK, Thomson M, Al-Mutawa'a S, Al-Hajeri D, Drobiova H, Ali M. Nitric oxide mediates the blood-pressure lowering effect of garlic in the rat two-kidney, one-clip model of hypertension. The Journal of nutrition. 2006 Mar 1;136(3):774S-6S.
8. Wallerath T, Poleo D, Li H, Förstermann U. Red wine increases the expression of human endothelial nitric oxide synthase: a mechanism that may contribute to its beneficial cardiovascular effects. Journal of the American College of Cardiology. 2003 Feb 5;41(3):471-8.
9. Pawar PA. Heart rate monitoring system using IR base sensor & Arduino Uno. In2014 Conference on IT in Business, Industry and Government (CSIBIG) 2014 Mar 8 (pp. 1-3). IEEE.
10. Arunachalam B, Devi R, Patvardhan A, Aiswarya R, Prasen V. Embedded temperature monitoring and control unit. In2010 International Conference on Recent Trends in Information, Telecommunication and Computing 2010 Mar 12 (pp. 293-297). IEEE.
11. Loftfield, N., Flessa, H., Augustin, J., & Beese, F. Automated gas chromatographic system for rapid analysis of the atmospheric trace gases methane, carbon dioxide, and nitrous oxide. Journal of Environmental Quality, 26(2), 560-564 (1997).
12. Daniela, B. G., Thomas, R., & Kolb-Bachofen, V. Nitric oxide in human skin: current status and future prospects. Journal of Investigative Dermatology, 110(1), 1-7 (1998).
13. Unnikrishnan, D. K. M., Radhakrishnan, V., Jacob, D. C., & KS, A. Wireless gadget for Home Bound Patients (using IEEE Standard 1073 for Medical Device Communications).
14. Karandeep Malhi, Subhas Chandra Mukhopadhyoy, "A Zigbee-Based Wearable Physiological Parameters Monitoring System", *IEEE*, vol. 12, no. 3, March 2012.
15. Altet, J., Claeys, W., Dilhaire, S., & Rubio, A. Dynamic surface temperature measurements in ICs. Proceedings of the IEEE, 94(8), 1519-1533 (2006).
16. Goswami, A., Bezboruah, T., & Sarma, K. C. Design of an embedded system for monitoring and controlling temperature and light. International journal of electronic engineering research, 1(1), 27-36 (2009).
17. Saidu, I. G., Momoh, M., & Mindaudu, A. S. Temperature monitoring and logging system

suitable for use in hospitals, incorporating GSM text messaging. International Journal of Information Sciences and Techniques (IJIST), *3*(1) (2013).

18. Barrett, S. F. Arduino microcontroller processing for everyone!. Synthesis Lectures on Digital Circuits and Systems, *8*(4), 1-513(2013).
19. Badamasi, Y. A. (2014, September). The working principle of an Arduino. In 2014 11th International Conference on Electronics, Computer and Computation (ICECCO) (pp. 1-4). IEEE
20. Abdullah, R., Rizman, Z. I., Dzulkefli, N. N. S. N., Ismail, S. I., Shafie, R., & Jusoh, M. H. Design an automatic temperature control system for smart tudungsaji using Arduino microcontroller. ARPN Journal of Engineering and Applied Sciences, 11(16), 9578-9581(2016).

A Descriptive Study on Mental Stress, Time-Management & Worklife-balance among Ph.D. Scholars

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ABSTRACT

Stress is an inevitable and humane fact in the present life's leagues scenario and day to day activities. It is a normal mental psychological reaction by our nervous system when it detects an ultimatum. It brings out an enormous quantity of negative vibes and lends us down physically and mentally. This study anchor on the stress dimensions of Ph.D. scholars and the association of stress with managing the time and work-life balance of respondents. The study was based on 100 samples and questions were scheduled on basis of dependent and independent variables of stress, work-life balance and time management. Statistical tools used were correlation and chi-square analysis with the support of the IBM SPSS processor. The reliability analysis was done and the results were marked on Cronbach alpha .708 means reliable. The statically tests done resulted in the acceptance of hypothesis and hence proved the significance that there is stress for Ph.D. scholars and there is a significant relationship between stress time management and work-life balance.

Keywords: *stress, time-management, work life-balance, PhD scholars, Ha-Alternative hypothesis, H0-null hypothesis*

Introduction

As per the latest regulations made by the UGC, drafts Ph.D. are mandatory for the post of associate professors and for direct instructing enrollment for teaching[1]. And Ph.D. is also not everybody's cup of coffee, the one who pursues Ph.D. must have to publish papers, do research work and only after publishing the final thesis on an open defense and after completing tough they will be awarded Ph.D., and these works and process are not easily achievable one and will take years and it is an expensive[2] one too. One who is pursuing must be dedicated to it; they have to compromise many things family, entertainments, public gatherings, health etc and have to prioritize themselves on their work. These works, deadlines, processes, workloads, and pressure make the work life of research scholar's extreme stressful and this leads to many problems in their personal life as well as in their work life too and it will negatively affect their mental[3] health too. They have to manage their time on the schedule to finish the works on time and not skip the deadline, also to avoid stress and rush on last minute, so the time has to be managed and arranged. And that too by allotting the time for personal needs, family needs and obviously for the work life. And there should always be a balance between the works and the personal life and it is called work-life balance. This research is to conduct a close study and to find the relationship between the mental stresses, time management, the work-life balance among the Ph.D. scholars and to find out the reasons for the stress.

Review of Literature

- Work organization and mental health problems in Ph.D. students (Katia Leveque on Journal of Research Policy-2015): -This study was concerned on the effect and potential impact of the present condition on the academic[4] stress and the health issues related to the Ph.D. scholars. The research was off on a three-phase model. First, the study assessed the prevalence of mental health problems in a representative sample of Ph.D. students in Flanders and Belgium. Secondly, the study made a comparison on the Ph.D. scholars as another three samples: (1) highly educated in the general population (2) highly educated employees and (3) higher education students. Third, the study assesses

those organizational elements connected with the role of Ph.D. students that foresees mental health status. The study shows that 32% of Ph.D. scholars are facing mental disorders that are common in nature, especially depression.

- Impact of time management[5] for IT services management (Heechun Yang on Procedia Computer Science Journal-2016):-In order to cope up with the current trends of the IT sector companies started outsourcing the works in the IT sector. The main objective of this outsourcing was to reduce cost without compromising[6] the service quality. And this study showed various ways of the impact of time management in the IT sector. The company had come up with a time management system by higher authorities approval by a weekly basis with hourly time spent

- Work Life Balance-An audit of staff experience at Oxford Brooks University (Simonetta Manfredi for Center for Diversity Policy Research-2004): the -This report shows us the result of a pan university-wide audit that was conducted in order to find out the experiences[7] of the staffs on the work-life policies on the University. The audit was based on staff survey and highlights the meaning of work-life balance and their values; on the light of employer-employee relationship and the importance of work-life balance.90% of the respondents believe that there should be a balance between paid work and personal life and that enables to make work better and smoother.

- Cause of stress among Ph.D. research scholars with reference to Rashtrasant Tukadoji Maharaj Nagpur University (KDV PRASAD for International Review of Management and Business Research-2017):-This study report makes a close analysis on the cause of stress that is faced by the Ph.D. scholars. The study was conducted among pre-PhD scholars. And on the base of 6 independent stress factors i.e.; work overload, role ambiguity, role overload, psychological factors, behavioral approach[8] and Avoidance strategies and how far it was effective. Stress exists in all forms of life and this survey found out several problems faced by researchers. And there were several questions that were unanswered like (do you consume alcohol, smoke etc).

Methodology

A. Scope of the study, Objectives Hypothesis, Methedology: This study aims to investigating analyzing and observing about the various stress and stages which are undergone by a researcher, and Indian research is hampered by smothering organization, low-quality training at most colleges and lacking financing.

The research is a tedious and time taking process, the present conditions and improper customs and ways which are followed by the universities make the life of researchers little tougher. And as per the recent report by the well known science magazine Nature states and criticize the administration for a substandard activity at enhancing the condition of advancement and research in the nation, isn't probably going to make for simple perusing for the HR Improvement Minister Smriti Irani who has been under fire for attempting to "Indianise" instruction by looking for contributions from conservative ideologues, or notwithstanding for P.M Modi has been urging researchers and analysts to look to the glories of old India.

The geographical scope of the study is limited to the geographical area of Kerala. Specifically the central zone of Kerala including Kottayam, Ernakulam, and Kollam

B. Objectives:

- To find out the correlation between demographic scalar and nominal variables on stress.
- To find out the reason, cause, and solution for stress faced by Ph.D. scholars.
- To find out the effect and relation between time and time management on the stress of Ph.D. scholars.
- To find out the effect and relation between work-life balance on stress among Ph.D. scholars.

C. Hypothesis:

H1: There is a positive and significant relationship between academic, research workload& stress.

H2: There is a positive and significant relationship between stress and work life balance.

H3: There is a positive and significant relationship between stress and time management.

H4: There is a relationship between demographic scalar and nominal variables on stress.

D. Research subject fields and methods: The survey for research was conducted among various groups of research scholars from different universities in Kerala. Sampling methodology adopted was simple random sampling, sample size ranged to 100 samples. The data and the results of the study were analyzed using IBM SPSS.

Findings and Results

This part of the research paper contains data analysis and the interpretation part. And the analysis is done with the use and application of appropriate and suitable statically tools that found suitable for the study and variables being used in the research. The software used for the test is IBM SPSS (Statically Package for Social Studies).

Reliability Statistics

Reliability Statistics 1

Table 1: Model Summary

Model	Chronbach Alpha	NOS
1	.708	17

a. Cause: *stress variables, worklife balance, time management*

b. Dependent Variable: *stress*

The reliability analysis is a scale that reflects the consistency of the study and the variables used in the study.1-5 liker scale was used in this study The Cronbach- reliability statistic measurement was assessed to gauge how every item in the examination of research instrument identified and related to the total of the instrument. Here in our study the Cronbach Alpha is .708 and that is acceptable and good value, it shows that the values in the variables are reliable.

The study was to find the extent of stress and the effect and cause of stress. This part of the research paper shows the effects and cause of stress, the analysis and interpretation of data. The study and the sampling data indicate that most of the respondents are stressed and rarely only a few are not stressed. Chi-Square and correlation study was used, here the independent factor is stress, and the dependant factors are pressure, workload, extra works, institutional rules, and regulations.

Correlation Statistics between Stress and Its Demographic, Scalar & Nominal Variables

Table 2: Correlation

Variables		P Value
1	Age of the respondents	-.91
	Marital status	.097
	Sex	-.97
	Area Of PhD	.231
	Dependants	.50
	Registration Type	.019
	Income	.064
	Expense	.076

a. Dependent Variable: Stress

b. variables:demographic,scalar&nominal variables.

The total number of respondents was limited to 100. In the age group 25-35 most of the respondents are always and often stressed, and many of them are stressed on some point of times too, and the 2nd group i.e. 35-45 they come in second place while considering stress. There were only a few respondents in the 45-55 age group they come 3rd position in stress. Only a few respondents respond that they rarely had and never had stress. We had used spearmen's rank correlation to find out the correlation between the stress level and demographic variab les.

Chi Square Statistics Between Stress and Its Corresponding Variables

Table 3: Chi-Square

Variables		Significance Value	Decision
1	Pressure to do works under certain standards	.000	Accept Ha Reject HO
	Unable to finish works on time due to academic works	.006	Accept Ha Reject HO
	Rules & Regulations causes hindrance	.000	Accept Ha Reject HO
	Tiredness and exhausted due to workload	.000	Accept Ha Reject HO
	Rush and impatientness causes stress	.000	Accept Ha Reject HO
	Physical Stress	.000	Accept Ha Reject HO
	Conflict between values and research work	.000	Accept Ha Reject HO

a. Dependent Variable: Stress

Here we made a close Comparison between the Independent variables and dependent variables that directly and indirectly lead to the stress for the undergoing predoctoral Ph.D. scholars by using chi-square analysis. On the light of survey conducted it was found out that one of many reasons behind the stress is that to challenge of immense pressure from the guide and other factors to do the works under certain standards and a benchmark.

Another factor that leads to stress is rules and regulations of the institution under we work it causes hindrance to work flexibly and lacks the freedom of researcher most of the researchers are facing this issue that leads to stress, Here the significant value is below 0.05 i.e. .000 we accept the Ha that there is a significant relationship between stress and work pressure load and we reject the H0 here.

Correlation between Physical Stress and Its Corresponding Variables

Table 4: Correlation

Variables		P Value
1	Headache	.78
	Anxiety Attacks	.55
	Sleeplessness	.125

a. Dependent Variable: Physical Stress

And the physical stress due to workload also leads to stress among the Ph.D. scholars. Here the significant value is below 0.05 i.e. .000 we accept the Ha that there is a significant, relationship between stress and work pressure load and we reject the H0 here.

Chi Square Statistics between Stress and Work Life Balance

Table 5: Chi-Square

Variables		Significance Value	Decision
1	Compromising of family due to work	.003	Accept Ha,Reject H0
	Inability of balancing work life	.001	Accept Ha,Reject H0
	Staying back late for works	.000	Accept Ha,Reject H0
	Thinking about work when not at work	.002	Accept Ha,Reject H0

a. Dependent Variable: Stress

Here we take in contemplation the variable of work-life balance. The prime cogitation of a human is family; we had checked whether the stress and work-life balance is related to family and compromisation of commitments to the family. Hence it is statically proven that compromisation of family commitments leads to improper work-life balance then it leads to stress among research scholars. Here the significant value is below 0.05 i.e.

Time management is an essential factor for research here we statically test whether time management effects stress by use of chi-square analysis

Chi Square Statistics between Stress and Time Management

Table 6: Chi-Square

Variables		Significance Value	Decision
1	Organizing work to finish research work on time	.007	Accept Ha Reject H0
	Exceeding the deadline	.008	Accept Ha Reject H0
	Proper to do list and time management	.008	Accept Ha Reject H0
	Unable to finish word due to lack of time	.006	Accept Ha reject H0

a. Dependent Variable: Stress

Organizing the works and finish it on time avoids excess of stress to the researcher. Here it is found statically that unorganized works time management and not finishing works cause is another cause of stress. Here the sign value is .007 i.e. less that 0.05 we accept Ha and reject H0 that there is a significant relationship between stress and time management. we accept Ha and reject H0 that there is a significant relationship between stress and time management. And it is evident that improper time management also causes stress

Suggested Recommendations

Managing the time properly in a scheduled work, life balance could reduce stress. Trying to do much more interesting things, do work relaxed and a free mind. Practicing yoga and meditation on a regular basis would bring down the mind under control and thus it will help

to reduce the stress. Doing organizing the works on the basis of priority and deadlines can reduce the last second razor tip sprint and it will reduce the excess stress. Understanding the researcher themselves and managing the mind can bring everything on track and automatically it leads to work management. Some suggested a unique way for stress management that is cooking and trying various food recipes

Integrating works that are relaxingly and similar in nature and do works on a daily nature and make a timetable for finishing the works.

Conclusion

The community of Ph.D. scholars is been facing an immense amount of stress from multiple sources. They are not been able to manage their time, neither able to balance the proportion of their work life and personal life in an appropriate ratio. It is found that both men and women irrespective of age, full time or part time registration are facing the threat of stress mentally and physically too. The unorganized and unscheduled way of doing works leads to excessive workloads and stress, therefore, the external academic works given will divide the productive time for carrying out research works and thus research works remains unfinished leads to stress, anxiety and extra workload. The interference of the researcher's freedom is another threat they need their space to be creative and intellectual the unwanted and some illogical rules and regulations is another threat that is being faced by the researcher. Sometimes there happens a conflict between the personal values principles or ethics followed by the researcher between the researches works they are currently working on. And hence proven by this research that there is immense stress for the Ph.D. scholar and lacks time management and proper work-life balance, and improper time and work-life balance can also lead to stress for research scholars.

Acknowledgement

Firstly, I would like to express my sincere gratitude to my mentor Ambily R for the continuous support of my research study and related study, for her patience, motivation, and immense knowledge. Her guidance helped me in all the time of my work and writing of this paper. I would also like to extend my thanks to my friends and family for their great help and support for this paper.

Ethical Clearance: Taken from working department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCE

1. Levecque K, Anseel F, De Beuckelaer A, Van der Heyden J, Gisle L. Work organization and mental health problems in PhD students. Research Policy. 2017 May 1;46(4):868-79.
2. Yang H. Impact of time management for IT services management. Procedia Computer Science. 2016 Jan 1;91:700-6.
3. Manfredi S, Holliday M. Work-life balance. An audit of staff experience at Oxford. 2004.
4. Prasad KD, Vaidya R. Causes of Stress Among PhD Research Scholars with Reference to Rashtrasant Tukadoji Maharaj Nagpur University: An Empirical Analysis. International Review of Management and Business Research. 2017 Jun 1;6(2):472.
5. Levecque K, Anseel F, De Beuckelaer A, Van der Heyden J, Gisle L. Work organization and mental health problems in PhD students. Research Policy. 2017 May 1;46(4):868-79.
6. Prasad KD, Vaidya R. Causes of Stress Among PhD Research Scholars with Reference to Rashtrasant Tukadoji Maharaj Nagpur University: An Empirical Analysis. International Review of Management and Business Research. 2017 Jun 1;6(2):472.
7. Kumar KA, Priyadarshini RG. Study to measure the impact of social media usage on work-life balance. InIOP Conference Series: Materials Science and Engineering 2018 Jul (Vol. 390, No. 1, p. 012045). IOP Publishing.
8. Chen SK. Internet use and psychological well-being among college students: A latent profile approach. Computers in Human Behavior. 2012 Nov 1;28(6):2219-26.
9. Jizi M. The influence of board composition on sustainable development disclosure. Business Strategy and the Environment. 2017 Jul;26(5):640-55.

Image Segmentation for Diabetic Retinopathy Using Modified Bacterial Foraging Optimization Algorithm

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ABSTRACT

In recent days, investigation of retinal vessels of fundus images is an essential way to screen and diagnose related diseases. Diabetes is a commonly occurring disease and is exponentially rising globally. diabetic retinopathy (DR)is an important reason for blindness. This paper presents a new image segmentation technique forDR. To segment the DR images, a modified bacterial foraging algorithm with Levi distribution. The efficiency of the (BFO-L) method is tested using two benchmark dataset namely DRIVE and STARE. A detailed comparative analysis is also made with the recently proposed methods under various measures. The experimental values imply that the BFO-L method detects tiny blood vessels and locates the edges effectively.While comparing the other methods on the applied DRIVE dataset, the presented method obtains maximum performance with a sensitivity value of 0.8725, specificity value of 0.9314, accuracy of 0.9798 and AUC of 0.9895 respectively.

Keywords: *DR; Image Segmentation; Levi distribution; Retina*

Introduction

Diabetic retinopathy(DR) is a widely occurring retinal issues caused by the complications of diabetes and it leads to complete blindness. The DR occurs in case the diabetes affects the small blood vessels and also damages a certain portion of eye known as retina[1]. The crucial fact is that the human cannot easily identify the existence of diabetes due to the absence of any symptoms at the beginning level. When the DR can be identified at the earlier level, appropriatehealing can be done to avoid the better condition of the patients. Else, it is hard to eliminate the diabetes once the symptoms are observed that is not curable. Diabetes is a commonly occurring disease and is exponentially rising globally. DR is an important reason for blindness. At the earlier level of DR, none of the symptoms exist in the eye and when disease begins, the existence of micro aneurysms (MAs), soft exudates and hard exudates and new damaged blood vessels increases[2]. All the diseases are curable, if any disease is found and controlled appropriately through ophthalmologist who employs fundus camera to monitor and detect the disease. To monitor diabetes, capturing retinal photos throughfundus is general; however, the effects are tedious. Disease diagnosis acts as a significant part in the entire diabetes detection procedure, in that, taking precise photos or high-resolution photos of retina are highly benefitting thing and techniques might aid to derive good outcomes in abnormality detection. Out of fundus images, a novel method or technique is reviewed for effective MA detection. MA is the initial DR marks which does not have the ability to spoil vision. Through a certain tool, the MAs counts are considered that provides diabetic progress in certain individuals. For automatic MA detection, various techniques or algorithms are employed. Both the diabetic and retina structure are demonstrated in Fig.1. Few software are available that are partly robotic and consumes more time. Many of the hospitals employ hardware system for

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detection at present time and it gives precise outcomes with high computation time. For abnormal and normal retinal classification, robotic detection systems employ clustering techniques like k-NN classifier. SVM classification methods are used through the proposed method to distinguish among the abnormal and normal retina.With a view to detect illness symptoms, professional physicians recommend that the patient with diabetics requires to be analyzed twice in a year. The detection is time taking and difficult that exhibits high error. Additionally, because of the enormous count of diabetic patients and the absence of medical service in few regions, several DR patients cannot be treated and diagnosed at appropriate time.Therefore, good treatment gradually tends to visual losses that are irreversible and even blindness symptoms. For primary phase patients, the deteriorated procedure can be delayed and monitored if DR might be detected and cured as soon as possible. On the other hand, the physical elucidation is highly based on medical experience

Images[3] and two-dimensional (2-D) color fundus images. Without based on the professional decisions, these techniques might divide robotically and gives trustworthy segmentation

The previous techniques of segmentation might be categorized into unsupervised or supervised[4] In order to inherent blood vessels features, unsupervised methods are modeled without depending on physical labeled map. Through RAdius based Clustering ALgorithm (RACAL), [5]projected an unsupervised method that maps image pixel allocation by distance-based principle. For the task of retinal vessel segmentation,[6] modeled a highly likelihood inversion model. An unsupervised coarse-to-fine algorithm was modeled[7] Depending on the curvature, morphology and spatial dependency, they divide vascular structure in this method. By employing region growing, background normalization and second-order Gaussian filter, [8]projected a contrast-sensitive segmentation technique.

While loss stabilizes, few hard examples had not been examined properly and the model of CNN ends its updation.

Proposed Method

Computational Intuition: Using a two-dimensional array of pixel rates, $I = \{I(s) \in [0, 1]: s \in S\}$, M × N cell image are represented over a rectangular lattice $S = \{(x, y) : 1 \le x \le M, 1 \le y \le N\}$ that is indexed through a coordinate (x, y). The segmentation of cell image focuses to divide the image into two partitions: background I_B and cell region I_C that fulfill the below conditions

$$\begin{cases} I_B \cap I_C = \phi \\ I_B \cup I_C = I \end{cases} \quad \ldots (1)$$

The edge detection idea is to denote the pixels I_E that rely among I_B and I_C, that is, in a tiny closure neighboring region $\eta(e)$ of any pixel $e \in I_E$, there present pixels e_1 and e_2 that fulfills

$$e_1 \in I_B \text{ and } e_2 \in I_C \quad \ldots(2)$$

Commonly, we consider $e_1 \in I_B$ or $e_2 \in I_C$ that result in single-pixel edges. Mostly, the edge detectors finds the entire image pixels many times in order to search pixels which fulfills the Eq. (2), that is always time taking and not appropriate for practical processing of huge images.

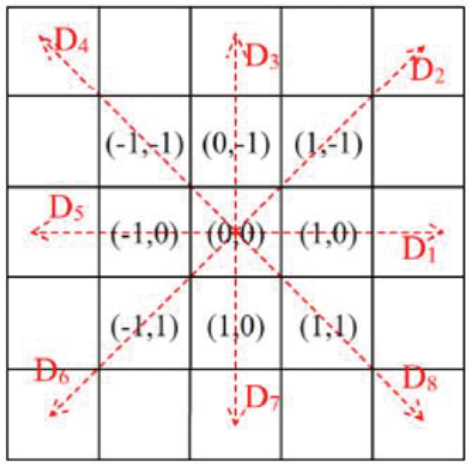


Fig. 1: Searching directions for every bacterium

Nutrient Concentration: Depending on image gradients, nutrient concentration is described. It is commonly complex to estimate the gradients precisely at boundaries because of the interlaced shade and light. We consider that there exists a noticeable discrepancy among the average intensities of cell background and regions. To produce gradient map ∇D, we imply Sobel operator[9] towards density map D subsequently. $\rho(s)$ $\|\nabla D(s)\|_2$ is the expression to denote gradient magnitude and $\varphi(s)$ is used to denote the gradient direction at every location s. Considering every bacteria search over eight direction as demonstrated in Fig. 2, we use gradient $\nabla D(s)$ around every direction D_k and indicate the proposed gradient magnitude through $\rho_k(s)$, k = 1,

2, … 8. The directional gradient magnitude is revised to reduce the non-maximum gradients as:

$$\rho_k(s) = \begin{cases} 0, \text{ if } \rho_k(s) \neq \max\{\rho_k(s^-), \rho_k(s), \rho_k(s^+)\} \\ \rho k(s), \text{ otherwise} \end{cases} \quad \ldots (3)$$

Let $\rho_k(s^-)$ and $\rho_k(s^+)$ demonstrate the gradient magnitude on either sides of s over direction, correspondingly D_k. At the end, we describe at location s the nutrient concentration function value as

$$J(s) = \begin{cases} \rho_k(s), \varphi(s) \in \left[\frac{2k-3}{8}\pi, \frac{2k-1}{8}\pi\right] \\ 0, \text{ otherwise} \end{cases} \quad \ldots (4)$$

Bacterial Foraging: By high nutrient concentration using reproduction, chemotaxis, elimination-dispersal [10]and swarming, the projected method focuses to push foraging of bacteria over pixels and therefore encircling the bacterial tracks as expected edges. It initiates with N population arbitrarily inoculated spores {K = k_1, k_2, …, k_N}, to define bacterial foraging operators, we consider spore k_m as a case study.

Dispersal: If spore location k_m pointed by l_m is a noxious position in order to nutrient concentration map that is

$$J(l_m) < T \quad \ldots (5)$$

Whether a location is nutrient-rich or noxious iass determined by the threshold T, the spore k_m disperses in spite of external circumstances. k_m drift pixel through pixel while dispersal around a arbitrarily initialized direction d_m till achieving nutrient-rich position otherwise employing drifting steps

Reproduction: It initiates reproduction and ends dispersing when k_m locate at a position of nutrient-rich. With similar location $l_{m1} = l_{m2} = l_m$, it might construct into a completely functional bacteria that is called as b_m which splits into two bacteria b_{m1} and b_{m2} and opposite starting directions $d_{m1} = -d_{m2}$ that fulfill $d_{m1} \perp d_m$ and $d_{m2} \perp d_m$.

Chemotaxis: The bacterial movements are simulated through chemotactic procedure. With positions of nutrient-rich, both children bacteria b_{m1} and b_{m2} forages at this stage. It calculates the adjacent ones in neighborhood $\eta(l_{mi})$ counterclockwise and near-to-far for every child bacterium $b_{mi}(i = 1, 2)$ at the location l_{mi}, in order to recognize location t which the concentration of nutrient fulfills

$$J(t) \geq T, t \in \eta(l_{mi}) \quad \ldots (6)$$

Every bacteria searches the direction that might modify at the same time less than $\pi 2$. A nutrient-rich position is met by b_{mi}, it swims to t and modify its chemotaxis direction toward $d_{mi} = t - l_{mi}$ as swimming direction. It ends the chemotaxis when a bacterium l_{mi} location cannot search for a position of nutrient-rich from its adjacent that is,

$$\forall t \in (l_{mi}), J(t) < T \quad \ldots (7)$$

The condition of health is a significant attribute for bacteria instead of location. Bacteria needs some energy for the movement of s_1 to s_2 location and therefore reduces its health as

$$\overrightarrow{H}(s_1, s_2) = \begin{cases} 1, |\rho(s_2) - \rho(s_1)| \geq T_h \\ 0, |\rho(s_2) - \rho(s_1) < T_h| \end{cases} \quad \ldots (8)$$

When moving, the environmental change may give harm to health that is denoted by threshold T_h. The bacteria might consume few nutrient and improves the health one reaching at nutrient-rich location s_2 as expressed below

$$H(s_2) = \begin{cases} 1, \rho(s_2) \geq \alpha T_h \\ 0, \rho(s_2) < \alpha T_h \end{cases} \quad \ldots (9)$$

To find whether a location is nutrient-rich, the parameter α and threshold αT_h are used. The m-th bacterium health at n-th chemotactic step can be estimated through

$$H(m, n) = H(m, n-1) - H(s_{m,n-1}, s_{m,n}) + H(s_{m,n}) \quad \ldots (10)$$

Let m-th bacterium location is denoted $s_{m,n}$ at chemotaxis step, and H (m, 0) = 0. While in the process of chemotaxis, the rate of bacterium's health fulfill the $H(m, n) \geq 0$, it might move, or it must end at present position.

Swarming: Two bacteria draw each other while the distance is large and push each other while it is very near, it is named as bacterial swarming.

Elimination: While a bacteria ends at chemotaxis phase with an arbitrary initial direction, it would be removed after creating one spore, that it initiates the process of dispersal.

BFO algorithm is effectively explores the search space as it works on every dimension

Levy flight is a random walk where the step length of search process is improved using an unpredictable deviation. The Levy Distribution is represented below.

$$\text{Levy}(\beta) \sim t^{-1-\beta},\ 0 < \beta < 2 \qquad \ldots (11)$$

$$\text{Levey}(\beta) = \frac{u \times \varnothing}{|v|^{1/\beta}} \qquad \ldots (12)$$

where u and v are normal distribution values, β is levy exponent and $\varnothing$ is computed by

$$\varnothing = \left[\frac{\Gamma(1+\beta) \times \sin\left(\frac{\pi\beta}{2}\right)}{\Gamma\left(\frac{(1+\beta)}{2}\right) \times \beta \times 2^{\left(\frac{\beta-1}{2}\right)}} \right]^{\frac{1}{\beta}} \qquad \ldots (13)$$

where β value can be assumed as 1.5, u and v are the random values with a mean of 0 and standard deviation of 1 from normal distribution.

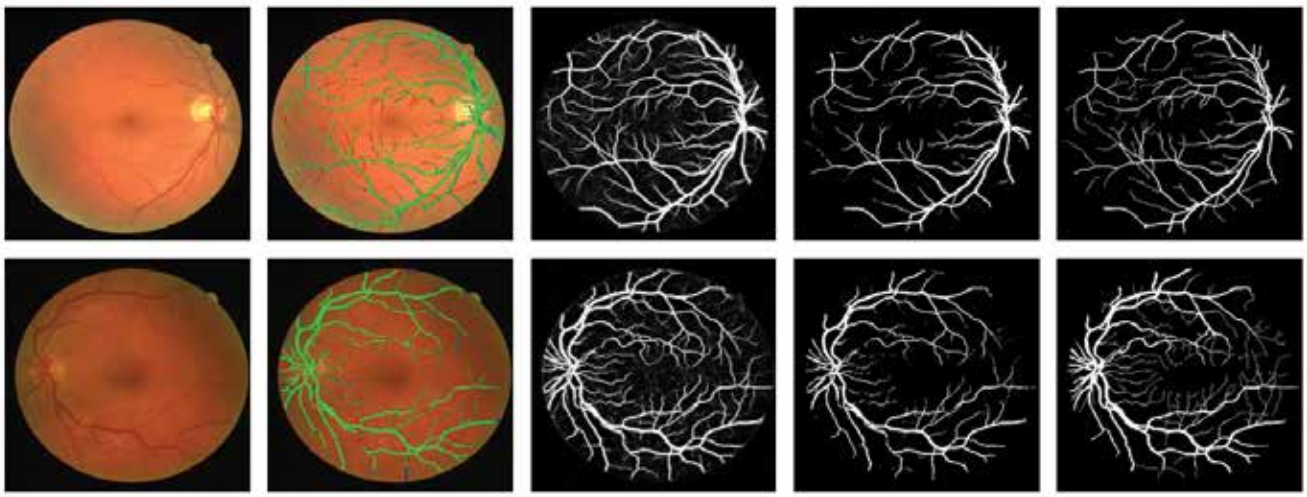
Performance Validation

Datasets: The validation of BFO-L takes place on two benchmark image dataset namely DRIVE [11]and STARE [12] retinal vessel segmentation of fundus images. The first DRIVE has a total of 40 images attained at 45° field of view (FOV) at a resolution of 565×584 pixels. Among the 40 images, half of the image set is used to train the model and the remaining half of the image set are employed to test the model. Every training image holds its respective ground truth segmented image done by a physician. A comparative analysis is done with the existing methods such as matched filtering, region growing, infinite perimeter active contour model, conditional random field, artificial neural networks [12]and deep learning methods.

Measures: For validation, a collection of performance measures are used. Each pixel value is segmented properly or not, and hence, the segmentation output falls under four types namely true positive (TP), false negative (FN), true negative (TN), and false positive (FP).

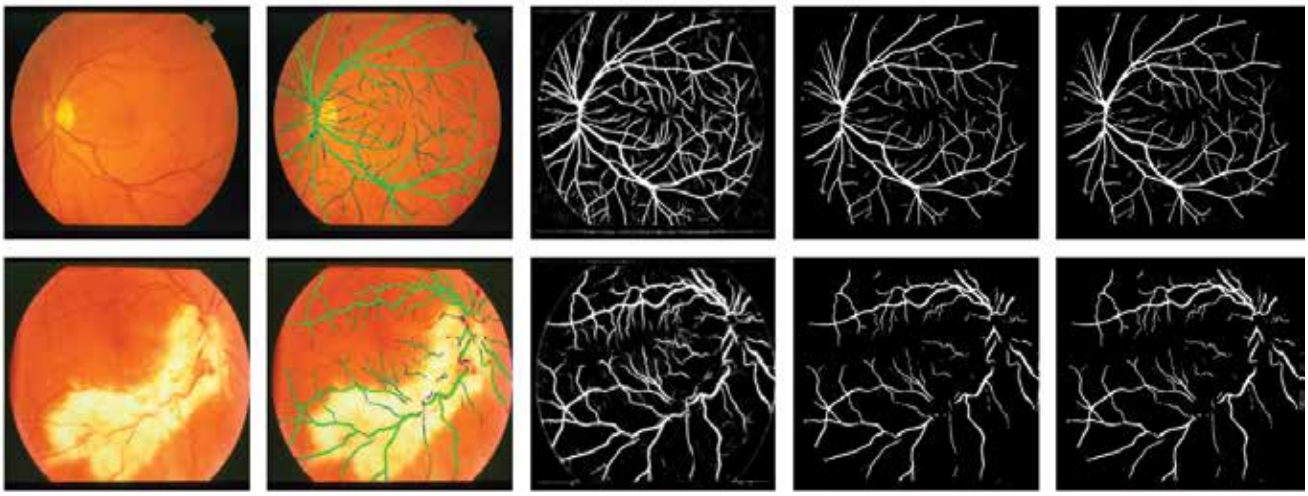
Results Analysis

An extensive experimentation takes place on two dataset to ensure the performance of the presented method. The attained results of the DRIVE and STARE dataset is provided in Table 1 interms of specificity, sensitivity, accuracy and AUC. A comparison is made with the segmentation results of the second observer results by the use of first observer results as ground truths. The results of the presented approach are comparable to the second expert segmentation values on DRIVE dataset with a small variation for different evaluation indicators. In addition, few variations among segmentation values and the expert results on STARE dataset also exists. As the second expert is concentrated on tiny thin vessels, they have high sensitivityOn the applied STARE dataset, a sensitivity of 0.8719 is attained by the expert's value and 0.7543 is obtained by the presented method. Similarly,



(a) Color image (b) Segmented image (c) Probability map (d) Binary segmentation (e) Ground truth

Fig. 2: Segmentation results of DRIVE



(a) Color image (b) Segmented image (c) Probability map (d) Binary segmentation (e) Ground truth

Fig. 3: Segmentation results of STARE

Figs. 3 and 4 illustrate the segmented results on the DRIVE and STARE dataset. A set of two images are chosen where one is healthy image and another[13] is lesion image. This approach keenly looks for tiny thin retinal vessels that are mainly assumed less significant in disease identification

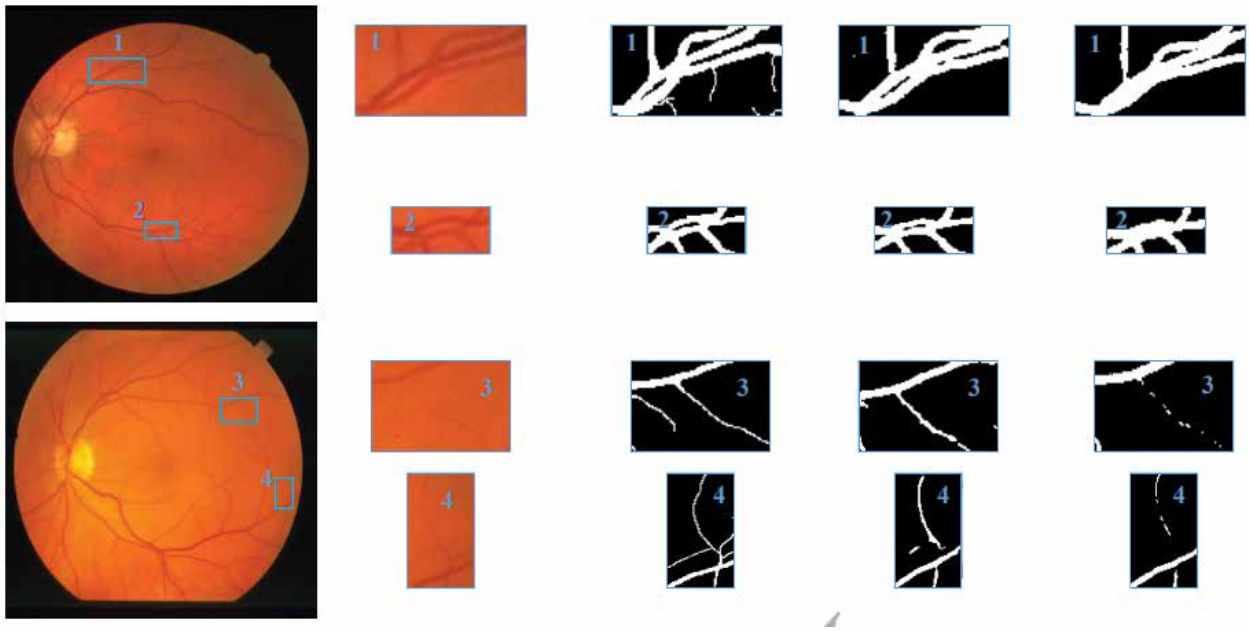


Fig. 4: Comparison of the segmentation effects

A comparative analysis of some local regions are depicted in Fig. 5, where the first row illustrate the vessels edges at the intersection and the second row displays the tiny thin vessels in low contrast area. From this Fig., the base structure[14] cannot identify few information of the vessels. But, the presented method enhances the segmented results of these details to a particular level and concentrates more on hard samples.

Table 1: Comparative analysis on STARE dataset

Type	Method	Sens.	Spec.	Accuracy	AUC
Unsupervised	Azzopardi et al. [19]	0.7716	0.9701	0.9497	0.9563
	Khan et al. [8]	0.7359	0.9708	0.9502	-
	Zhao et al. [9]	0.7800	0.9780	0.9560	0.8740

Conted…

Supervised	Zhu et al. [2]	0.6944	0.9819	0.9526	0.9769
	Marin et al. [12]	0.7680	0.9738	-	-
	Orlando et al. [20]	0.7140	-	0.9545	-
	Wang et al. [1]	0.7412	-	0.9585	-
	Liskowski et al. [21]	0.7027	0.9828	0.9545	0.9671
	Dasgupta et al. [22]	0.7543	0.9814	0.9632	0.9751
	Proposed	0.7716	0.9701	0.9497	0.9563
	Azzopardi et al. [19]	0.8259	0.9818	0.9752	-

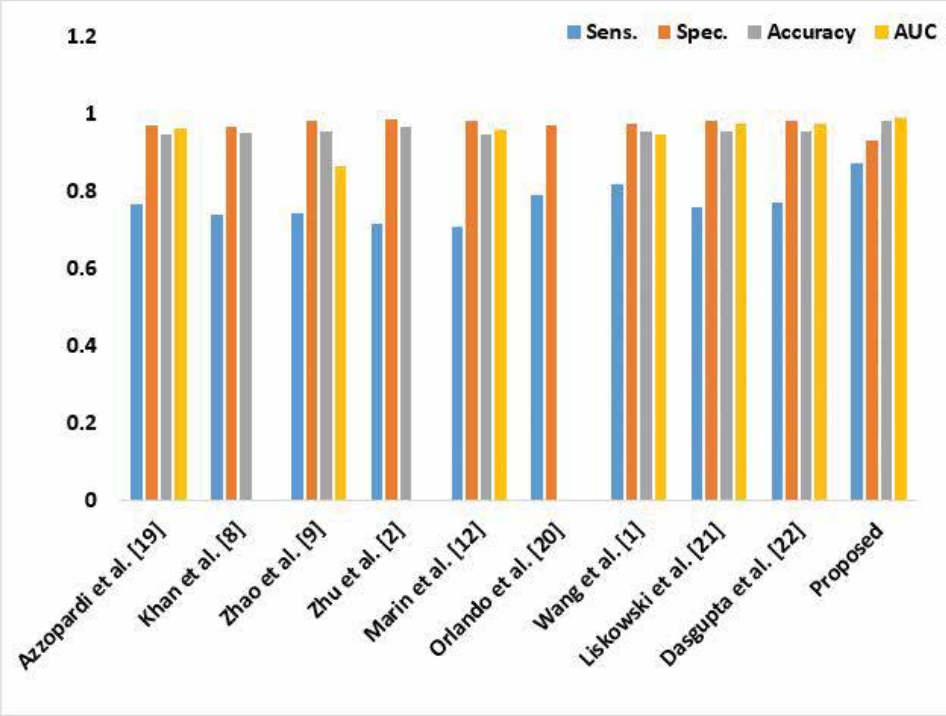


Fig. 5: Comparative results of DRIVE dataset

From the table values provided in Table 2 and Table 3, it is obviously clear that the presented method achieved excellent results over the compared methods on both DRIVE and STARE dataset. As shown in Tables 2 and 3, the results demonstrate that[15] the proposed method outperforms most of the state-of-the-art segmentation methods in DRIVE and STARE datasets whether compared to supervised methods or unsupervised methods.

Conclusion

Presently, the occurrence of DR becomes raising and increasing the human blindness globally. In this paper, we have introduced new image segmentation technique for DR. To segment the DR images, a BFO-L algorithm is devised using Levi distribution. The efficiency of the BFO-L method is tested using two benchmark datasets namely DRIVE and STARE. A detailed comparative analysis is also made with the recently proposed methods under various measures. On comparing the other methods on the applied DRIVE dataset, the presented method obtains maximum performance with a sensitivity value of 0.8725, specificity value of 0.9314, accuracy of 0.9798 and AUC of 0.9895 respectively. At the same time, values shown in Table 3 ensure the maximum results with a sensitivity value of 0.8259, specificity value of 0.9818 and accuracy of 0.9752 respectively.

Ethical Clearance: Taken from working department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Nie M. State wildlife policy and management: the scope and bias of political conflict. Public Administration Review. 2004 Mar;64(2):221-33.
2. Zhu C, Zou B, Zhao R, Cui J, Duan X, Chen Z, Liang Y. Retinal vessel segmentation in colour fundus images using Extreme Learning Machine. Computerized Medical Imaging and Graphics. 2017 Jan 1;55:68-77.
3. Abràmoff MD, Garvin MK, Sonka M. Retinal imaging and image analysis. IEEE reviews in biomedical engineering. 2010;3:169-208.
4. Fraz MM, Remagnino P, Hoppe A, Uyyanonvara B, Rudnicka AR, Owen CG, Barman SA. Blood vessel segmentation methodologies in retinal images–a survey. Computer methods and programs in biomedicine. 2012 Oct 1;108(1):407-33.
5. Sinthanayothin C, Boyce JF, Williamson TH, Cook HL, Mensah E, Lal S, Usher D. Automated detection of diabetic retinopathy on digital fundus images. Diabetic medicine. 2002 Feb;19(2):105-12.
6. Ng J, Clay ST, Barman SA, Fielder AR, Moseley MJ, Parker KH, Paterson C. Maximum likelihood estimation of vessel parameters from scale space analysis. Image and Vision Computing. 2010 Jan 1;28(1):55-63.
7. Neto LC, Ramalho GL, Neto JF, Veras RM, Medeiros FN. An unsupervised coarse-to-fine algorithm for blood vessel segmentation in fundus images. Expert Systems with Applications. 2017 Jul 15;78:182-92.
8. Khan MA, Soomro TA, Khan TM, Bailey DG, Gao J, Mir N. Automatic retinal vessel extraction algorithm based on contrast-sensitive schemes. In2016 International conference on image and vision computing New Zealand (IVCNZ) 2016 Nov 21 (pp. 1-5). IEEE.
9. Zhao Y, Rada L, Chen K, Harding SP, Zheng Y. Automated vessel segmentation using infinite perimeter active contour model with hybrid region information with application to retinal images. IEEE transactions on medical imaging. 2015 Sep;34(9):1797-807.
10. Salazar-Gonzalez A, Kaba D, Li Y, Liu X. Segmentation of the blood vessels and optic disk in retinal images. IEEE journal of biomedical and health informatics. 2014 Nov;18(6):1874-86.
11. X. Yin, B. W. Ng, J. He, Y. Zhang, D. Abbott, Accurate image analysis of the retina using hessian matrix and binarisation of thresholded entropy with application of texture mapping, Plos One 9 (4) (2014) e95943.
12. D. Mar´ın, A. Aquino, M. E. Gegundez-Arias, J. M. Bravo, A new supervised method for blood vessel segmentation ´ in retinal images by using gray-level and moment invariants-based features, IEEE Transactions on Medical Imaging 30 (1) (2011) 146–158
13. H. Fu, Y. Xu, D. W. K. Wong, J. Liu, Retinal vessel segmentation via deep learning network and fully-connected conditional random fields, in: IEEE International Symposium on Biomedical Imaging, 2016, pp. 698–701.
14. S. Xie, Z. Tu, Holistically-nested edge detection, International Journal of Computer Vision (2015) 1–16
15. T.W. Ridler, S. Calvard, Picture thresholding using an iterative selection method, IEEE Transactions on Systems, Man and Cybernetics 8 (1978) 630–632.

Segmentation of Human Eye Pupil with Novel Grid Based Localization Computing

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ABSTRACT

This paper discuss about grid computing which increase the performance of vision image segmentation. The segmentation process with grid computing identifies the challenging in computation task. Novel grid based method supports image processing technique to circle eye pupil in normal and defective eyes. The procedure of the proposed system use real eye images as data collection for input to grid computing. Image corner and line edge detection is replaced with grid based technique to achieve good segmentation result. Grid with different sizes classified to reach neighbors to form grid segment. Adjacency graph merge the regions of highlighted eye pupil. This grid location points of eye image is noted to identify the eye center localization. The experimental task proves the efficiency of automate segmentation compared with other algorithms.

Keywords: *Eye ball Detection; Bilateral Filtering; Grid Based Pupil Localization; Power Law Transformation*

Introduction

The human eye is an organ which lets us to observe and study more vis-à-vis the surrounding world. Our eyes are utilized in virtually all activities that we do such as reading, writing, working, watching TV and in countless other ways. Soon after the birth, babies are capable of developing the skill of perception through eyes. However, their vision will be indistinct and requires constant exercise to develop acuity that too within a very short time frame. The visual acuity development will be virtually complete by the time the baby attains school age. Immediately after its birth, a child incapable to coordinate the eye movements. Further, their eyes will undergo minor misalignments which may repeatedly occur over a few months, might not be a cause for concern. In addition, the child should master gazing technique during this course of time. However, a major cause for concern should be one eye's constant deviation from the direction of the other's and should be treated at the earliest by an ophthalmologist as conveyed [1].

Cerebral palsy is an illness of movement, muscle position which affected through injury happens to young, emerging brain, furthermost frequently former to birth. Signs, as well as indications, seem throughout early stages or playschool years. In common, cerebral palsy causes impaired movement related through irregular reactions, droopiness or inflexibility of the limbs and trunk, irregular position, instinctive actions, unsteady walking, or a certain mixture of these. People who are suffering from cerebral palsy might possess difficulties absorbing and usually contain eye muscle imbalance that the eyes cannot concentrate on the similar object. Human with cerebral palsy correspondingly might suffer a condensed series of indication at different stage due to stiffness of muscles [2].

Cerebral palsy's result on practical capabilities differs significantly. Particular people who affect with this illness may walk but others couldn't. Certain persons show regular or near-normal intellectual capability; however, others may possess cerebral debilities. Epilepsy, sightlessness or else deafness correspondingly can be existing.

Among eye care advancements, the sight conservation technology has been deliberated most important throughout the previous generation. It was found that frequent challenges by human eyes to overcome refractive errors outcomes in constant fatigue affecting whole physical well-being. Hamel (1997)

therefore it stressed the prominence of early discovery of refractive errors through examination by an eye specialist and correction of the same by glasses or other means3. Soon after the birth, babies are capable of recognizing things with their eyes. On the other hand, their visualization will be unclear and needs continuous exercise to progress insight that too inside a very less duration of time setting. The visual acuity development will be essentially achieved through the time the baby gets to school age. In their initial week of life, a child will still be unable to manage their eye movement, and it will experience light misalignments that might frequently happen over a few months. Meanwhile, the child would also master the gazing method. Nonetheless, the main reason for concern is one eye's constant abnormality from the way of the other's and must be treated at the earliest by an ophthalmologist as stated by Ocampo, V.V.D., and Foster, C.S. (2007) [4].

Eye disorder is has less control of eye movements. The eyes moves when the head position get changed. People with eye disorder have problem to move eyeballs according to head movement and sometimes be stable in one position. Disease like **nystagmus,** cataracts have problem with optic nerve and retina. Nysatgmus, esotropia are some eye disorder which one eye be normal mode and other eye gets affected. Children affected by this are undergone for visual stimulation and improve the eyeball movements.

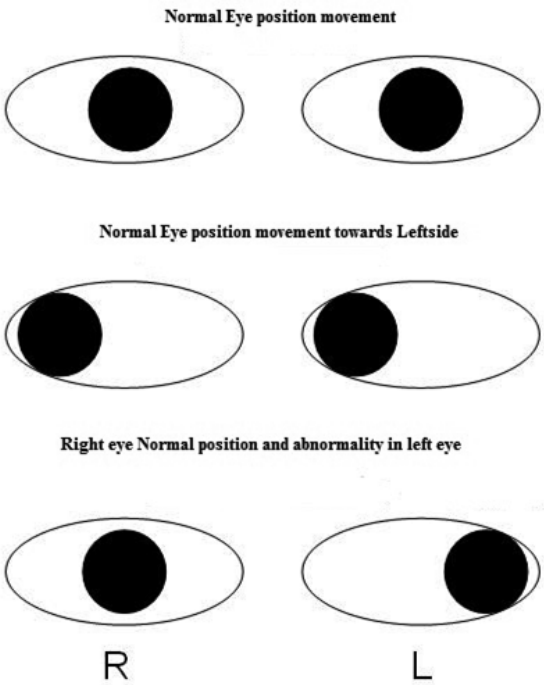


Fig. 1: Normal and abnormality eye

Different abnormality of one eye movement is referred by esotropia, exotropia and hypertropia. It is identified by the physical and perceptible changes in the eye. This checked by moving the eye ball in all direction, covering one eye to focus the object. Above age 5 checked by the alphabet letters with some distance. The examines like retina examination, slit lamp test and cycloplegic refraction helps to identify defective eye. Defectives in eye lens is detected with specs and the problem in nerves can't be corrected as soon as. This is treated as applying vision therapy, Orthoptics, Botullinum toxin (BOTOX) injection, the procedure of suppression and Surgery for severe case of eye nerves damage.

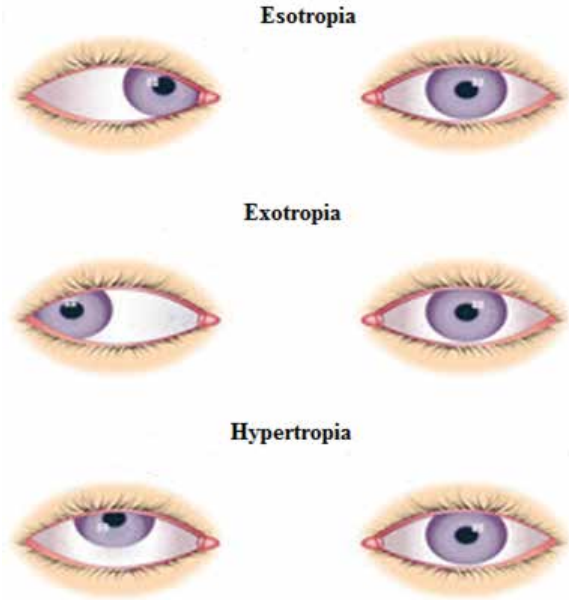


Fig. 2: Eye Strabismus

In previous works, many techniques are suggested for detection and localization of pupil. A distinct approach in iris localization and pupil extraction was explained from eye images in [5]by extracting the edges using fuzzy logic approach resulting into effective edge estimation technique and later use of these inputs to circular Hough Transform for detection of both a novel method for eye center localization was discussed in [6].Advanced performance was attained by focusing the eyes via facial feature regression and then perceiving eye midpoints with a cascade of regression forests through HoG features. A precise and fast pupil localization structure was suggested in [7]which performed fine for eye images attained either by means of the Near Infrared (NIR) or Visible Wavelength (VW) illumination. A robust pupil localization algorithm based on circular Hough transform was proposed in [8].The algorithm was tested on 37 images took from CASIA Iris dataset with various simulated eyelid occlusions.

In this research is planned as: Section 2 contributes an outline of state of the art in pupil segmentation algorithms. Section 3 defines the novel grid-based detection technique: section 4 presents, the concept of detection of segmentation methods and the proposed methodology procedure. Section 5 defines the results and discussion and section 6 give the conclusion part.

Formulation

A. Image Enhancement: It is useful in all fields where images have to be agreed and investigated. For instance, medical image analysis, study of images from satellites etc. Basically image enhancement means, changing an image 'f 'into image 'g' using 'T'. The values of pixels in images 'f' and 'g' are represented by 'r'and's', respectively. As supposed, the pixel values r as well as s are associated by the appearance,

$$s = T(r) \quad \ldots(1)$$

Where T is a transformation that plots a pixel value r into a pixel values. Subsequently, the effects are recorded back into the level [0, L-1], where $L=2^k$, k being the number of bits. The consequences are recorded in to the grey scale level. Therefore, for example, for an 8-bit image the range of pixel values will be [0, 255]. Also, color images can stretched with the similar theory. At the level of 0 to 255 is nothing but pixel values of a digital grey image.

B. Power Law Transformation: Enhancement of image will be achieved in a spatial or else the Fourier domains in addition to a significant parameter essential to see in this background are contrast enhancement. In a spatial domain, techniques utilized could be additionally categorized into gray level conversions, histogram processing and so on. As stated beyond, histogram equalization mourns from the fact that it may every so often decrease the contrast. Histogram specification can be perfect to suit the images but needs several user inputs. Likewise, PLT or else piece-wise linear transformation processes also require several user inputs.

$$s = cr^{\gamma} \quad \ldots(2)$$

Where, s and r are the gray levels of pixels in an output besides input images, individually and 'c' is a constant term. These PLT functions are revealed vividly in below fig. This figure demonstrates the graph of PLT using the input gray level r beside x-axis and output gray levels on y-axis for numerous values of γ. Let r_{max} be the dominant peak in the histogram. If r_{max} has a large value (in the range 150–255), then it is perceived from a below graph that contrast widening happens by means of selecting $\gamma > 1$ whereas for dark images (r_{max} lies in the range 0–100), we understand that selecting $\gamma < 1$ leads to contrast stretching.

C. Bilateral Filter (BF): It [9] is a nonlinear filter which achieves longitudinal averaging deprived of the smoothing edges. It has made an effectual denoising technique of an image. A significant concern using the BF is filter parameters selection that affects the outcomes meaningfully. One more research concern of BT is computation speed acceleration.

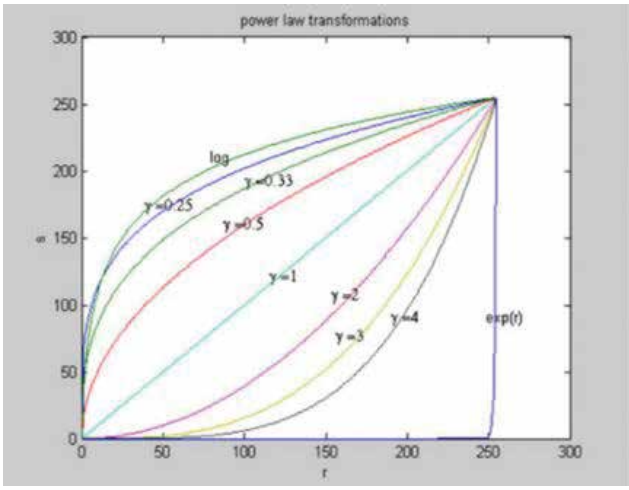


Fig. 3: A plot of PLT with input gray-level along X-axis for different γ and output gray level along Y-axis for different γ.

With some threshold values discovered the localization of the pupil and determined the normal and defective eye.

In 1998, Tomasi et al. primarily offered a BF. The BF theory similarly existed in as a SUSAN filter in addition to in as the neighborhood filter. It is worth stating that Beltrami flow procedure is deliberated as a theoretic derivation of a BF[10] that yields a range of image improving procedures extending from the 2L linear diffusion to 1L non-linear flows. The BF takes in a local neighborhood in a weighted sum of pixels;

Accurately, at a pixel position x, bilateral filter output is computed as follows

$$\tilde{I}(x) = \frac{1}{c}\Sigma_{y\in N(x)} e^{\frac{\|y-x\|^2}{2\sigma_d^2}} e^{\frac{|I(y)-I(x)|^2}{2\sigma_y^2}} I(y) \quad \ldots(3)$$

Where σ_d and σ_y are parameters adjusting the increased level weights off in spatial in addition to intensity areas, correspondingly, N{x) is a spatial area of pixel I{x), and C is normalization constant:

$$C = \Sigma_{y\subset N(x)} e^{\frac{\|y-x\|^2}{2\sigma_d^2}} e^{\frac{|I(y)-I(x)|^2}{2\sigma_y^2}} I(y) \quad \ldots(4)$$

D. Segmentation: It is a fundamental process in image processing, for extract and identify the object region from the image, and it is one of significant image segmentation approaches because it is simple to implement.

The binary image denoted the separate region concerning examined object and background. The transformation procedure from grayscale into a binary image is well-defined in Eq. 4.

$$g(x,y) = \begin{cases} 1(\text{white}) \text{ if } f(x,y) > T \\ 0(\text{black}) \text{ if } f(x,y) \geq T \end{cases} \quad \ldots(5)$$

Where g(x,y) and f(x,y) are binary image pixel values in addition to grayscale image, correspondingly and 'T' isa threshold value.

Initially, the central part of binary images created must be studied to recognize a pixel value[11]. If a pixel value point was not '1', an opposite procedure was obligatory to inverse every pixel in the image from value '1' to '0' and vice versa by executing Eq. 5.

$$g(x,y) = \begin{cases} 1(\text{white}) \text{ if } f(x,y) > 0 \\ 0(\text{black}) \text{ if } f(x,y) \geq 0 \end{cases} \quad \ldots(6)$$

Where g(x,y) is the pixel values of binary image. The inversion procedure was frequently desired for cases where examined objects were dimmer[12] when compared with background. consequently that the background seems black and the investigated image seems white.

Pupil localization using Novel Grid Based Eye Detection: The flowchart is presented in below figure 1. In our proposed work, the grid is used for the pupil position in the eye. The segmentation procedure is a vital phase to get an exact selection of pupil besides the iris region.

This system consists of following stages such as:

1. Load the original Eye image.
2. Filtering of an image using a BF.
3. Power law transformation (exponential).
4. Segmentation of the pupil using a binary method.
5. Using the pupil binary value, detect the pupil in the eye and a circle will be drawn.
6. Determine the pupil center and make the grid in that image.
7. Apply inverse binary segmentation and the pupil is segmented and then the location of the center is determined.
8. Pupil status and eye status are determined using the center value of Pupil in the grid.

Power law transformation (exponential) is used for image enhancement process, and then the segmentation process of the pupil is achieved using the binary method. Then by using the binary value and detection of the pupil in the eye is performed and then mark a circle. Further, the discovery of pupil center is implemented and then makes the grid in the image. The grid is created using the pixel point like row and column. Mark the every 30 and 30 column pixel value changed the grid is created. Also, add the axis label the eye identify as defective eye.

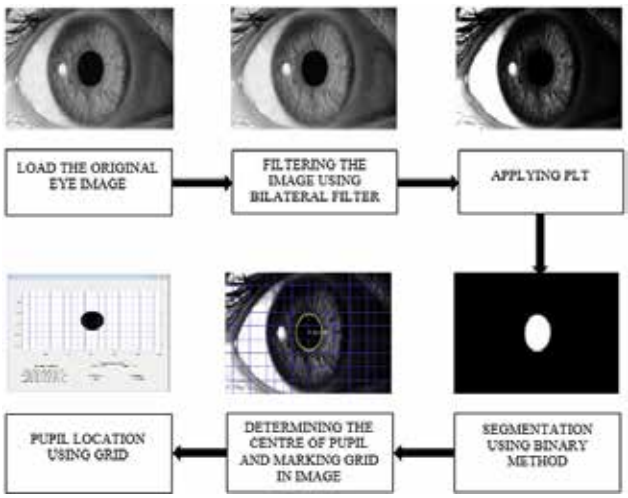


Fig. 4: Flowchart of the proposed method GRID based localization

Results snd Discussion

The suggested technique intended for pupil localization of the exact eye position is key for application

related to iris and pupil localization to excerpt the pupil area appropriately. It was executed using MATLAB software. We collected 45 different images subjects from the Point of Gaze (PoG) Eye dataset, real-time images collected from special schools and eye based hospitals and normal images collected from general public and some images are collected from Internet. The implementation was done in MATLAB software.

Table 2 shows the original image, filtered image, power law transformation image, binary image, marking a circle and the pupil position through the grid method[13]. The size of the grid is 600x270 and the size of each cell is 30x30. The count of the cells is around180 and the size of the eye is 600x270.

Table 1: Boundary conditions

Position of pupil	Boundary condition (in pixel)
Centre	380>X>200 & 210>Y>60
Centre (Vertical view)	210>Y>60
Centre (Horizontal view)	380>X>200

The above figure 3 demonstrates the pupil position when it is positioned in the center. The boundary conditions are given as if the x-axis value lies between 200 and 300, and y-axis value lies in between 60 and 210 then the position of the pupil are in the center. If the boundary condition for x-axis is in between 600 and 380 and y-axis is 0 and 150, then the position of the pupil is at the top right location. If the boundary condition for x-axis is in between 600 and 380 and y-axis is 250 and 150

Table 2: Normal right eye and normal left eye with variation

Person	Right eye (in pixel)	Left eye (in pixel)	Variation
P1	(305,136)	(304,135)	1.4142
P2	(318,144)	(317,142)	2.2361
P3	(334,154)	(332,152)	2.8284
P4	(344,156)	(342,158)	2.8285
P5	(360,164)	(358,166)	2.8248
P6	(362,170)	(360,172)	2.4521
P7	(364,186)	(362,184)	2.8245
P8	(372,194)	(370,192)	2.8248
P9	(378,196)	(376,200)	4.4721
P10	(379,202)	(380,210)	11.313

Conclusion

An innovative technique was proposed for segmentation of the pupil using the integration of power-law transformation for image enhancement and binary filtering for the removal of the noise in the image. The binary technique was considered for the procedure of the segmentation of pupil. The suggested method was implemented by considering 200 different images from Point of Gaze (PoG) Eye dataset, real-time images collected from special schools and eye based hospitals and normal images collected from general public and some images are collected from databases. The implementation was done in MATLAB software. The outcomes showed that this technique delivered precise segmentation. The proposed concept can be utilized in the vision stimulation evaluation system.

Acknowledgement

This project was funded by DST-SERB (Department of Science and Technology-Science and Engineering Research Board) all the way through the Fund Grant Number (EMR/2017/000073). The author be grateful to the Children from Sairam special school for differently disable children, Madurai, TamilNadu for supporting to collect the eye image data.

Ethical Clearance: Taken from working Department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCE

1. Reimer AM, Cox RF, Boonstra FN, Nijhuis-van der Sanden MW. Measurement of fine-motor skills in young children with visual impairment. Journal of Developmental and Physical Disabilities. 2015 Oct 1;27(5):569-90.
2. Tomasi, C., &Manduchi, R. (1998, January). Bilateral filtering for gray and color images. In Computer Vision, 1998. Sixth International Conference on (pp. 839-846). IEEE.
3. Reimer AM, Cox RF, Boonstra FN, Nijhuis-van der Sanden MW. Measurement of fine-motor skills in young children with visual impairment. Journal of Developmental and Physical Disabilities. 2015 Oct 1;27(5):569-90.

4. Dixit A, Pathak S, Raj R, Naveen CH, Satpute VR. An Efficient Fuzzy Based Edge Estimation for Iris Localization and Pupil Detection in Human Eye for Automated Cataract Detection System. In2018 9th International Conference on Computing, Communication and Networking Technologies (ICCCNT) 2018 Jul 10 (pp. 1-6). IEEE.

5. Levinshtein A, Phung E, Aarabi P. Hybrid eye center localization using cascaded regression and hand-crafted model fitting. Image and Vision Computing. 2018 Mar 1;71:17-24.

6. Jan F. Pupil localization in image data acquired with near-infrared or visible wavelength illumination. Multimedia Tools and Applications. 2018 Jan 1;77(1):1041-67.

7. Setiawan MT, Wibirama S, Setiawan NA. Robust Pupil Localization Algorithm Based on Circular Hough Transform for Extreme Pupil Occlusion. In2018 4th International Conference on Science and Technology (ICST) 2018 Aug 7 (Vol. 1, pp. 1-5). IEEE.

8. Xiao F, Huang K, Qiu Y, Shen H. Accurate iris center localization method using facial landmark, snakuscule, circle fitting and binary connected component. Multimedia Tools and Applications. 2018 Oct 1:1-21.

9. George A, Routray A. ESCaF: Pupil Centre Localization Algorithm with Candidate Filtering. arXiv preprint arXiv:1807.10520. 2018 Jul 27.

10. Wang Z, Cai H, Liu H. Robust eye center localization based on an improved SVR method. InInternational Conference on Neural Information Processing 2018 Dec 13 (pp. 623-634). Springer, Cham.

11. Maini R, Aggarwal H. A comprehensive review of image enhancement techniques. arXiv preprint arXiv:1003.4053. 2010 Mar 22.

12. Smith, S. M., & Brady, J. M. (1997). SUSAN—a new approach to low-level image processing. International journal of computer vision, 23(1), 45-78.

13. Maini, R., & Aggarwal, H. (2010). A comprehensive review of image enhancement techniques. *arXiv preprint arXiv:1003.4053*.

Cardiac Tele-care

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ABSTRACT

Electrocardiography is the key aspect to diagnose the cardiac malfunctions. The standard method is still cumbersome, time consuming and labor intensive. Glove based comprehensive remote physiological assessment platform will provide the benefits of telemedicine with less complicated electrode placement. Telemedicine allows patients in remote areas to access medical personnel quickly, efficiently and without travel to get proper prescriptions. This paper aims at providing an end to end IoT platform for cardiac patients that enables seamless data collection of bio-signals from various sensors and transmission of those data for diagnosis purpose.

Keywords: *electrocardiogram, telemedicine, ECG telehealth, Internet of Things, mobile application.*

Introduction

Electrocardiography remains the primary diagnostic procedure for detecting many cardiac problems. It is used routinely for diagnostic purposes by monitoring a patient's condition during pre and post surgery. Wearable technology and telemedicine are considered as the future of health care [1]. E-Health monitoring system allows close monitoring of vital parameters irrespective of the location of patient [2]. The smart sensor platform can be used to retrieve signals from different body sensors and can be monitored on the smart phone [3]. It is possible to calculate the heart rate from the ECG signals using ARM 7 controller [4]. ECG data are sampled according to Nyquist theorem and are packetized to improve the efficiency and to minimize the data loss during transmission [10].

ECG waves are filtered by using instrumentation and operational amplifiers and transferred to PC via audio jack or cable[1]. Wireless transmission can be achieved through Bluetooth, Wi-Fi, Li-Fi, SigFox or LoRa. IoT is the system of interrelated computing devices with exchange of data that are recognized by unique code [5]. The 2 Xbee-pro wireless modules can also be used to transmit signals only upto a range of about five meters[6]. A wireless sensor network monitoring human vital physiological parameters via HC-06 Bluetooth module as proposed in [9] covers only upto a range of 10 meters.

Graphical User Interface (GUI) provides an interactive platform between patient and the doctor which has prescription add-ons[7]. The system model proposed in [8] is a smart sensor system allowing continuous monitoring of patient in conjunction with a smart phone which limits the data access only to the authorized person. The main objective of the work presented in this paper is to acquire bio-signals and transmit it through IoT for diagnosis by the doctor where they can prescribe medications or suggest appointments to the patient.

Methodology

The proposed method incorporates all electrodes and sensors inside the glove thereby eliminating the clutter of separate cables. This provides natural alignment of electrodes positioned on right palm of the patient. The placement of electrodes in the glove is shown in Fig.1. While the user places the right palm on the chest in implacable regional fashion, the palm and lower arm naturally aligns with correct anatomical positions. The pressure of the patient's hand against the body maintains the constant stable skin contact without need for special preparation of skin. In addition to this, oxygen concentration and heart rate are also obtained. These signals are processed and transmitted to cloud and retrieved back in mobile application through IoT.

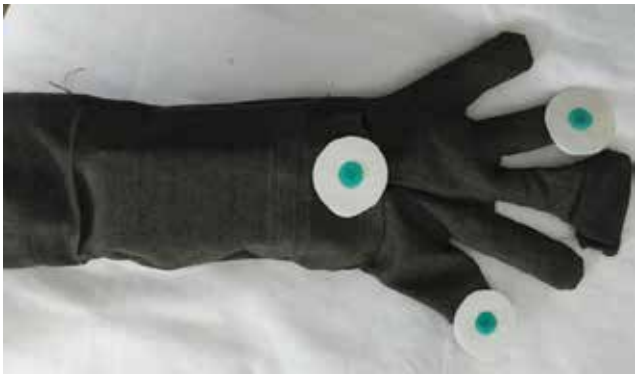


Fig. 1: Electrode placement in glove

A. Block Diagram: The sensing network incorporates SpO_2 sensor and heart beat sensor and ECG electrodes. SpO_2 sensor detects patients' oxygen saturation level by a non invasive method. The mechanism behind the sensor involves passing light wave through fingertip and the reflected light waves are collected to determine the oxygen saturation level. Pulse is an elementary way to indicate the heart rate. Heart beat sensor uses photo-plethysmography technique in which the volumetric changes in blood through the vascular region causes variation in the light intensity that is measured. ECG computes the electrical activity of the heart. Since ECG signals are extremely noisy, an integrated signal conditioning block is required. The outputs from 3-leads are given to Signal Conditioning Unit (SCU) which is devised to extract, amplify and de-noise the bio-potential signals.

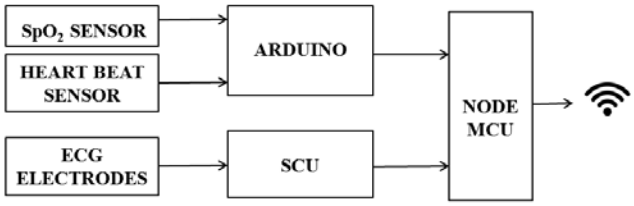


Fig. 2: Block diagram of the proposed system

Arduino is the processor used to collect the signals from SpO_2 and heart beat sensor. Node MCU is an IoT platform that is used to transmit the received bio-signals to the cloud as represented by the block diagram in Fig.2. The data are transmitted in the form of array to avoid data loss during transmission.

B. Mobile Application: Mobile application is developed using Kodular software. It is an open source software wherein various blocks present in the application is created using drag and drop options. It acts as a GUI for the doctor as well as the subject. The vital parameters of a subject is viewed in the doctor's screen in the mobile application where they can add prescriptions as shown in Fig.3. The patient can access the prescription in the mobile application as shown in Fig.4.

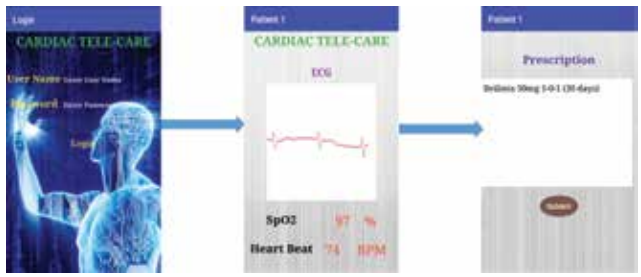


Fig. 3: Doctor's access in mobile application

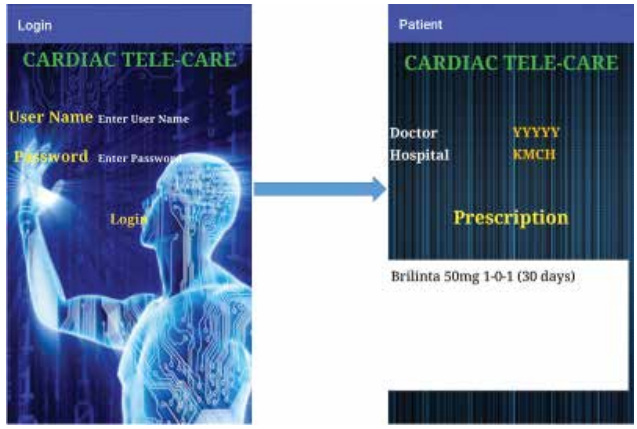


Fig. 4: Patient's access in mobile application

Advantages and Limitations

The main advantage is that it can be used by any personnel with short learning curve. It has user friendly options to use a mobile or a tablet. It possesses a modular design format with the capabilities to upgrade to a multi-parameter measurement system. Another advantage is its compact and cost effective design. Limitation of this system is that the processor has a minimum delay of 5s to 10s to acquire and transmit the signals. This can be overcome by using a high speed processor.

Conclusion and Future Work

The proposed system is complemented by sophisticated user friendly proprietary software, hardware solutions which utilizes touch screen for fast trouble free operation. This technology can serve in any medical institution from small practices to large hospitals. It is a breakthrough in medical community replacing the conventional electrode placement with an easy procedure. It does not require trained technicians

to operate. This can be used by the patients in remote places and can be transmitted through IoT technology for obtaining prescriptions from the doctor. The incidence of cardiac problems is more in rural areas also. Such people are largely ignorant about the problem and the situation often gets out of hand by the time they reach doctors. This system could be incorporated in primary health centers in rural areas thereby providing good contact between the rural people and specialists in urban areas.

Ethical Clearance: Taken from working Department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCE

1. YUNUS M, TALIB A, KHAN A. Designing a 3-lead cost effective ECG recording glove for home monitoring. Bioscience and Engineering: An International Journal (BIOEJ). 2014 Jul;1(1).
2. Kotevski A, Koceska N, Koceski S. E-health monitoring system.
3. Tikate MD, Yenare RP, Thakkar DP, Warale MS. Biomedical Data Transmission System with Central Monitoring. International Journal of Scientific Research and Engineering Studies (IJSRES). 2015;2(2):91-5.
4. Mahesh V, Kandaswamy A, Venkatesan R. Telecardiology for rural health care. International Journal of Recent Trends in Engineering. 2009 Nov 1;2(3):6.
5. Chhabra M, Kalsi M. Real Time ECG monitoring system based on Internet of Things (IoT). International Journal of Scientific and Research Publications. 2017 Aug;7(8).
6. Lukman AA, Agajo J, Gana KJ, Ogbole IC, Ataimo EE. Development of a low power consumption smart embedded wireless sensor network for the ubiquitous environmental monitoring using ZigBee module. ATBU Journal of Science, Technology and Education. 2017 Jun 13;5(1):94-108.
7. Chaichana T, Pititeeraphab Y, Sangworasil M, Masuura T. Implementation of Wireless Electrocardiogram Monitoring System. International Journal of Electronics and Electrical Engineering. 2016 Jun;4(3):248-52.
8. Manivannan N, Celik N, Balachandran W. Evaluation of a behind-the-ear ECG device for smartphone based integrated multiple smart sensor system in health applications.
9. Ahmed A, Lukman AA, James A, Mikail OO, Umar BU, Samuel E. Human Vital Physiological Parameters Monitoring: A Wireless Body Area Technology Based Internet of Things. Jurnal Teknologi dan Sistem Komputer. 2018 Jul 31;6(3):115-21.
10. Yang Z, Zhou Q, Lei L, Zheng K, Xiang W. An IoT-cloud based wearable ECG monitoring system for smart healthcare. Journal of medical systems. 2016 Dec 1;40(12):286.

A Map Reduce Framework for Identifying Association Rules between Clinical Traits of Asthma

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ABSTRACT

Asthma is one of the major wide spread and continual conditions worldwide. Ecological features may play vital roles in asthma. In data mining, association rule mining is the appropriate algorithm to identify the relationship between different features of a dataset. Big data Analysis helps in preventing the disease and detecting the disease in advance. MapReduce helps in reducing the time complexity of big data. In this paper, we propose a MapReduce framework with association rule mining technique to find the clinical traits of asthma.

Keywords: *Asthma, Association Rule Mining, Clinical Traits, Apriori Algorithm, Data Mining, Map Reduce, Big Data.*

Introduction

Asthma is a wide spread provocative chronic lungs disorder in which respiratory systems are prone to narrow[1]. Environment factors and genetics are the two main elements which cause asthma [2]. Wheezing, chest tightness, coughing and shortness of breath are main symptoms of asthma [3]. Association rule mining reveals the association between different features of large data[4]. Two steps in association rule mining are[5] (i)Finding all the frequent itemsets that satisfy minimum support threshold and, (ii) Generating strong association rules. Big data is a collection of huge complex data sets. It is difficult to process them using traditional tools[6]. Big data helps in extracting interesting values. Many new technologies and frameworks for bigdata were created to provide high storage parallel processing. The cost for storage and processing also gets dropped. MapReduce is the main concept that supports distributed computing with big data[7]. All the rules generated by the association rule mining algorithm are not useful. So interesting and uninteresting rules has to be identified. In this paper we propose a framework, where asthma dataset is transformed into different partitions using hadoop. In each partition the existing association rule mining algorithm like apriori algorithm can be applied to generate the frequent itemsets. Then a map reduce algorithm can be applied to find consistent and inconsistent rules. This framework can be used to find the clinical traits of asthma.

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Related Works

Guneet Kaur et al,[8] applied the classification techniques in hadoop to examine the chronic kidney disease dataset. Dinesh J. Prajapati et al used the frequent pattern mining techniques with map reduce to extract the frequent itemsets in the distributed environment. They also proposed map reduce based algorithm for consistent and inconsistent rule detection. They also compared the efficiency of this proposed method with fast distributed data mining and count distribution algorithms. Botao wang et al[9] proposed a mapreduce based learning machine for online parallel processing. In this work,first the sequential machine's matrix calculation dependency relationships were analyzed. Then the synthetic and real data is used to evaluate POS-ELM. Tajunisha et al proposed a Map Reduce frame work to predict student performance. This technique proposes the high classification accuracy in bigdata and time complexity. Giulia Toti et al[10]used an Associationrule mining based methodology to study and analyze the risk variations and exposures of pediatric asthma.

In all the above works different authors use different data mining techniques with or without mapreduce framework for business and medical applications. But they do not support for asthma dataset. So we propose a Map Reduce with apriori system to handle time complexity and to improve accuracy.

Proposed Methodology

The Association rule mining technique helps in finding the structure that leads to envisage the existence of a particular thing by using the co-existence of any other item. Association rules are used in identifying the relationship between different features of a dataset. In our research, a person with asthma disease has a number of main symptoms and exposures of asthma disease. There may be multiple associations exist among those symptoms and exposures. Association rule mining technique will be helpful in find out those associations. Big data leads to big analysis. If we have more data we can analyse causes and exposures of a particular disease in more effective way. MapReduce framework can be used to process parallel and distributed data. So we propose a MapReduce framework to implement the apriori algorithm to detect the causes and exposures of asthma by processing the big asthma dataset. The flow graph(Figure 1) and steps are given below

Methodology

Step 1: Data collection from hospitals/questionnaire

Step 2: Data pre-processing

Step 3: Partition the data based on age

Step 4: Applying Apriori algorithm locally and parallel in all nodes

Step 5: Apply MapReduce algorithm to find consistent and inconsistent rules.

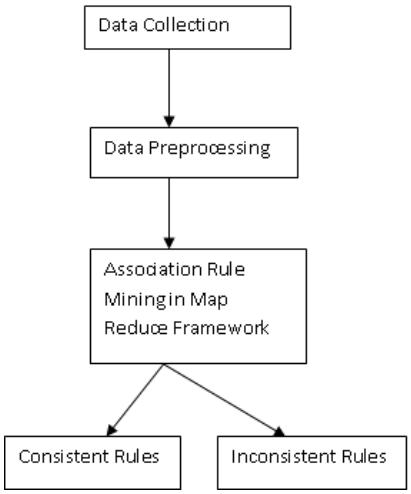


Figure 1: Flow graph of a proposed work

A. Data Collection: For this research data can be collected from various sources like questionnaire from the asthma patients during hospital visits, online questionnaire through social medias and hospital databases. 300 patient records were collected from local hospitals. Some of the features and it's explanations are given in Table I. The symptoms and exposures of asthma can be included as attributes. But our main focus is to identify the major exposure of asthma disease.

Table I: List of Attributes

Attributes	Explanations
DRINKING WATER	Is the person take purified drinking water
TYPE OF FOOD	Vegetarian/Non-Vegetarian
WORKING ENVIRONMENT	Air Conditioning Rooms/ Polluted area
MEDICATIONS	How long a person have medications
ANY OTHER DISEASE	Is the person have any other disease

B. Data Preprocessing: The first step will be integrate all the collected data(from different sources) into a single dataset. Then the dataset can be cleaned and transformed to make them suitable for analysis. This process eliminates the inefficient data.

C. Map Reduce Framework with Apriori Algorithm: MapReduce is a program model to process the data in a distributed environment. Generally MapReduce process is carried out with the help of two different programs. First one is map program and the second one is reduce program.

- **Map Program:** There can be multiple map programs in a MapReduce task. All Mappers do the same work on different partitions or nodes. The data is read and processed with the help of map program. For every partition there will be an output that is produced by the map program
- **Reduce Program:** The reducer is used to collect and combine outputs that were created by map tasks of different partitions.

Here, Apriori algorithm is applied parallelly on different chunks of dataset in the form of different map

tasks.The generated rules are combined and grouped by reduce tasks based on the support and confidence values. All the association rules produced by this algorithm may not be useful. So the rules are again processed by the map task in the second phase to identify the consistent rules as well as inconsistent rules as two reduce tasks.

Conclusion

Data analytic structure is important to develop our perceptive of asthma exposure. From this viewpoint, it is noteworthy to make investment in advancing computational tools to resolve health care problems. This new credible method helps to merge asthma data with big analysis, so that this integrative approach can be used by clinicians and epidemiologists to recognize the exposures and heterogeneity of asthma and allergic disease.

Ethical Clearance: Taken from working Department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Busse WW, Lemanske RF. Expert Panel Report 3: Moving forward to improve asthma care. Journal of Allergy and Clinical Immunology. 2007 Nov 1;120(5):1012-4.
2. Martinez FD. Genes, environments, development and asthma: a reappraisal. European Respiratory Journal. 2007 Jan 1;29(1):179-84.
3. Cathrin Princy. J, Sivaranjini. K. Asthma Prediction Using Classification Technique. IJCTA 9(27),(2016) 415-421.
4. Prajapati DJ, Garg S, Chauhan NC. Interesting association rule mining with consistent and inconsistent rule detection from big sales data in distributed environment. Future Computing and Informatics Journal. 2017 Jun 1;2(1):19-30.
5. Han J, Pei J, Kamber M. Data mining: concepts and techniques. Elsevier; 2011 Jun 9.
6. Ahmed Oussous, Fatima Zalra Benjelloun, Ayoub Ait Lahcen, Samir Belfkin. Big Data Technologies: A Survey. Journal of King Saud University-Computer and Information Sciences 30(2018) 431-448.
7. Almayan H, Al Mayyan W. Improving accuracy of students' final grade prediction model using PSO. In2016 6th International Conference on Information Communication and Management (ICICM) 2016 Oct 29 (pp. 35-39). IEEE.
8. Kaur G, Sharma A. Predict chronic kidney disease using data mining algorithms in hadoop. In2017 International Conference on Inventive Computing and Informatics (ICICI) 2017 Nov 23 (pp. 973-979). IEEE.
9. Wang B, Huang S, Qiu J, Liu Y, Wang G. Parallel online sequential extreme learning machine based on MapReduce. Neurocomputing. 2015 Feb 3;149:224-32.
10. Toti G, Vilalta R, Lindner P, Lefer B, Macias C, Price D. Analysis of correlation between pediatric asthma exacerbation and exposure to pollutant mixtures with association rule mining. Artificial intelligence in medicine. 2016 Nov 1;74:44-52.

A Study on Knowledge, Attitude and Practices towards Breast Cancer among Reproductive Age Group Women in an Urban Area of Coimbatore

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ABSTRACT

Background: Breast cancer is the most common cancer representing 25% of all cancers. For every 2 cases diagnosed breast cancer one women dies. Early detection and treatment of breast cancer increases the chance of survival. Breast self -examination (BSE), Clinical breast examination, Mammography are different methods for screening of breast cancer. Only with early detection we can achieve longer survival.

Aims and Objective: To assess the knowledge, attitude and practice towards breast cancer among women of reproductive age group and to suggest necessary recommendations based on the observation to improve awareness of breast cancer in the study population.

Methodology: Using Purposive sampling technique 125 women aged 18-49 years were interviewed to assess their Knowledge, attitude and practice in an Urban area of Coimbatore.

Results: Among the participants 27.2% had family history of gynaecological cancer, 70.4% know about breast cancer, 40% know the methods of Breast Self-Examination (BSE), 36.8% practice BSE.

Keywords: *Breast cancer, Breast self-Examination, Knowledge, Attitude, Practice, Mammography*

Introduction

Breast cancer is the leading cancer in women both in the developed and the developing countries. Breast cancer followed by the cervical cancer are the most common cancers among women in India. Breast cancer is the most common cancer representing 25% of all cancers. For every 2 cases diagnosed of breast cancer one woman dies.[1] Early detection in order to improve breast cancer outcome and survival remains the cornerstone of prevention and control of death due to breast cancer.[2]

Across the world 1 million new cases are diagnosed annually.[3] Incidence in India varies from 7.2 to 33.4/100,000 (annual age adjusted rate).[4] Early detection and treatment of breast cancer increases the chance of survival.[5] Breast self -examination (BSE), Clinical breast examination (CBE), Mammography are different methods for screening of breast cancer.[6] Though theoretically BSE remains the tool for abating mortality due to breast cancer, in real life its application is low. Study among women in United States showed that the monthly breast cancer screening rates ranged from 29- 63%.[7]

There is a paucity of data on the knowledge, awareness of Breast cancer and breast self-examination (BSE) in Urban Coimbatore. This study was done to explore the knowledge, awareness and practice of Breast self-examination and to explore if there is any association between demographic characteristics, knowledge of breast cancer and practice of breast self-examination and so as to plan for awareness campaigns in future.

Aims and Objectives

1. To study the knowledge, attitude and practices towards breast cancer among women in reproductive age group.
2. To suggest necessary recommendations based on the observation to improve awareness of breast cancer in the study population.

Material and Method

Study area	Sundarapuram, Coimbatore
Study design	Community based cross sectional study
Study subjects	Reproductive age group women (18-49 years)
Sampling technique	Purposive sampling
Sample size	125
Inclusion criteria	Women among reproductive age group (18- 49 years) who consent to participate in the study
Exclusion criteria	Known case of breast cancer on treatment
Ethical consideration	IHEC approval obtained. Confidentiality maintained
Study tool	Questionnaire
Analysis	SPSS-23

Methodology

A study on Knowledge, Attitude and Practices towards breast cancer among reproductive age group women was done in Sundarapuram which is an urban area in Coimbatore where the Urban health centre of the teaching hospital is located. After pilot testing using the pre- test questionnaire necessary correction and validation was made and proper study was undertaken.

The women among reproductive age group between 18- 49 years who gave consent were taken up for the study. Data collection was done among 125 women using purposive sampling technique.

The semi structured questionnaire included various knowledge components in breast cancer like if they know about breast cancer, signs and symptoms of breast cancer, breast self-examination (BSE), comprehensive breast examination (CBE), mammography and treatment options. Attitude components like early case detection, breast feeding, risk factors and screening techniques and practice on screening techniques.

Data was collected entered in excel sheet and analysed using SPSS-23 software. Results were tabulated. Study on association and correlation between knowledge, attitude and practice components were analysed using chi- square test and Pearson correlation. p value of < 0.05 was taken as statistically significant. Confidentially was maintained throughout the study.

Breast Self-examination: BSE is a screening test to detect breast cancer using inspection and palpation of the breasts in standing in front of mirror, lying and in shower. It is done once in a month using a standard procedure.[8]

Comprehensive Breast Examination CBE: CBE is a technique in screening of breast cancer. It is extensive component of BSE.[9]

Observation and Results

Table 1: Socio Demographic Characteristics

Socio- demographic characteristics (N = 125)	n (%)
Age distribution	
18-25	52 (41.6)
26-33	26 (20.8)
34-41	19 (15.2)
42-49	28 (22.4)
Occupational status	
Government	27 (21.6)
Self employed	12 (9.6)
Unemployed	21 (16.8)
Socio economic status (Modified Kuppusamy scale for the year 2018)	
Lower middle	66 (52.8)
Upper lower	54 (43.2)
Lower	5 (4.0)
Marital Status	
Married	94 (75.2)
Unmarried	31 (24.8)

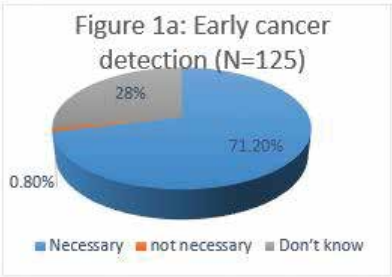
Among the study subjects most of them (41.6%) belong to 18-25 years of age. Among the study subjects, 31.2% of the study subjects were employed. In this study 52.8% were from lower middle class and 43.2% were from upper lower class. In this study, 75.2% of the subjects were married.

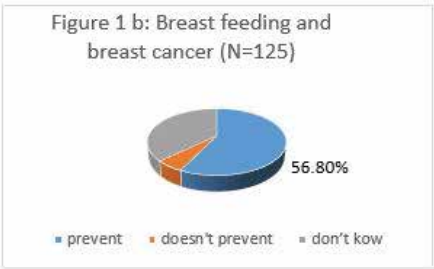
A positive family history of breast/reproductive tract cancers was elicited among 27.2% of the study subjects. None of the women in the study were smokers but 19.2% had exposure to passive smoking and 4.8% of the subjects were tobacco chewers. Hormone replacement therapy (HRT) and Oral contraceptive pills (OPC)were used by 11.2% of the subjects.

Table 2: Knowledge about breast cancer (N = 125)

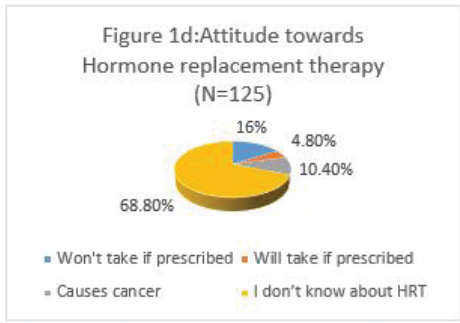
Knowledge about breast cancer	Responses n (%)
Know about breast cancer	88 (70.40)
Know the signs of cancer	70 (56)
Painless swelling can turn into cancer	83(66.40)
Know Breast self-examination	50 (40)
Know comprehensive self-examination	32 (25.60)
Know Mammography	53 (42.40)
Breast cancer is curable	71 (56.80)
Breast cancer is treatable	81 (64.80)
Breast cancer is Fatal	60 (48)
Breast feeding can prevent cancer	84 (67.20)
Small breast lump can turn into cancer	98(71.20)

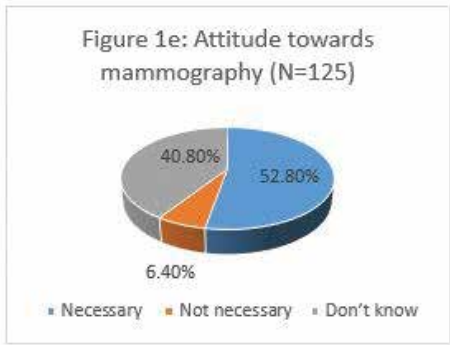
As depicted in table 3, 70.4% of the subjects knew about breast cancer, 71.2% of them knew that small lump can turn into cancer, 67.2% said that breast feeding can prevent cancer, about 40% of the respondents knew about breast self-examination, 42.4% knew about mammography and 64.8% said that breast cancer is treatable.











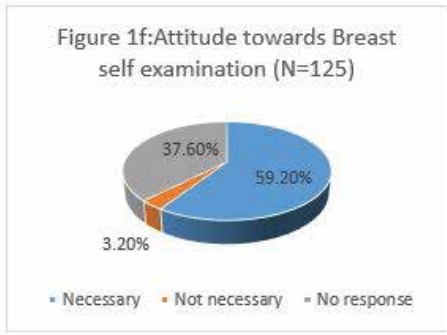


Figure 1a-f: Attitude towards breast cancer

The pie charts (figure 1a- 1f) depicts the attitude of study subjects towards breast cancer- 71.2% said that early diagnosis of cancer is necessary, 56.8% said that breast feeding can prevent cancer, 24% sad that alcohol consumption can cause breast cancer, 58.2% said breast self- examination is necessary and 52.8% said mammography is necessary.

Table 3: Practices on breast cancer prevention

Practice (N = 125)	Response n (%)
Breast self-examination	49 (36.8)
Comprehensive breast examination	28 (22.4)
Mammography	1 (0.8)

Among the study subjects 36.8% practice self-breast examination, 22.4% practice comprehensive breast examination and 0.8% had underwent mammography.



Figure 2: Reason for not practicing Breast Self-Examination (BSE) (N = 125)

Figure 2 shows that 28% don't know about breast self-examination, 29% don't know about the steps of BSE and 40% didn't know the importance of BSE.

*- Statistically significant ($p < 0.05$)

The above table shows the association of factors like age, education, occupation, family history and marital status and KAP towards breast cancer. There is a significant association between age and knowledge and attitude, education and Knowledge, attitude and practice. Higher the literacy level better was the KAP towards breast cancer. Occupational status had significant association between knowledge and attitude while family history of cancer among the study participants showed no significance. Married women had better knowledge, attitude and practice towards breast cancer and it was statistically significant.

There was a significant association between knowledge, attitude and the practice habits of the breast self- examination among the study subjects.

Table 4: Correlation among Knowledge, attitude and practice towards breast cancer screening

		Knowledge	Practice	Attitude
Knowledge	Pearson Correlation	1	0.658	0.548
	Sig.(1 tailed)	NS	0.000*	0.000*
Attitude	Pearson Correlation	0.548	0.374	1
	Sig.(1 tailed)	0.000*	0.000*	NS
Practice	Pearson Correlation	0.658	1	0.374
	Sig.(1 tailed)	0.000*	NS	0.000*

(*Statistical Significance $p < 0.05$)

The above table shows that there is a significant correlation between knowledge with attitude and practice towards breast cancer. Better the knowledge and awareness regarding breast cancer screening better were the screening practices.

Discussion

From our study we found that 70% of the study subjects know about breast cancer which is way better when compared to the study conducted by Siddharth R et al[10] where 81.1% of them were unaware about the Breast cancer and in the study by Somdatta et al[5] half of the study population were aware about the condition. In another Indian study by Agarwal et al[3] the awareness was 47.9%. the high level of awareness towards breast caner in this study population can be attributed to the health education campaigns conducted in the study area.

It was also found that increase in literacy and socio economic status increased the knowledge regarding breast cancer which is similar to our study. Rural and urban women did not differ significantly in their knowledge of breast cancer in this study. However, awareness about breast cancer varied depending upon education, employment, and economic status. Siddharth et al[10]also found that women with higher levels of education had significantly higher knowledge about breast cancer in their study of 300 women in Andhra Pradesh in India.

In our study 40% knew about breast self-examination, compared to Siddharth R et al[10] where 11% of the subjects knew about BSE.

In the present study among the participants who know about breast examination, 36.8% practice BSE. The reason for not practicing BSE was that they don't know about BSE, don't know about the steps of BSE, and few don't know its importance. While in studies conducted by Prankin et al[11] and Singh et al[12] showed knowledge and awareness of early detection measures of breast cancer such as BSE was not consistent.

Conclusion and Recommendation

Education and associated factors like socio-economic status and employment have an impact on early detection of the disease and initiation of treatment in early stages of cancer. Our study also highlights the association of

knowledge and attitude and the BSE practices. More the knowledge about screening techniques better was the practice rate. The teaching of BSE can alert any abnormal changes in the breasts and seek medical attention immediately. Positive health care can go a long way in increasing health awareness amongst the study population and their health seeking behaviour.[13]

This study demonstrates the need for health education programs about risk factors, signs, symptoms of breast cancer, to improve the awareness among women. Female centred clinics and women self- help groups should be organised in appropriate and accessible locations for early detection and practice of BSE. should help them practice screening for breast cancer.

Further periodic researches and surveys about knowledge and practice of BSE are recommended to assess the positive impact of health education. Educating health care workers and nurses to impart training about BSE is also crucially important. We should have major policy changes to increase the screening and health education programmes which would increase the overall positive impact on reducing the burden of the disease.

The Author has no conflict of interest and funding to be disclosed.

Ethical Clearance: Taken from working Department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Jonas S. ATINER's Conference Paper Proceedings Series.
2. White A, Thompson TD, White MC, Sabatino SA, de Moor J, Doria-Rose PV, Geiger AM, Richardson LC. Cancer screening test use—United States, 2015. MMWR. Morbidity and mortality weekly report. 2017 Mar 3;66(8):201. Agarwal G and Ramakant P (2008).
3. Tarawneh MI, Tarawneh MR, Akel A. Knowledge and Practice of Jordanian Women towards Breast Cancer and Breast Self Examination: A Cross Sectional Study in 2006. Journal of the Royal Medical Services. 2011 Jun;102(351):1-7.
4. Anderson BO, Cazap E, El Saghir NS, Yip CH, Khaled HM, Otero IV, Adebamowo CA, Badwe RA, Harford JB. Optimisation of breast cancer management in low-resource and middle-resource countries: executive summary of the Breast Health Global Initiative consensus, 2010. The lancet oncology. 2011 Apr 1;12(4):387-98.
5. Ferro S, Caroli A, Nanni O, Biggeri A, Gambi A. A cross sectional survey on breast self examination practice, utilization of breast professional examination, mammography and associated factors in Romagna, Italy. Tumori Journal. 1992 Apr;78(2):98-105.
6. Parkin DM. Global cancer statistics in the year 2000. The lancet oncology. 2001 Sep 1;2(9):533-43.
7. Khokhar A. Breast cancer in India: where do we stand and where do we go?. Asian Pacific Journal of Cancer Prevention. 2012;13(10):4861-6.
8. Takiar R, Vijay CR. An alternative approach to study the changes in the cancer pattern of women in India (1988-2005). Asian Pac J Cancer Prev. 2010 Jan 1;11:1253-6.
9. Falguni tandel, pratima more. Stability indicating hplc method for simultaneous estimation of nicotinamide and salicylic acid. Ijprt. (2018), [cited april 24, 2019]; 8(2): 43-47.
10. V. Sakthive, Mr. P.V.Kesaven, J.Martin William, S.K.Madan Kumar. Integrated platform and response system For healthcare using Alexa.. (2019), [cited April 24, 2019]; 7(1): 14-22.
11. S.Monisha, M.Monisha, P. Deepa, R. Sathya, K.Gunasekaran. An android application for exhibiting Statistical chronicle information.. (2019), [cited April 24, 2019]; 7(1): 7-9.
12. Anandarajagopal K, Sunilson JA, Promwichit P. Bombax ceiba Linn. bark extracts shows anti-microbial activity. Int J Pharm Res. 2011;3(1):24-6.

Health Promoting Lifestyle Practices: A Comparative Study on Health and Non-Health Professional Students

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ABSTRACT

Objective: To identify the health promoting lifestyle practices among health professional (HP) and non-health professional (NHP) students using HPLP (II) scale.

Method: A comparative design was used for the present study. 200 students were selected by using purposive sampling technique. A self-administered questionnaire (HPLP II) was used to assess the healthy lifestyle practices in six domains. The data analysis was done by using descriptive and inferential statistics.

Results: Out of total 200 participants, 100 were health professional and 100 were non-health professional students. The highest mean out of a scale of 4, was 2.96 (SD=0.618) and 2.96 (SD=0.618) for spiritual growth in health professional students and non-health professional students respectively. The lowest mean score was 2.19(SD=0.625) and 2.09 (SD= 0.605) for physical activity and health responsibility in health professional students and non-health professional students respectively. Significant difference between the groups were identified in the sub scales of health responsibility (2.43 Vs 2.09, P=0.005), inter personal relationship (2.85 Vs 2.78, P=0.089) and nutrition (2.29 Vs 2.39, P=0.017). No major difference was observed between other sub scales. The overall performance was moderate among health professional students (2.55) and low among non-health professional students. (2.48)

Conclusion: The study concluded that many of the students were not adopting healthy lifestyle practices. Health professional students had moderate scores and non-health professional students had low scores.Since this study shows moderate and low health promoting lifestyle practices, there is need to develop guidelines and periodic investigation for the students for their good health.

Keywords: *Health promotion, Lifestyle practices, Health professional students (HP), Non-health professional students (NHP), Health Promoting Lifestyle Profile-II (HPLP II).*

Introduction

Illness can strike anybody at any time at any age. In later decades, way of life has been perceived as the determinant of well-being and has turned into a focal point of expanding research interest around the world[1]. A healthy lifestyle can leave you fit and at decreased risk for sicknesses. A balanced diet, regular workout and proper rest are the major factors for maintaining good health [2.] Health promoting lifestyle practices are the efforts that people follow to remain healthy, to prevent major illness and to lead a better life. Non-communicable diseases are the leading cause of death and disabilities worldwide. Better health practices help to prevent the occurrence of non-communicable diseases [3.]

Globally, non-communicable diseases are responsible for 63% of all deaths and they are responsible for an estimated 80% of the worldwide burden of sicknesses. Records revealed that 53% of the cause of death are associated with poor lifestyle. Unhealthy lifestyle practices lead to non-communicable diseases like obesity,coronary artery diseases, diabetes, musculoskeletal and spinal problems[4]. The World Health Organization (WHO) has said that 60% of a person's fitness and quality of life depends on his/her way of life. Numerous studies revealed that good health practices reduceillnesses and mortality rates.Health related

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behaviors in the initial stage of life have an impact on the ailment risks related to lifestyle in later stages of life. Hence it is essential to promote healthy lifestyle behaviors among the youth.[1,5.]

A study had been conducted among medical and non-medical students in University of Malaysia to compare the health risk factors and health promoting behaviors amongst them. The study showed that awareness among medical students is higher than non-medical students. But there is no significance in health promoting behaviors amongst them[6]. Another study was conducted in Pakistan to compare healthy lifestyle and dietary habits in medical and non-medical students. It is predicted that medical students have more knowledge about healthy lifestyle practices than non-medical students. But no data showed that this awareness leads to good habits.[7]One study conducted to analyze the health promoting lifestyles of medical students in Bhopal, Madhya Pradesh showed that health status of medical students is low in Bhopal.[8]

College life is a crucial period for students astheir behaviors are vulnerable to drastic changes. Hence, university and college years represent a critical time for health and nutritional education [7]. It is vital to increase health promoting habits among the youth. In order to do that it is very important to assess their lifestyle habits and behavior. Only few studies have been conducted in India related to this topic. The findings of the study will reveal the existing lifestyle practices among them.[8,9]This will help us to plan in advance and educate the young population about the importance of following healthy lifestyle practices. Hence the investigator decided to assess the lifestyle practices among college students.[7,8]

Materials and Method

Setting and Design: This comparative design study was conducted in selected colleges, Bangalore. This was done to assess the health promoting lifestyle practices among health professional and non-health professional students and to compare among the group.

Participants: This study included 200 students studying various nursing and degree courses in selected colleges in Bangalore. 100 students from nursing college and 100 students from degree college were selected for the study by using purposive sampling technique.

Instruments: Aself-administered questionnaire was used for data collection. The survey of the students was done in two parts. The first part included demographic questions and the second part contained 52 items related to Health Promoting Lifestyle Profile (HPLP II). The revised HPLP II questionnaire developed by Walker in 1987, measures behavior in six sub scales. These sub scales were physical activity (PA-8), spiritual growth (SG-9), health responsibility (HR-9), interpersonal relationship (IPR-9), nutrition (N-9), and stress management (SM- 8)[10,11,12].

The HPLP II questionnaire was composed of 52 items based on six sub scales. The mean score of the scale was divided into 3 levels as high (>3), moderate (2.5–3) and low (<2.5). Many researchers have been used the HPLP II scale for health promotion and have verified it's high validity and reliability. The English version of this overall scale reported a Cronbach alpha of 0.94 and an alpha ranging from 0.79 – 0.87 for the six sub scales. The higher the mean score obtained, the higher is the index of health promoting lifestyle.[8,11]

Data Collection Method: This study was approved by the Institutional Ethical Review Board (IERB). Formal permission was obtained from the college administration, ethical committee and heads of departments. Students were selected based on purposive sampling method. The investigator explained about the study and obtained written informed consent from the participants. Then the investigator allotted the questionnaire to the participants. The inclusion criteria for the study were,

1. Students studying in various nursing courses and various degree courses in selected colleges, Bengaluru.
2. Students who are willing to participate.
3. Students who can read and write English.

Data Analysis

The data collected was analyzed by using descriptive and inferential statistics. The data collected was entered into a master sheet. Descriptive statistics was used to describe the data by using percentage, mean, median, mode and standard deviation (SD). To relate between the variables, Pearson's correlation coefficient was used. SPSS V2 was used for the analysis. An alpha value of 'p' less than 0.05 was used to determine the statistical significance [8, 13, 14, 15].

Findings

Sociodemographic characteristics of the participants: A total of 200 students were studied, among them 28% were males (56/200) and 72% were females (144/200).

Among health professional students, 82% were females and rest 18% were males whereas among non-health professional students 62% were females and 38% were males. (Table 1)

Table 1: Distribution of Students by Gender and Age

Variable		HP	NHP	N	%
Gender	Male	18	38	56	28
	Female	82	62	144	72
	Total	100	100	200	100
Age	18	1	29	30	15
	19	11	27	38	19
	20	40	22	62	31
	21	19	19	38	19
	22	16	2	18	9
	23	9	1	10	5
	24	1	0	1	0.5
	25	3	0	3	1.5
	Total	100	100	200	100

Health promoting life style practices among health professional students: The findings of the present study revealed that the average mean score for health promoting lifestyle practices among health professional students were moderate (2.55). Highest score falls in the sub scales of spiritual growth (2.96) and lowest score for physical activity (2.196). (Table 2)

Table 2: Distribution HPLP II Score and its subscales

Scale	Mean		Standard Deviation	
	HP	NHP	HP	NHP
HPLP II Score	2.550	2.480	0.574	0.599
Physical Activity	2.196	2.173	0.625	0.623
Spiritual Growth	2.960	2.960	0.618	0.618
Health Responsibility	2.430	2.090	0.624	0.605
Interpersonal Relationships	2.850	2.780	0.575	0.629
Nutrition	2.290	2.390	0.518	0.601
Stress Management	2.598	2.542	0.485	0.522

Conted…

Description of gender and health promoting lifestyle practices among health professional students: The findings revealed that males have the highest score in the sub scales of interpersonal relationships (3.0) and the lowest score in nutrition (2.39), whereas females have the highest score in spiritual growth (2.99), and the lowest score in physical activity (2.19).

Description of gender and health promoting lifestyle practices among non-health professional students: The findings revealed that males have the highest score in the sub scales of spiritual growth (2.89), and the lowest score in health responsibility (1.97) whereas females have the highest score in spiritual growth (3.0), and the lowest score in physical activity (2.06).The findings showed that males have better performance than females in the sub scales of physical activityand stress management, whereas females have better performance than males in the sub scales of spiritual growth, health responsibility, interpersonal relationships and nutrition. (Table 5)

Comparison of health promoting life style practices among health professional and non-health professional students: The findings of the present study revealed that there was significant difference between the groups in the sub scales of health responsibility (2.43 vs 2.09, P=0.005), interpersonal relationship (2.85 vs 2.78, P=0.089) and nutrition (2.29 vs 2.39, P= 0.017). There is no significant difference between the group in the sub dimensions of physical activity, stress management and spiritual growth.(Table 2, 3)

Table 3: Comparison of health promoting lifestyle practices (HP and NHP)

Subscales		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig	T	df	95% Confidence Interval of the Difference	
						Lower	Upper
Mean PA	Equal variances assumed	0.014	0.905	0.255	198	-.152	0.197
	Equal variances not assumed			.255	197.9	-.152	0.197

Conted…

Mean SG	Equal variances assumed	2.82	1.00	0.00	198	-.172	0.172
	Equal variances not assumed			0.00	198	-.172	0.172
Mean HR	Equal variances assumed	7.896	**0.005**	3.914	198	0.169	0.511
	Equal variances not assumed			3.914	197.8	0.169	0.511
Mean IPR	Equal variances assumed	2.919	**0.089**	0.821	198	-.098	0.238
	Equal variances not assumed			0.821	196.4	-.098	0.238
Mean N	Equal variances assumed	5.793	**0.017**	-1.260	198	-.257	0.057
	Equal variances not assumed			-1.260	193.8	-.257	0.057
Mean SM	Equal variances assumed	0.298	0.586	0.789	198	-.084	0.197
	Equal variances not assumed			0.789	196.9	-.084	0.197

Description of Health promoting life style practices among health professional and non-health professional students: The study findings revealed that health professional students have higher scores than non-health professional students in the sub scales of health responsibility (2.43 vs 2.09) and interpersonal relationships (2.85 vs 2.78) whereas non-health professional students have higher scores than health professional students in the sub scale of nutrition (2.39 vs 2.29) There is no significant difference between the groups in the sub dimensions stress management, physical activity and spiritual growth. [Table 2]

Association of gender and health promoting lifestyle practices among health professional students: The findings revealed that there is significant association between gender and nutrition subscale at 0.05 level of significance (P=0.07) and no significant association between gender and other subscales at 0.05 level of significance among the health professional students. (Table 4)

Table 4: Association of gender and health promoting lifestyle practices (HP)

Gender	Female			Male			P Value
	n	Mean	SD	n	Mean	SD	
Mean PA	82	2.11	0.58	18	2.59	0.68	0.45
Mean SG62	82	2.43	0.61	18	2.44	0.70	0.45
Mean HR	82	2.99	0.62	18	2.83	0.62	0.53
Mean IPR	82	2.82	0.57	18	3.00	0.59	0.30
Mean N	**82**	**2.27**	**0.50**	**18**	**2.39**	**0.61**	**0.07**
Mean SM	82	2.61	0.48	18	2.55	0.51	0.65

Association of gender and health promoting lifestyle practices among non-health professional students: The findings revealed that there is significant association between gender and physical activity subscale at 0.05 level of significance (p=0.05) and no significant association between gender and other subscales at 0.05 level of significance among the health professionals students. (Table 5)

Table 5: Association of gender and health promoting lifestyle practices (NHP)

Gender	Female			Male			P Value
	N	Mean	SD	n	Mean	SD	
Mean PA	**62**	**2.06**	**0.55**	**38**	**2.35**	**0.70**	**0.05**
Mean SG	62	3.00	0.63	38	2.89	0.61	0.70
Mean HR	62	2.16	0.58	38	1.97	0.64	0.79
Mean IPR	62	2.79	0.66	38	2.76	0.59	0.47
Mean N	62	2.40	0.56	38	2.37	0.67	0.16
Mean SM	62	2.53	0.50	38	2.57	0.57	0.19

Discussion

The current study was done to evaluate the health promoting lifestyle practices among health professional and non-health professional students and to compare among the groups. The study findings revealed that the overall performance score was slightly higher for health professional students than non-health professional students (2.55 Vs 2.48). According to HPLP II total score, both the groups were not adopting healthy lifestyle practices on regular basis. These findings were consistent with previous studies conducted.[7,8]

The findings revealed that in the areas of health responsibility, interpersonal relationship and nutrition there was a significant difference between health professional and non-health professional students. In the areas of health responsibility and interpersonal relationship, health professional students have higher scores than non-health professional students whereas in the area of nutrition non-health professional students have higher scores than health professional students. There was no significant difference in the areas of physical activity, spiritual growth and stress management.

The findings revealed that overall HPLP score among health professional students were moderate (2.55) and non-health professional students were low (2.48). Health professional students had slightly higher scores than non-health professional students. The overall scores were moderate which was consistent with those found in other studies.[4,15]

The result suggests the need for health teaching for both health professional and non-health professional students. A detailed awareness of the lifestyle and health needs of students is essential and will help to plan more effective interventions.

Conclusion

The main findings of the study revealed that majority of the students do not exhibit healthy lifestyle. It revealed the need for promoting healthy lifestyle practices among both health professional and non-health professional students. Considering these findings and other studies suggestions, we proposed the strategies for healthy lifestyle promotion by developing guidelinesand periodic investigations for the students for their good health. Our findings may help health educators, curriculum planners and faculty administrators in planning guidelines to structuralize a healthier campus and to develop health promotion programs supporting healthy choices among students.

Acknowledgement

The satiation and euphoria that accompany the successful completion of this research would be incomplete without the mention of the people who made it possible. We thank the research team of Accendere Knowledge Management Services, CL Educate Ltd. for their unflinching guidance, continuous encouragement and support to successfully complete this research work.

Conflict of Interest: No conflict of interest.

Source of Funding: No specific grant from any funding agency.

Ethical Clearance: The study was approved by the Institutional Ethical Review Board (IERB). Administrative approval was obtained from the departments of nursing and degree colleges. We informed the students about the study and obtained written informed consent to participate in the study. Subjects were informed that their participation was completely voluntary and were assured of confidentiality of the data.

REFERENCES

1. Wang LP, Wang L. Deqi Sensation in Different Kinds of Acupuncture.
2. Younis NM. Assessment of healthy lifestyle habits among Mosul university students. International Journal of Advanced Nursing Studies. 2014 Jul 1;3(2):69.
3. Mašina T, Madžar T, Musil V, Milošević M. Differences in health-promoting lifestyle profile among croatian medical students according to gender and year of study. Acta clinica Croatica. 2017 Mar 1;56(1):84-91.
4. Mehri A, Solhi M, Garmaroudi G, Nadrian H, Sighaldeh SS. Health promoting lifestyle and its determinants among university students in Sabzevar, Iran. International journal of preventive medicine. 2016;7.
5. Syahrul S, Kimura R, Tsuda A, Susanto T, Saito R, Agrina A. Parental Perception of the Children's Weight Status in Indonesia. Nurs Midwifery Stud. 2017;6(1):e38139.

6. Tanjani PT, Azadbakht M, Garmaroudi G, Sahaf R, Fekrizadeh Z. Validity and reliability of health promoting lifestyle profile II in the Iranian elderly. International journal of preventive medicine. 2016;7.

7. Sajwani RA, Shoukat S, Raza R, Shiekh MM, Rashid Q, Siddique MS, Panju S, Raza H, Chaudhry S, Kadir MM. Knowledge and practice of healthy lifestyle and dietary habits in medical and non-medical students of Karachi, Pakistan. Journal of the Pakistan Medical Association. 2009;59(9):650.

8. Chouhan S, Pakhare AP, Kumar EC, Praveen EP. Reliability and Validity of CHO-CHO-Mobile Scale in Young Medical Adolescent Students in Bhopal-A Pilot Study. National Journal of Integrated Research in Medicine. 2017 Sep 1;8(5).

9. Geok SK, Yusof A, Lam SK, Japar S, Leong OS, Fauzee MS. Physical activity and health-promoting lifestyle of student nurses in Malaysia. Journal of Biosciences and Medicines. 2015 Mar 18;3(03):78.

10. Health promoting lifestyle profile II scoring. Available at http://www.unmc.edu accessed on 14/03/2018.

11. Walker, Susan N, Sechrist, Karen R, Pender, Nola J. Health promoting lifestyle profile II adult version available at http://deepblue.lib.umich.edu accessed on 10/03/2018.

12. Syahrul S, Kimaru R, Tsuda A, Susanto T, Saito R, Ahmead F. Prevalence of Underweight and overweight among school aged children and association with lifestyle. International Journal of Nursing Sciences, 2016; 3: 169-77.

13. Susanoto T, Sulistyorini L, Wuryaningsih E. W, Babtar S. School health promotion: A cross sectional study. International Journal of Nursing Sciences, 2016; 3: 291-98.

14. Burns N, Grove S. K, Understanding Nursing Research, 4th Edition, 200; 413-28.

Effectiveness of Stress Management Strategies on Occupational Stress in Educational Institution

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ABSTRACT

Occupational stress is considered as a level of tension when a person experiences a disagreement between the working environment challenges and their possibilities of coping. The reason for the study was to recognize and compare the various level of occupational stress among working men and women and the findings can be useful to improve the organizational behavior and the employee- employer interaction. A quasi experimental one group pre-test post-test design was used. 109 employees were selected using quota sampling technique from the Group of Institutions. Data was collected using Baseline data and The Workplace Stress Scale. After the first assessment, Informational booklet on Stress Management Strategies was administered and post-test was conducted after 21 days. Majority of the participants were teaching staffs. The investigation shows that the highest level of stress at both data collection times was of Moderate stress. The most utilized stress management strategies were of the Physical and Spiritual domains. The result of the investigation is useful to improve the organizational behavior and the employee- employer interaction.

Keywords: *occupational stress, stress management strategies, working men and women, stress.*

Introduction

Stress is a common problem that affects almost all of us at some point in our lives. Each one of us experience different stresses across our full life span repeatedly which leads to increased incidence of stress problems. Stress is expressed as a reaction to our changing and demanding circumstances. It depends upon each one of us and our capacity to handle the change that stress makes us feel good or bad. Change is the one that never changes and how we react to that change is more important and is the determining factor for stress[1].

Nowadays stress is highly associated with job and work-related pressure is one of the real wellbeing dangers of the cutting-edge work environment. It represents a significant part of the physical ailment, substance misuse, and family issues experienced by millions of blue and white-collar workers. Work related pressure and distressing working conditions have been connected to low efficiency, non-attendance, and expanded rates of mishaps on and off the activity[2].Work and family are the two most vital viewpoints in individuals' lives and, as opposed to the underlying conviction that they are particular parts of life; these spaces are firmly related (Ford *et al.,2007)*. In any case, when work denies individuals a chance to use their imagination, insight, and basic leadership capacity, it causes pressure[6].

The conventional response of management is usually to "blame the victim," considering stress as an individual or "personal" problem that workers bring to work from home. Rather than the act of pointing the finger at individuals for their failure to fit into a heartless workplace, what is more important is to analyze the structure of employment necessities and social connections at work in order to improve the well being and thereby reducing stress[3]. The reason for the study was to determine the level of occupational stress, strategies adopted for management of stress and does the level of stress reduce after adopting the stress management strategies among working men and women in an educational institution.

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Occupational Stress: Work related pressure is treated as a condition of strain which happens when a person detects a difference between the workplace challenges and their potential outcomes of adapting. A moderate amount of occupational stress could be motivating and impelling, but the situation becomes serious if the stress is too high or long-term and there are little coping resources[9], using drugs, little movement and sedentary lifestyle and unhealthy diet[9].

Occupational stress also causes certain risk to the organization as well as the societies. The problem which can occur in the organization are low creativity, work ability and commitment of employees, high level of incapability to work, great staff turnover, increased risk of occupational accidents and quality problems that generate costs emanating from the dissatisfaction of customers. If an employee in stress could take it out on their family and co-citizens, increasing the aggressiveness in society[10].

Goal and research questions for the study: The reason for the current study was to recognize and compare the various level of occupational stress among working men and women, type of stress management adopted to cope with stress and the level of stress reduction after adopting the stress management strategies.

The explicit research questions were:

1. What are the degrees of stress at each data collection time?
2. Does the degree of stress reduce after adopting the stress management strategies?
3. What are the strategies adopted for the management of stress?

Materials and Method

Design: A quasi experimental one group pre-test post-test design was used for the study. There were two measures for data collection: Before and after administration of Informational Booklet on Stress Management.

Setting: The study was conducted in a selected group of institutions at Bangalore, Karnataka, India. It is a private institution and it offers different courses such as Nursing, Pharmacy, Physiotherapy, Management, Degree courses and Pre-University College. The staffs working in this institution are primarily teaching faculty.

Participants: The target population for the study was the working men and women of different courses in the Institution. The accessible population was teaching staffs, clerical staffs, librarians and administrative staffs. The inclusion criteria were: (i) working men and women of a selected institution. (ii) employees who are willing to take part in the study. Participants not included were (i) employees who had undergone stress reduction programme. (ii)Grade 4 workers. The eligible sample for the study was selected by Quota sampling technique.

Measure

Demographic Data: Demographic proforma was designed to collect the baseline information of the participants. It includes information regarding characteristics of the participants such as age, gender, marital status, educational qualification, source of family support in assisting with household activities and child rearing, occupation, additional responsibilities, religion, number of hours of work in a day.

The Workplace Stress Scale: The workplace stress scale was developed by The Marlin Company, North Haven and the American Institute of Stress, Yonkers, New York. It includes 8 statements that describe how an employee feels about the current job and how often they have a feeling of stress utilizing 5-point Likert Scale.

Stress Management Strategy Module: This consists of stress symptom checklist which was used to assess the stress level. The participants were able to identify their level of stress based on the scoring key. The stress level varies from low, moderate, high and very high.

Ethical Considerations: Moral endorsement was acquired from the Institutional Ethical Review Board (IERB) before the beginning of the investigation. Intentional interest was underscored for the investigation. The subjects were guaranteed of their entitlement to security, and information was entirely classified.

Data-Collection Method: Data was collected by obtaining formal permission from Authority of the selected educational institution. After explaining about the research and obtaining informed consent, pre-test was conducted using Standardized Work Place Stress Scale to assess the level of occupational stress among the group.

Data Analysis: The key instrument used for this analysis is SPSS (Version 20, IBM: Armonk, New York, United States) was used to analyze the data. Descriptive and inferential statistical tests were utilized to fulfill the goal of the study. The first research question was

analyzed with the use of descriptive statistics such as mean, median, standard deviation, range, frequency, and percentage. The inferential test, paired sample t-test, was used to answer the second and third research question.

Results

Attributes of the study sample: The attributes of the participants are summarized in Table 1. The mean age of the participants was 32.28 years [(SD) = 1.42], with a range of 23–75 years. Majority of the participants were male (n = 75, 68.8%), Hindu (n = 87, 79.8%), unmarried (n = 78, 71.6%). Majority (n=104, 95.4%) of the participants are teaching staffs. The majority of the participants worked for ≤ 8 hours in a day (n=63, 57.8%). Majority of the participants spent ≤ 1 hour to travel to and from the Institution (n = 49, 45%)

Table 1: Attributes of the study sample (n = 109)

Variable	Frequency %	Mean (SD)	Median	Minimum	Maximum
Age		32.28 (8.076)		23	75
Sex					
Female	34 (31.2%)				
Male	75(68.8%)				
Religion					
Hindu	87(79.8%)				
Muslim	4(3.7%)				
Christian	17(15.6%)				
Others	1(.9%)				
Marital Status					
Married	31 (28.4%)				
Unmarried	78 (71.6%)				
Occupation					
Teaching Staff	104(95.4%)				
Clerical Staff	5(4.6%)				
No. of hours of work a day					
≤ 8 hours	63 (57.8%)				
8 - ≤12 hours	25 (22.9%)				
12 - ≤15 hours	12 (11%)				
More than 15 hours	9 (8.3%)				
No. of hrs spent in travel					
≤ 1 hour	49 (45%)				
1-2 hours	26 (23.9%)				
2-3 hours	20 (18.3%)				
>3 hours	14 (12.8%)				
Health Problems					
Yes	33(30.3%)				
No	76 (69.7%)				

Degrees of stress and the sort of stressors

Pre-administration of the Stress Management Strategy Module: The level of stress experienced by the participants before administering the Stress Management Strategy module ranged from 12 to 40 (mean= 22.16, SD= 4.374). When the subscales are considered, the result denotes that adequate control/ input over work duties (mean= 3.21, SD=1.187) and utilization of skills/talents fully (mean= 3.8, SD=1.032) had the most noteworthy means among the workplace stress subscale scores

Post-administration of the Stress Management Strategy Module: The participants reported that the level of stress experienced after the administration of the Stress Management Strategy Module ranged from 9 to 39 (mean= 21.83, SD=4.596). From the Workplace Stress Subscales, adequate control/input over work duties (mean=3.30, SD=1.167) and utilization of skills/talents fully (mean=3.57, SD=1.133) had the most noteworthy means among the workplace stress subscale scores.

Stress Management Strategies utilized by the participants: Different forms of stress management strategies were introduced to the participants in the form of a module. Out of 109 participants, only 17 of them had performed these activities. The information that was received was statistically analyzed and it was found that there was a drastic difference between the pre-test and post-test.

Table 2: Stress Management strategies adopted by participants

	Pre-test		Post-test		Remark
R Squared value	0.549		0.852		A positive impact of the inputs on the outcome
Sig	0.393		0.012		A shift of result from insignificant to significant domain
Variables	**t-value**	**Sig**	**t-value**	**Sig**	**t_2-t_1**
Physical	-2.352	0.046	-2.141	0.065	0.212
Emotional	-1.214	0.260	-5.071	0.001	-3.857
Spiritual	-0.720	0.492	-2.837	0.022	-2.117
Mental	0.830	0.430	3.760	0.006	2.930
Social	1.673	0.133	2.853	0.021	1.180
Duration of activity (Physical)	-0.182	0.860	1.991	0.082	2.173
Duration of activity (Relaxation)	-0.421	0.685	2.869	0.021	3.290
Duration of activity (Spiritual)	0.753	0.473	2.386	0.044	1.633

Shift of result shows that there is a clear indication of the impact of the Stress Management Strategies on the psychology of the participants which is measured by the R squared value. With the significance level of the relationship, there is a clear indication of the impact of the activities on the shift of participant's perception from insignificant to significant. (Table 3).

Changes in level of stress and type of stressors

Table 3: Paired *t* test comparing working men and women's scores in the workplace Stress Scale before and after the introduction of Stress Management Strategies

Scale/ Subscales	Mean SD	t value	df	p-value
Total stress scores				
Pre	22.16(4.374)	.738	108	.462
Post	21.83(4.596)			
Work conditions unpleasant/unsafe				
Pre	2.39(.971)	1.87	108	0.064
Post	2.19(.938)			
Job negatively affecting physical/emotional well-being				
Pre	2.24(1.130)	-0.631	108	0.53
Post	2.31(1.111)			

Conted…

Too much work with unreasonable deadline				
Pre	2.67(1.037)	0.084	108	0.933
Post	2.66(.964)			
Difficulty in openly expressing opinions/feelings to superiors				
Pre	2.61(1.114)	0.971	108	0.334
Post	2.49(1.085)			
Job pressures interfere with family or personal life				
Pre	2.62(1.129)	1.277	108	0.204
Post	2.48(1.191)			
Adequate control/input over work duties				
Pre	3.21(1.187)	-0.666	108	0.507
Post	3.30(1.167)			
Recognition and rewards received for good performance				
Pre	2.77(1.015)	-0.226	108	0.822
Post	2.80(1.025)			
Utilization of skills/talents fully				
Pre	3.81(1.032)	1.787	108	0.077
Post	3.57(1.133)			

Table 4 compares the working men and women's workplace stress scores before and after the introduction of stress management strategies, for the subscale scores,

statistical significance was met only for two subscales. (Table 4).

Degree of stress among the participants: The degrees of stress as calculated on the basis of the scores given in the Workplace Stress Scale. The findings revealed that majority of the participants were having moderate stress in the pre-test (47.7%) and post-test (40.4%). This could be possibly due to health problems that the participants had or of the number of working hours in a day. (Table 5)

Table 4: Degree of stress among working men and women before and after the introduction of stress management strategies

Degree of stress	Pre-Test		Post-Test	
	Frequency	%	Frequency	%
Relatively Calm	4	3.7	9	8.3
Fairly Low	34	31.2	34	31.2
Moderate Stress	52	47.7	44	40.4
Severe Stress	16	14.7	20	18.3
Potentially Dangerous	3	2.8	2	1.8

Discussion

Revealed Stressors: From the investigation, stress from the utilization of skills/talents fully at work and adequate control/ input over work duties were found to be the most prominent source of stress by the participants. This finding is in contrast with a study by Mohamed Taher (2018), who found that the major source of occupational stress was from the nature of work.

Degrees of Stress: The present study found that majority (47.7%) of the participants had *moderate stress* during the pre-test and it significantly reduced to 40.4% in the post-test which also constitutes majority of the participants. This study finding is in consistent with a previous study [10]. The present study findings revealed that the participants reported higher level of stress before administering the stress management strategy module than the after. The level of stress for the total score on the Workplace Stress Scale reduced after administering the Stress Management Strategy module.

Most utilized stress management strategy: Out of the 109 participants, 17 of them had reported to have sincerely adopted the stress management strategies given on the Booklet. It was found that the most utilized stress management strategy was performing physical activity. Performing physical activity was thought to be the only effective strategy to manage stress but the participants also reported that other form of strategies was also helpful such as Mental and Social strategies which are clearly shown in Table 3.

Constraints and future proposals: The present study has few limitations. First of all, the study was conducted in an educational institution and the participants particularly the teaching staffs were not available most of the time as they are engaged with their teaching and other activities. Second, the stress management strategy module prepared required a period of 21 days for the effectiveness to take action. The researchers find great difficulty in convincing the participants to perform the strategies everyday for a consecutive 21 days because of the tight schedule of the teachers.. More descriptive form of study with the use of different scales of measurement may be used in another study. And, lastly out of the 109 participants, only 17 of them sincerely adopted the stress management strategies which made it difficult for the investigators to generalize the study for further use.

Conclusion

The present investigation adds to the information of occupational stress and management strategies among working men and women in an educational institution. The study revealed that the major source of stressors in both the data collection times were utilization of skills/ talents fully at work and adequate control/ input over work duties

Relevance for clinical practice: Findings of this study can contribute towards the development of practice of stress management strategies in the work environment. Stress management strategies adopted in

This study is simple practice guidelines which can be followed by all the staff with little ease and they can help a long way in reducing stress and building positivity in the work place.

Acknowledgement

The satiation and euphoria that accompany the successful completion of this research would be incomplete without the mention of the people who made

it possible. We thank the research team of Accendere Knowledge Management Services, CL Educate Ltd. for their unflinching guidance, continuous encouragement and support to successfully complete this research work.

Ethical Clearance: Taken from working Department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Clarke S, Cooper C. Managing the risk of workplace stress: Health and safety hazards. Routledge; 2004 Jul 31.
2. Ford MT, Heinen BA, Langkamer KL. Work and family satisfaction and conflict: a meta-analysis of cross-domain relations. Journal of applied psychology. 2007 Jan;92(1):57.
3. El AA, El Mola M, Mohamed SA. Staff nurses expected role versus actual role at South Valley University. Egyptian Nursing Journal. 2018 Jan 1;15(1):62.
4. Gallego EC, Vera M, Signani F. Women and men at work: analyzing occupational stress and well-being from a gender perspective. Revista Puertorriqueña de Psicología. 2015;26(2):172-91.
5. Holman D, Johnson S, O'Connor E. Stress management interventions: Improving subjective psychological well-being in the workplace. Handbook of wellbeing. Salt Lake City, UT: DEF Publishers. DOI: nobascholar. com. 2018.
6. Lambert EG, Hogan NL. Correctional Staff: The Issue of Job Stress. InThe Practice of Correctional Psychology 2018 (pp. 259-281). Springer, Cham.
7. Rivera-Torres P, Araque-Padilla R, Montero-Simó M. Job stress across gender: the importance of emotional and intellectual demands and social support in women. International journal of environmental research and public health. 2013 Jan;10(1):375-89.
8. Sreevani R. A guide to mental health and psychiatric nursing. JAYPEE BROTHERS PUBLISHERS; 2007.
9. Falconer K. Fractal geometry: mathematical foundations and applications. John Wiley & Sons; 2004 Jan 9.

Effectiveness of Station-based Skill Training Model through Objective Structured Clinical Examination (OSCE): Nursing Students' Skills in Performing the Clinical Procedures

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ABSTRACT

Background: Objective Structured Clinical Examination (OSCE) is "a best way to deal with the appraisal of clinical ability in which the domain of competence are evaluated in a very much arranged structure with consideration being significant to objectivity", or as an assessment of structured clinical skills. An OSCE requires every trainee to exhibit particular abilities and practices in a simulatory setting with institutionalized patients. It comprises short undertakings of tasks and each task is assessed by an analyst utilizing a foreordained scheme of plan. The OSCE has turned into an entrenched strategy for evaluation which is extensively utilized as a technique for appraisal in field of nursing educational program.

Objectives: This study implemented to assess the procedural skills of nursing students using OSCE scales when station-based expertise preparing and to evaluate the effectiveness of station-based skill training model for teaching procedural skills among nursing students.

Method: A pre-experimental one group pre and post test design was used with 30 randomly selected samples. The clinical skills of the students were observed before and after giving the station based skill training. The three selected skill stations were venipuncture, wound dressing and NG tube feeding.

Results: The mean post test scores in all three skill procedures were significantly high indicating that the station based skill training model was effective.

Conclusion: The OSCE acts as a tool in assessing and evaluating the students skills in performing clinical procedures.

Keywords: *Station based skill training, Objective structured clinical examination, nursing students*

Introduction

The learner's clinical capabilities to be assessed, for the most part the area of potency to perform with cogency, turns into a critical need in their learning procedure. Then the learner's increase with different unparalleled encounter that are risky in figuring the result of an individual and the program. Therefore, it is important to utilize different assessment techniques to comprehend nursing trainees' clinical ability and to put more excellence on the strategies that energizes the learning of clinical aptitudes, while at the same time contributing a space for evaluating them. One such space is the Objective Structured Clinical Examination (OSCE)[1].

The OSCE has been broadly and progressively utilized since it was discovered during the 1970s. Successful and legitimate clinical assessment ought to be of worry to all nursing resources and clinical teachers. There is a sensible desire for assessment to be objective, solid, particular, and archived. Clinical aptitudes and practice assume the huge job in preparing different gatherings; the achievement of prentice in these fields relies upon what they realize and progress toward becoming retained with the content. Likewise, students need to know, obviously depicted, the particular

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goals by which they are being assessed. One kind of evaluation, which meets these criteria is an execution based appraisal. A case of an execution based appraisal is the —OSCE. Studies have demonstrated that it is a viable assessment apparatus to evaluate reasonable aptitudesamong the trainees [1].

In numerous examples, the OSCE procedure has been adjusted to test students from various health care delivery services. Additionally, this technique has pulled in impressive consideration in light of abnormal states of unwavering quality, noteworthiness and objectivity, the content, legitimacy of the accomplished aptitudes, reasonableness, making inspiration for learning, and educators' and trainees' fulfillment. In OSCE, Objective means inspectors utilize an agenda for assessing and evaluating the students, Structured means learner sees a similar issue and plays out similar undertakings in a similar time allotment, Clinical means the errands are illustrative of those looked in genuine clinical circumstances. OSCE, as a technique for clinical abilities evaluation has various inborn focal points:

- Firstly, it can incorporate both summative and developmental parts, in which a judgment or assessment of a person's execution is made (summative) trailed by the arrangement of criticism, from which the understudy can learn (developmental).
- On the other hand, every trainee is required to show particular practices in a simulated setting, strict command over the clinical setting is conceivable, while in the meantime, reflecting genuine expert assignments.

This control wipes out the result of pure chance issue that emerges when understudies are surveyed inside this present reality clinical condition with real patients and also the danger of damage jumping out at a patient [2].

Other studies have recommended that larger studies are needed to establish the effectiveness of the OSCE within nursing education [3].

A cross sectional expressive examination uncovered greater part of understudies from the test and control bunches given positive criticism about the OSCE qualities. The examination reasoned that OSCE is an exceptionally helpful and adequate strategy for assessing nursing prentices' clinical abilities [4].

A basic survey was led and results demonstrated that the OSCE has been emphatically evaluated for objectivity in trainee appraisal and gives a 'hands on methodology' to evaluate clinical ability in circumstances where 'this present reality' clinical condition is neither fitting nor possible. The examination inferred that the OSCE can be viewed as an important technique for upgrading nursing student assessment [5].

A relative report uncovered OSCE examination as outstanding amongst other appraisals as it offers an alluring alternative for assessing nursing trainee competency. It gives specific qualities as far as workforce staff objectivity and unwavering quality of the evaluation procedure for all understudies, particularly when contrasted and different strategies for evaluating the practice [6].

Therefore OSCE when is utilized effectively can be an exceedingly fruitful as an instrument to assess and evaluate the clinical skills of nursing understudies in playing out the methods which fosters them to be independent professionals.

Materials and Method

Study Design: A pre-experimental one group pretest posttest design was used to accomplish this study purpose.

Participants and Sample Size: The study participants were male and female nursing students selected via simple random sampling technique. In total 30 students who met the inclusion criteria were invited to participate in the study. Students were eligible to participate if they were pursuing first year B.Sc. Nursing and agreed to give informed consent.

The Study Setting: The study was conducted in Krupanidhi college of nursing at Bengaluru, which is a private institution having various nursing courses with a yearly intake of 60 nursing students.

Instruments: Two questionnaires and one scale were used to collect the data.

A Demographic Performa to collect the baseline information of the samples and a rating scale was used to assess the student's skills in performing the various clinical procedures which included the standard steps which was scored differently for each of the procedures.

Procedure of Data Collection

The study was conducted in two phases.

Phase I: In this phase, permission was obtained from the nursing college authorities and respondents. Informed consent was taken from the participants and the baseline demographic information was collected with the help of a demographic Performa.

Phase II: In this phase, pretest was conducted using a 3 point rating scale for all the three procedures. Followed by, station based skill training for all the three procedures was given to the group of 10 students each day.

After a week, post test was conducted by rating scale for all the three procedures.

Data Analysis

The Statistical package for the social sciences (SPSS) version 20 (IBM: Armonk, New York, United States) was utilized for data entry, tabulation and analysis.

Descriptive statistics were used to describe the demographic variables and data collected. A parametric t test was conducted to explore the effectiveness of station based skill training in performing the clinical procedures among nursing students. A The statistical level of significance was set at $p < 0.05$.

Sources of Data: Data was collected from B. Sc (N) students pursuing their first year in selected nursing college.

Results

Description of sample

Table 1: Description of demographic variables

Variable	Frequency	%
Age		
17-19 years	26	86.7%
19-21 years	4	13.3%
>21years	0	0%
Gender		
Male	14	46.7%
Female	16	53.3%
Religion		
Hindu	16	53.4%
Muslim	6	20%
Christian	8	26.6%
Family		
Nuclear	30	100%
Joint	0	0%
Clinical Performance		
Poor	0	0%
Average	16	53.3%
Good	14	46.7%
Excellent	0	0%

Table 1 : Regarding the characteristics of the entire sample (n=30). The majority of participants were females (53.3%), aged between 17 to 19 years, with Hindu religion (53.4%), the nuclear family (100%) and the majority with average (53.3%) clinical performance.

Effectiveness of station based skill training

Table 2: Description of pretest and posttest scores of level of performance

Scores	Pre Test						Post Test					
	Venipuncture		Wound Dressing		NGTube Feeding		Venipuncture		Wound Dressing		NGTube Feeding	
	F	%	F	%	F	%	F	%	F	%	F	%
Unsatisfactory	29	96.7%	30	100%	28	93.3%	0	0%	0%	0%	0%	0%
Meets Exceptional	1	3.3%	0	0	2	6.7%	14	46.7%	1%	3.3%	4%	13.3%
Exceptional	0	0	0	0	0	0	16	53.3%	29%	96.7%	26%	86.7%

The above table 2 depicts the comparison of the student's skill in performing the procedures. The venipuncture procedure had 96.7% of students receiving an unsatisfactory score and 53.3% scored exceptionally on the post test. The wound dressing showed 100% unsatisfactory in the pretest and 96.7% in the post test with 3.3% meets exceptional.

Table 3: Effectiveness of station based skill training in performing the clinical skills among nursing students

Procedures	Pre test	Post test	Mean difference	t Value	df	p Value
Venipuncture	13.83	37.6	23.76	17.15	29	0.000
Wound dressing	13.3	43.46	30.16	31.89	29	0.000
NG tube feeding	11.3	35.60	24.30	30.38	29	0.000

t = 2

Table - 3 reveals that calculated' values 17.15, 31.89 & 30.38 are higher than the tabulated 't' value 2.00. It shows that the station based skill training was found to be Effective. The result shows that there is a significant increase in skills for performing the clinical procedures on Post Test. Hence, Research Hypothesis (H_1) is accepted.

Discussion

The study results showed that the station based skill training in performing the clinical procedures is highly effective in improving the skills among nursing students.

It is apparent that an extensive variety of evaluative strategies are important to evaluate the understudies clinical capability and more prominent accentuation ought to be put on those techniques which support the learning of clinical aptitudes and simultaneously give a suitable Instrument to evaluate them in this angle. OSCE goes about as a better apparatus in evaluating the potential abilities and competence [7].

These discoveries are in concurrence with previous investigations:

An investigation recommends that OSCE is a helpful and a satisfactory instrument for assessing prentice execution of clinical abilities. Most understudies saw OSCE as a decent appraisal, which secured extension of which enabled them to remunerate in various settings territories and limited their odds of failing [8].

Another investigation recommends OSCE program application before first clinical nursing practice was successful as far as essential nursing abilities learning. It is important to strengthen nursing aptitudes which was depending on the examination after effects of different clinical procedures [9].

There was another report led to contrast the OSCE and customary strategy which generalized that OSCE examination offers an appealing alternative for evaluation process for all trainees, particularly when contrasted and different strategies for assessing the clinical practice [10].

The other investigation was a sum of 49 understudies were assessed on three of six patient reenactment stations and one of two inpatient stationary stations. Both developmental and summative assessment of the learners execution on learning, application, judgment and aptitudes were directed and utilized for individual criticism, and program assessment. The staff, understudies and institutionalized patients observed the OSCE to be an advantageous experience [11].

There was another examination, which indicated halfway devotion recreation utilizing OSCE technique is a helpful preparing system. It empowers small gatherings of nursing trainees to rehearse in a controlled condition on how to respond satisfactorily in a basic patientconsideration circumstance. Subsequently, this sort of preparation is extremely important to outfit scholars with at least specialized and non-specialized aptitudes previously they utilize them to have an extended role in practice [12].

An evaluator considers uncovered that the OSCE is an important and a reasonable type of appraisal. Nursing students distinguished that they felt more arranged for and more sure about the situations which helped them to improve the career 13.

There are lots of studies being conducted using descriptive analysis and critical reviews and this study using the experimental design in conducting the study among nursing students in performing the clinical procedures are very few in the nursing and especially for the first year. As for the results of this study, the students who were having the average performance in their clinical evaluation showed exceptional scores after OSCE training. Hence this study motivates the other universities and the nursing colleges to adopt the OSCE for the beginners to foster them with the best clinical skills and competence.

Implications in Nursing

- The study findings OSCE can be implemented in the evaluation of subjects, not merely the nursing foundation.

- The OSCE can be effectively used in recruitment of staff.
- OSCE helps the novice nurses to foster their clinical expertise and make them competent.

Limitations: The study is limited to nursing undergraduate students of Krupanidhi College of Nursing, Bangalore.

Conclusion

OSCE is a realistic assessment today in nursing education and practice. The OSCE covers a broad aspect of clinical skills of OSCE and measure the essential clinical skills to a great extent OSCE scores are standardized.

The OSCE can identify student's weakness and strengths and help faculty guide students to improve clinical skills. The implementation of OSCE at Faculty of Nursing, Krupanidhi College was a useful experience for students and was considered a valuable and worthy of further development and enhancement.

Recommendations

- A study on clinical assessment of the teaching staff may be made using OSCE covering a wide range of skills.
- A similar study can be conducted on a large sample using true experimental designs to ensure generalization.
- The examiners may use a variety of skill stations to ensure objectivity in clinical assessment.
- Developing standardized and approved OSCE stations for each department.
- Nursing examination boards and universities shall incorporate OSCE to improve standards of nursing education.

Conflicts of Interest: The authors declare no conflicting of interest.

Source of Funding: The funding was done by the KRIC (Krupanidhi Research Incubator Centre) to implement the OSCE.

Author's Contribution: All authors contributed voluminously to this paper. The main author designed the study and interpreted the data. The author and co authors were responsible for data collection and data entry. The main author performed the analysis and interpretation of the data and writing the original draft.

Ethical Approval: Official endorsement and authorizations from the principal of the nursing college and the head of the divisions were acquired. The proposition was exhibited in the institutional ethical board and acquired ethical leeway. Every one of the members was given with satisfactory clarification about the points and targets of the investigation and brought about educated assent. The confidentiality of information was guaranteed through coding all things considered. Moreover, the members were educated that they could deny or pull back from the examination anytime of time without giving reason.

Acknowledgement

The satiation and euphoria that accompany the successful completion of this research would be incomplete without the mention of the people who made it possible. We thank the research team of Accendere Knowledge Management Services, CL Educate Ltd. for their unflinching guidance, continuous encouragement and support to successfully complete this research work.

Ethical Clearance: Taken from working Department

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Seto TL, Tabangin ME, Josyula S, Taylor KK, Vasquez JC, Kamath-Rayne BD. Educational outcomes of Helping Babies Breathe training at a community hospital in Honduras. Perspectives on medical education. 2015 Oct 1;4(5):225-32.
2. Wass V. Vleuten C Van der, Shatzer J, Jones R. Assessment of clinical competence. Lancet. 2001;357(24):945-.
3. Mahmoud GA, Mostafa MF. The Egyptian nursing student's perceptive view about an Objective Structured Clinical Examination (OSCE)'. Journal of American Science. 2011;7(4):730-8.
4. El-Nemer A, Kandeel N. Using OSCE as an assessment tool for clinical skills: nursing

students' feedback. Australian Journal of basic and Applied sciences. 2009;3(3):2465-72.

5. Smith V, Muldoon K, Biesty L. The Objective Structured Clinical Examination (OSCE) as a strategy for assessing clinical competence in midwifery education in Ireland: A critical review. Nurse education in practice. 2012 Sep 1;12(5):242-7.
6. Eldarir SA, El Sebaae HA, El Feky HA, Hussein HA, El Fadil NA, El Shaeer IH. An introduction of OSCE versus traditional method in nursing education: Faculty capacity building and students' perspectives. J Am Sci. 2010;6:1002-4.
7. Khattab AD, Rawlings B. Assessing nurse practitioner students using a modified objective structured clinical examination (OSCE). Nurse Education Today. 2001 Oct 1;21(7):541-50.
8. Pierre RB, Wierenga A, Barton M, Branday JM, Christie CD. Student evaluation of an OSCE in paediatrics at the University of the West Indies, Jamaica. BMC medical education. 2004 Dec;4(1):22.
9. Yoo MS, Yoo IY. Effects of OSCE method on performance of clinical skills of students in fundamentals of nursing course. Journal of Korean Academy of Nursing. 2003 Apr 1;33(2):228-35.
10. McWILLIAM PL, Botwinski CA. Identifying Strengthsandweaknessesin Theutilizationofobjective Structured Clinical Examination (OSCE) In Anursing Program. Nursing education perspectives. 2012 Jan 1;33(1):35-9.
11. Rentschler DD, Eaton J, Cappiello J, McNally SF, McWilliam P. Evaluation of undergraduate students using objective structured clinical evaluation. Journal of Nursing Education. 2007 Mar 1;46(3)..
12. Guillaume Alinier, Barry Hunt, Ray Gordon, Colin Harwood. Effectiveness of intermediate-fidelity simulation training technology in undergraduate nursing education, **Wiley online library.**2006, 1365-2648.
13. Mary Brosnan, Gary Brown. Implementing OSCE in nurse registration programs in a center in Ireland: A utilization focused evaluation. **Nurse Education Today,** Vol 26, Issue 2, Feb 2008 Page 115-122.

Cogency of Aggression Management Training Programme on Competency of Nursing Students in a Selected College in Bangalore

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ABSTRACT

Objectives: To investigate the cogency of aggression management training programme on competency of nursing students.

Method: A pre-experimental, one group pre-test and post-test design was utilized. 71 nursing students from one of the biggest nursing colleges in Bangalore were selected by purposive sampling technique. Consent was taken from the subjects and pretest was conducted using self-administered questionnaire and Likert scale to assess the level of knowledge and confidence. Later aggression management training programme was given and post-test was conducted with the same tool in a period of one week. Analysis is done with paired t- test for comparison and Chi square test for association with selected demographic variables.

Results: It shows that the level of knowledge and confidence is significantly higher during the posttest. The comparison of knowledge level (t=13.2, p=0.00) and confidence level (t=5.58, p=0.00) shows that the aggression management training programme was highly effective on competency of nursing students.

Conclusions: A training programme on aggression management can be inculcated in the curriculum of nursing students so that they will have adequate knowledge and confidence to manage patients with aggression. To recapitulate, the present study shows that there is a high cogency of aggression management training programme on the competency of nursing students.

Keywords: *Aggression management training programme, competency, nursing students.*

Introduction

Anger is a typical human feeling that, when taken care of properly and communicated emphatically, can give an individual a positive power to solve problems and settle on choices concerning life circumstances. Outrage turns into an issue when it is expressed forcefully and violence happens when people lose control of their resentment[1]

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Hostility has taken the lives of about 16 lakh people worldwide. For each individual who bites the dust due to rampage, a lot more are traumatized and endure the ill effects of somatic, genital, reproductive and emotional well-being issues. WHO works with accomplices to counteract violence through experimentally sound techniques that are conceived and actualized in connection to cause at the levels of the individual, family, community and society[2]

Aggression emerges from a natural thrust as a protective reaction and is showed either by productive or dangerous conducts specifically towards self or others. Hostile people disregard the privileges of other individuals. They should battle for their own interests and they expect same from others[3]. Self-confidence would essentially lack due to the presence of outrage behavior. Offensive people upgrade their self-esteem by overwhelming others and thereby demonstrating their

dominance and in doing so; they try to conceal their uncertainty and susceptibility[1]

Social psychologists define aggression as "behavior that is intended to harm another individual who does not wish to be harmed"[4]

As indicated by the World Health Organization, violence in a working environment is a deliberate exertion of physical force counter to self, others or to a crowd, which has a greater probability of causing harm, death, abnormal development or deprivation. Work environment viciousness, and especially customer initiated outrage, is a significant issue for psychiatric nurses, as they are one among the most in-danger populations.Incidents of aggressive behavior among patients in mental hospitals varies from 0.07– 0.25 violent episodes for each bed per year[5]. An examination on violence at workplace demonstrated that somewhere in the range of 14% and 61% of psychiatric health workers have been affected by aggressive behaviors of hostile patients[6].

The outcomes of aggressive behavior are numerous, regardless of whether they will be on victims, institutions or on society. A systematic review was done on consequences of aggressionin the working environment of hospitals was conducted and distinguished 68 studies with distinctive sorts of potential consequences. In this, 47 studies determined a few psychological ramifications for workers, 27 disclosedsomatic outcomes, 25 uncovered an effect on emotional well-being, 47 spotlightedon the aftereffects of work functioning, 10 demonstrated a detrimental effect on the patient care and the quality of relations, and 4 announced monetary and social culminations[7].

A few investigations in the health care sector have built up a positive relationship between work environment violence and mental distress and between work environment viciousness and a lesser level of self-confidence to adapt to patient hostility. the conceived intensity of violent nature may diminish after educating, which could be an indication of an expanded certainty to control these situations[8].

In order to nullify the workplace violence in psychiatric hospitals, education and training programs can be implemented at the student level itself. These programs generally help the student nurses for skill development which will aid them to appreciate and respond to savage situations and to cope with its ramifications. They comprise various techniques to enhance knowledge, legal responsibilities, risk assessment and control strategies.

The nursing students are exposed to psychiatric patients and the potential risk to become a victim of aggression or violence. Hence training programme fosters the students in managing the psychiatric patients.

Consequently this study is intended to explore the cogency of aggression management training programme on the competency of nursing students and to associate the competency of nursing students with selected demographic variables. Keeping in mind the end goal, two hypotheses were formulated:

H_1: There will be significant difference in the mean pre-test and post-test scores of competency on aggression management among nursing students

H_2: There will be significant association between the competency of nursing students on aggression management and their selected demographic variables

Materials and Method

Study Design: A pre-experimental one group pretest posttest design was used to attain the purpose of the study.

Subject of the Study: The subjects of the present study were nursing students chosen by purposive sampling technique. Altogether 71 students who met the sample selection criteria were welcomed to take part in the study

Setting: The study wascarried out in one of the biggest nursing colleges in Bangalore, which is a private institution having various nursing courses with a yearly intake of 60 nursing students.

Instruments: Two questionnaires and one scale were used for the data collection.

A Demographic Performa to collect the baseline information of the samples and a structured self-administered questionnaire to assess the knowledge in managing aggressive patients and protecting self in a psychiatric ward. It has 25 items which helps to assess how effective the training session in making a change in the level of knowledge of the participants[9,10]

The Likert scale was used to assess the level of confidence in managing incidents of aggression owing to the training they had received. This is to evaluate the extent to which trainees considered the content of training had practical usefulness and was conveyable to the workplace and their ability to make use of skills learned in clinical practice and also to assess the confidence to work in clinical setting[11].

Data Collection Method: The study was conducted in two phases.

Phase I: In this phase, permissionwas obtained from the nursing college authorities and respondents. Informed consent wastaken from the participants and the baseline demographic information was collected with the help of a demographic Performa.

Phase II: In this phase, pretest was conducted using self-administered questionnaire and rating scale followed by aggression management training programme that was given through lecturing, power point presentations and role play. A module was prepared by the researcher for providing training programme and the module had the components like:

a. Definition & characteristics of aggression

b. Types of aggression

c. Causes and predisposing factors of aggression

d. Observation, communication and therapeutic relationship

e. Prevention and management of aggression

After a week, post test was conducted by using same self-administered questionnaire and scale.

Data Analysis: The key instrumentused for information entry,classification and scrutinization was the version 20 of Statistical Package for Social Sciences (SPSS)

Descriptive statistics were used to describe the demographic variables and data collected. A parametric t test was conducted to explore the effectiveness of aggression management training programme on competencies of nursing students

Findings

Description of Sample: Regarding the characteristics of entire sample (n=71), 49.3% were first year B.Sc & 50.7% were second year B.Sc nursing students. The majority of the participants were females (78.9%), aged between 18 to 20 years, living in rural areas (50.7%), with Hindu religion (46.5%), the nuclear family (80.3%) and never experienced with aggressive patients (94.4%). (Table:1)

Table 1: Description of demographic variables

Demographic variables	Frequency	Percentage
Age		
18 – 20 years	62	87.3%
21– 23 years	08	11.3%
>23 years	01	1.4%
Sex		
Male	15	21.1%
Female	56	78.9%
Course of study		
1st year B.Sc (N)	35	49.3%
2nd year B.Sc (N)	36	50.7%
Religion		
Hindu	33	46.5%
Christian	19	26.8%
Muslim	08	11.3%
Others	11	15.5%
Type of Family		
Nuclear	57	80.3%
Joint	14	19.7%
Area of Living		
Urban	29	40.8%
Rural	36	50.7%
Tribal	06	8.5%
Mother's educational status		
Postgraduate	4	5.6%
Graduate	7	9.9%
Higher secondary	16	22.5%
Secondary	17	23.9%
Primary	10	14.1%
No formal education	17	23.9%
Father's Educational Status		
Postgraduate	7	9.9%
Graduate	10	14.1%
Higher Secondary	23	32.4%
Secondary	17	23.9%
Primary	8	11.3%
No formal education	6	8.5%

Conted Table 1…

Mother's Occupation		
Public Sector	10	14.1%
Private Sector	07	9.9%
Self Employed	17	23.9%
Sedentary Worker	4	5.6%
House Wife	33	46.5%
Father's Occupation		
Public Sector	2	36.6%
Private Sector	09	12.7%
Self Employed	29	40.8%
Sedentary Worker	07	9.9%

Conted Table 1…

Previous experience		
Yes	04	5.6%
No	67	94.4%

Effectiveness of aggression management training programme: The data analytics reveals that no students were having adequate knowledge during pretest whereas 28.2% were having adequate knowledge in posttest. The mean score of knowledge on aggression management was 11.24 during pretest which was increased to 19.4 during posttest.

Table 2: Description of pretest and posttest scores of level of knowledge

N = 71

Level of knowledge	**Pre test**				**Post test**			
	Frequency	**Percentage**	**Mean**	**Standard deviation**	**Frequency**	**Percentage**	**Mean**	**Standard deviation**
Adequate knowledge	-	-	11.24	2.62	20	28.2%	19.36	4.31
Moderately adequate knowledge	7	9.9%			40	56.3%		
Inadequate knowledge	64	90.1%			11	15.5%		
Total	71	100%			71	100%		

The data scrutinized reveals that only 7% were having high perceived confidence in pretest which escalated to 31% during posttest. It manifested a significant improvement in the level of confidence in managing aggressive patients before and after the training programmeby comparing the pretest (26.1) & the posttest (32.9) mean score. (Table 3)

Table 3: Description of pretest and posttest scores of level of confidence

N = 71

Level of confidence	**Pre test**				**Post test**			
	Frequency	**Percentage**	**Mean**	**Standard deviation**	**Frequency**	**Percentage**	**Mean**	**Standard deviation**
High perceived	5	7%	26.05	8.02	22	31%	32.85	7.69
Moderately perceived	35	49.3%			39	54.9%		
Low perceived	31	43.7%			10	14.1%		
Total	71	100%			71	100%		

The data analysis exhibits that the aggression management training programme was found to be highly effective. Paired't' test was applied to scrutinize the data and it explicit that there was a significant increase in posttest scores of level of knowledge (t_{70} = 13.24, p = 0.00) and confidence (t_{70} = 5.58, p= 0.00). Hence, Research Hypotheses (H_1) is accepted. (Table – 4)

Table 4: Effectiveness of aggression management training programme on competency of nursing students

N = 71

Competency	**Mean Pretest score**	**Mean Posttest score**	**Mean difference**	**t value**	**p value**
Knowledge	11.24	19.4	8.16	13.24	0.000
Confidence	26.1	32.9	6.8	5.58	0.000

t value- 2.00

Table 5 reveals that there is an association between age and type of family with the pretest knowledge score. Other variables are not associated with both level of knowledge and confidence. So the research hypothesis (H_2) is rejected for the entire demographic variable except age and type of family with knowledge.

Discussion

The study results showed that the training programme on aggression management is highly effective on competency of nursing students. This is extensively in accord with a number of studies:

35 studies on the effectiveness of education and training programme on violence at the workplace were systematically reviewed and their outcomes demonstrated that the knowledge and confidence enhanced and positive attitude were expanded[12].

A study was described in acute hospital setting and demonstrated that all nine educations and training programs retrospect direct with enhanced confidence and ameliorated attitude, skills, and cognizance. They observed no remarkable alteration in the incidence of savage deeds in the workplace, yet in light of 38 studies carried on in psychiatric settings, they concluded that the best vantages of instruction programs is related to knowledge, skill and confidence in managing hostility[13].

A quasi-experimental study was done on the consequence of aninstruction program on nursing undergraduate's attitude towards apprehension and self-confidence in handling hostility among patients. Variables were measured three times for both groups that is pre-test, post-test on the last day of intervention, and a follow up after 3 months of training. They concluded that there is a significant increase in the perceived confidence amid interventional group participants only[14].

Education programmes that spotlights awareness of racial, cultural, social, religious and spiritual needs also alleviates disturbed/violent behavior and such training programmes should be conducted appropriately to ensure the effectiveness.

The present study findings are supported by the above discussed studies where all are showing the high cogency of training programme on competency of nurses in managing aggressive patients

Implication for education, practice and research: The study findings have implications for student nurses and staff nurses. An aggression management training programme should be implemented in the nursing curriculum for providing advanced knowledge about managing aggressive patients and also to improve the confidence level of a nurse to handle patients who are potential for aggression. Raising nurses' awareness about the appropriate techniques of managing an aggressive patient is highly recommended as it can relieve the stress and anxiety of a nurse while working in psychiatric setting.

Conclusion

Violence and aggression, the premise of much research in recent years, is a noteworthy professional issue for nurses who work with mentally ill patients. Aggression management is a critical component of an overall strategy to tackle patients with hostility. This study offers an aggression management training program, beneficial to enhance knowledge and perceived confidence among nursing undergraduates. Student nurses accounted an increase in situational and environmental mindfulness as well as improved confidence and technical skills for forestalling and managing aggressive behavior. To hammer the last nail, the results of this study demonstrate a high cogency of aggression management training program on the competency of nursing students.

Recommendations of the Study: Based on the results, the subsequent suggestions are initiated

Further research is recommended to concentrate on the influence of training programs on the behaviour of patients. It can also consider larger samples for better generalization. More research can be focused on staff nurses who directly deal with aggressive patients. Also the use and impact of various health promoting strategies on psychological well-being should be encouraged. Other variables are not associated with both level of knowledge and confidence. So the research hypothesis (H_2) is rejected for the entire demographic variable except age and type of family with knowledge.

Acknowledgement

The satiation and euphoria that accompany the successful completion of this research would be

incomplete without the mention of the people who made it possible. We thank the research team of Accendere Knowledge Management Services, CL Educate Ltd. for their unflinching guidance, continuous encouragement and support to successfully complete this research work.

Conflict of Interest: No conflict of interest

Source of Funding: The funding was done by KRIC (Krupanidhi Research Incubation Centre) to execute the present study.

Ethical Clearance: Ethical Clearance is Taken from working Department

REFERENCES

1. Townsend MC, Morgan KI. Psychiatric mental health nursing: Concepts of care in evidence-based practice. FA Davis; 2017 Oct 19.
2. Krug EG, Mercy JA, Dahlberg LL, Zwi AB. The world report on violence and health. The lancet. 2002 Oct 5;360(9339):1083-8.
3. DENNEN J. Theories of Aggression. Default Journal Holland. 2005:1-48.
4. Baron. R. A, & Richardson, DR Human aggression.
5. Roche M, Diers D, Duffield C, Catling-Paull C. Violence toward nurses, the work environment, and patient outcomes. Journal of Nursing Scholarship. 2010 Mar;42(1):13-22.
6. Piquero NL, Piquero AR, Craig JM, Clipper SJ. Assessing research on workplace violence, 2000–2012. Aggression and violent behavior. 2013 May 1;18(3):383-94.
7. Lanctôt N, Guay S. The aftermath of workplace violence among healthcare workers: A systematic literature review of the consequences. Aggression and violent behavior. 2014 Sep 1;19(5):492-501.
8. Guay S, Goncalves J, Boyer R. Evaluation of an education and training program to prevent and manage patients' violence in a mental health setting: a pretest-posttest intervention study. InHealthcare 2016 Sep (Vol. 4, No. 3, p. 49). Multidisciplinary Digital Publishing Institute.
9. Burns N, Grove SK. The practice of nursing research: Conduct. Critique. 2005.
10. Polit DF, Beck CT. Nursing research: Generating and assessing evidence for nursing practice. Lippincott Williams & Wilkins; 2008.
11. Linsley P. A realistic evaluation of two aggression management training programmes (Doctoral dissertation, University of Nottingham).
12. Wang S, O'Brien-Pallas LL, Hayes L. A review and evaluation of workplace violence prevention programs in the health sector. Toronto: Nursing Health Services Research Unit; 2008 Jul.

To Assess the Knowledge and Attitude Towards the Prevention of Traffic Collisions among College Students

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ABSTRACT

Objectives: To assess the knowledge and attitude on prevention of traffic collision among college students.

Method: A Quantitative approach with descriptive survey design was used in the study. The sample of 200 students from a selected degree college were selected by using purposive sampling technique. A structured knowledge questionnaire and attitude scale was used to collect the data from the subjects after obtaining informed consent.

Results: Among 200 respondents, 50% of the respondents possess moderate knowledge, 48% respondents possess inadequate knowledge and remaining 2% possess adequate knowledge on traffic collisions and its prevention. Also the majority (63%) of subjects was having favorable attitude, 34% was having a moderate favorable attitude and 3% were having an unfavorable attitude regarding traffic rules and regulation and use of safety measures. The overall mean knowledge and attitude scores of respondents regarding traffic collision and its prevention was 14.65 and 30.36 respectively.

Conclusion: This study found that only 2% of the respondents are having adequate knowledge, even though 63% demonstrates a favorable attitude. Thus, it can be concluded that the attitude and knowledge may not be positively correlated and even if the knowledge level is low, people tend to have attitude variations due to their experience. It's very important to understanding their level of knowledge, to help in planning effective technology for preventing traffic collisions.

Keywords: *Knowledge, traffic collisions, Rules and regulation, College students*

Introduction

Traffic collisions are a major public health issue faced globally. Every day, there are 1.25 million people that are involved in a traffic collision each year. Somewhere in the range of 20 and 50 million people endure non-deadly wounds, with many suffering disabilities because of their injuries. Traffic collisions cause major economic losses to people, their families, and to countries in general[1].

According to the statistics, the age group between 15 and 44 years account for 48% of deaths due to a traffic collision. From an early age, males will probably be associated with traffic collision than females. Around seventy five percent (75%) of all traffic collision happen among young men (younger than 25 years) and they are just about 3 times as liable to be killed in a traffic collision. Traffic collisions are anticipated to become the seventh leading cause of death by 2030[2].

As per the Ministry of Road Transport and Highways report, 1,50,785 individuals died and another 4,94,624 were harmed in 4,80,652 traffic collisions in India in 2016. This converts into 1317 accidents and 413 deaths every day or 55 accidents and 17 deaths every hour. The number of traffic collisions has expanded by 31% from 2007 to 2017 and that of fatal road crashes have expanded by 25.6% in a similar period. Traffic collision fatalities increased by 3% over the past year (from 1,46,133 in 2015 to 1,50,785 in 2016) and traffic collision severity expanded from 29.1 in 2015 to 31.4

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in 2016. The number of deadly accidents has increased since 2005 and saw a sharp rise from 1,31,726 in 2015 to 1,36,071 in 2016 [3].

The traffic collision incidence rate is commonly seen among the group between 18-45 years (68.6%) and this is due to the negligence, road condition and mobile phone usage. India has the highest traffic collision rate over the globe[4]. One in each 10 deaths is accounted from India. The state of Karnataka was in third place among all the states that represented 86% of the aggregate traffic collision, with a rate offer of 9.2. The state also found at the fourth place in representing the greatest number of fatalities, with a rate offer of 7.4. Bengaluru saw 5,323 traffic collisions in 2016, of which 790 were fatal. As indicated by Bengaluru traffic police information, a year ago (till October) 4,246 traffic collisions have been accounted for, of which 546 were killed, while 3,537 individuals were harmed in these accidents[5].

A cross-sectional study was conducted among 360 higher secondary school students in Chennai. An organized survey and attitude scale was used to acquire information from 360 understudies. Among 360, 186 members (51.7%) had sufficient knowledge and 174 members (48.3%) had inadequate knowledge on the traffic rules and regulation. Among the participating members, the greater part of the members had a positive attitude on traffic rules and regulation. 46.4% members who had been exposed to traffic collisions, pedestrian accidents accounted only 7.2%, the remaining were motor vehicle collisions. The most widely recognized explanation behind motor vehicle accidents was high speed in 58 members (37.4%), followed by overtaking in 41 members (26.5%) and remaining 38 members (24.5%) due to bad road conditions. Traffic collision is the most undesirable thing to happen to road users, however they happen regularly. The most disastrous thing is that we don't learn from our mistakes. The greater part of the road users are very much aware of the general rules and safety measures while utilizing road, but it is just the laxity on the part of road users, which causes collisions[6]. Main causes of traffic collision are due to human errors like over speeding, drunken driving, distractions, red light jumping, avoiding usage of safety measures like seat belts and helmets, negligence of rules and regulation. And its most important to conduct the research studies in different population to find out gap in preventive measures.

An investigation was held among the understudies of Management and Science University, Malaysia. The questionnaire was distributed randomly to the 109 understudies with the mean age of 20.94 ± 1.89 years of the Faculty of Health and Life Sciences. Around 39 (35.7%) members had been associated with at least one or more than one traffic collision. Around 93.6% of them were strongly/emphatically persuaded of safety belts importance. Multiple linear regression method demonstrated that age and attitude were significantly connected with the exposure to the collision[7]. The investigation concluded that members had moderate knowledge about traffic rules and regulation and majority of them said that high speed, drivers' lack of knowledge about traffic rules and laws. All understudies were very strong/emphatically persuaded of safety belts importance. Age and attitude were essentially connected with the exposure to the collision.

A cross sectional study was done at Amal school, a private sector organization in Tulspura. An organized poll was utilized to get information from 100 youngsters in class four to ten. Results among the respondents, 58% were males and 90% were between the ages of 9-13 years. Major representation was from classes 4 (22%) and seven (21%). The greater part of the members participating in the investigation (88%) had driven bicycles while motorbikes were utilized by only 27%. The understudies of class 4, 5, 6 were not able to recognize road signs (56%) but rather whatever is left of the understudies effectively recognize the road sign. The awareness in regards to road signs was 52% among males and 51% females. The knowledge level of study members with respect to road signs was impressively high, especially what to do with the traffic signal indicates (94%), not to horn (79%) zebra crossing (95%) and pedestrian prohibited (75%). Students agreed that driving without a valid license is an offense (69%) and possibility of traffic collision when driving bikes and motorcycles without a helmet (89%) and using mobile phones while driving (92%). Among the respondents, 86% had driven a cycle and 27% had driven a motorcycle only 10% wore a head protector while riding. Valid license was available with 4% understudies and 29% of school youngsters had been associated with a roadside collision. Good knowledge about road rules and regulation did not convert into the students[8].

Road Safety Awareness in India is exceptionally poor in this manner and there is a need to teach and

make individuals aware of the road security through different occasions and projects such as shows, classes, social projects, portable displays through vans, and follow road safety weeks, giving on the spot help and medical aid to road users, circulation of road safety and security pamphlets and handouts etc., on a regular basis. This should be possible with the assistance of schools, universities, RWA (resident welfare associations), NGOs, transport and exchange associations. It is essential to teach about the measures to be taken to limiting the event of traffic collision among school kids, undergrads, drivers of business vehicles, auto drivers, transport drivers, truck drivers, bike drivers, cyclists and so on.

Method

Study Design: The current research study was a quantitative study with descriptive survey design conducted among college students in Krupanidhi group of institutions, Bengaluru.

Sample Size Technique: The sample size was 200 students of Krupanidhi group of institutions. In this study, purposive sampling technique was used to select the sample falling under inclusion criteria. The selection criteria includes students who are present during the time of data collection.

Instruments used for the study: In this study instrument was developed based on study design by 2 sections:

- A structured knowledge questionnaire regarding prevention of traffic collision It is designed to elicit the knowledge of students regarding prevention of traffic collision, it consists of 30 items.
- Likert scale to assess the attitude regarding prevention of traffic collision it consists of 10 items

Statistical Method: We used descriptive statistics in the form of Frequency, mean, percentage and standard deviation will be used for the demographic data. Chi square test was used to test the association between the knowledge and attitude score regarding prevention of traffic collision among the college students. We used IBM, SPSS statistics 20 for windows 7 to analyze the data. The results were considered statistically significant if the p-value was more than 0.05.

Result

Table 1: Socio demographic details of the participants

(N = 200)

Characteristic	Category	Frequency	Percentage
Age of the participants	17-18 years	47	23.5
	19-20 years	80	40.0
	20-21 years	51	25.5
	above 21	22	11.0
Gender	Male	79	39.5
	Female	121	60.5
Education level	PUC	12	6.0
	Degree	171	85.5
	MBA	5	2.5
	Physiotherapy	12	6.0
Experience of driving	1 year experience	22	11.0
	2 years experience	20	10.0
	more than 2 years	76	38.0
	no experience	82	41.0
Own vehicle	Yes	77	38.5
	No	123	61.5
Exposure to any traffic collision	Yes	52	26.0
	No	148	74.0

The above table depicts that majority of participants 80 (40.0%) fall in age group between 19-20 years. Among 200 participants, 121 (60.5%) were female and 79 (39.5%) were male. Majority of the participants was from degree - 171 (85.5%). 82 (41%) participants were not having driving experience whereas 76 (38%) participants had more than 2 years experience in driving, 77 (38.5%) participants having their own vehicle remaining 123 (61.5%) were not having their own vehicle and 52 (26%) participants were exposed to the traffic collision.

Table 2: Distribution of participants according the level of knowledge on prevention of traffic collision among college students

(N = 200)

Sl. No.	Knowledge level	Classification of participants	
		Number	Percentage (%)
1.	Inadequate (≤50%)	97	48%
2.	Moderate (51-75%)	100	50%
3.	Adequate (>75%)	3	2%
4.	**Total**	200	100%

The above table demonstrates that among 200 participants, 50% of the participants possess moderate knowledge, 48% participants possess inadequate knowledge and only 2% possesses adequate knowledge on regarding traffic collision. (Table 1)

Table 3: Distribution of participants according the level of attitude on prevention of traffic collision among college students.

(N = 200)

Sl. No.	Level of Attitude	Classification of participants	
		Number	Percent (%)
1.	Unfavorable attitude (≤50%)	5	3%
2.	Moderate favorable attitude (51-75%)	68	34%
3.	Favorable attitude (>75%)	127	63%
	Total	200	100%

Data presented in table 2 shows that majority 63% of participants were having favorable attitude, 34% of participants having moderate favorable attitude and 3% were having unfavorable, regarding traffic rules and regulation and use of safety measures.

Table 4: Description of knowledge and attitude frequencies on traffic collision and its prevention among degree students

N = 200

Area wise	No. of items	Range	Median	Mean	SD
Knowledge	**30**	17	15.00	14.65	2.860
Attitude	**10**	21	31.00	30.36	3.615

The above table reveals that the overall mean score of knowledge and attitude regarding traffic collision and its prevention was 14.65 with SD 2.860 and 30.36 with SD 3.615 respectively. (Table 3)

Table 5: Association between level of knowledge with selected socio demographic variable

N = 200

Variable	Knowledge score		
	χ^2	Df	Inference
Age	5.726	8	NS
Gender	1.147	4	NS
Family mIncome	4.578	6	NS
Education	13.784	6	S*
Experience in driving	14.191	6	S*
Ownership of vehicle	3.208	4	NS
Exposed to any road traffic collision	3.486	4	NS
Previous information regarding traffic collision	5.040	6	NS

S*= significant, NS= not significant

The Chi square value shows that there is an association between level of knowledge with education and Experience in driving on the level of 0.05.

Table 6: Association between attitude with selected socio demographic variable

N = 200

Variable	Attitude score		
	χ^2	Df	Inference
Age	9.151	8	NS
Gender	.543	4	NS
Family Income	7.602	6	NS
Education	6.622	6	NS
Experience in driving	15.614	6	S*
Ownership of vehicle	4.823	4	NS
Exposed to any road traffic collision	3.837	4	NS
Previous information regarding traffic collision	9.786	6	NS

S* = significant, NS = not significant

The data presented above shows that there is a significant association between level of attitude on Experience in driving with road traffic collision.

Discussion

Traffic collisions have emerged as an important public health issue which needs to be tackled by multi-disciplinary approach. The trend in road accident injuries and death is alarming in countries like India. Therefore, assessing knowledge and attitude regarding traffic collision and its prevention among the college students.

The mean age of the study participants fall in the age group between 19-20 years 80 (40.0%) and majority 121 (60.5%) were female and 79 (39.5%) were male. Where 76 (38%) participants had more than 2 years experience in driving, 77 (38.5%) participants having their own vehicle and 52 (26%) participants exposed to the traffic collision, Similar findings were reported by the research study were 37.6% participants mean age below 20 years remaining 62.4% was 20 years and above. 79.8% participants having their own vehicle among 35.7% involved one or more traffic collision[7].

These findings were supported by a study conducted among Higher Secondary School Students on December 2014 in Chennai revealed that half of the participants had positive attitude towards road safety and regulation[6].

The findings of the present study depict that there is a significant association between levels of knowledge with education and experience in driving whereas the attitude score is significantly associated only with experience in driving. Similar research study findings reported that year of experience in driving associated with road collision[9].

Conclusion

This study found that only 2% of the respondents are having adequate knowledge, even though 63% demonstrates a favorable attitude. Thus, it can be concluded that the attitude and knowledge may not be positively correlated and even if the knowledge level is low, people tend to have attitude variations due to their experience.

Recommendations: On the basis of the findings of the present study, the following recommendations have been made:

- A similar study can be conducted on a larger sample for generalization of study findings.
- Further research is recommended for other age groups and public in backward districts, taluks, villages etc.
- A comparative study can be conducted on adolescents of urban and rural schools.
- An Experimental study can be conducted with randomization and control groups.
- A correlative study to assess the relationship between knowledge and attitude regarding traffic collision

Acknowledgement

The satiation and euphoria that accompany the successful completion of this research would be incomplete without the mention of the people who made it possible. We thank the research team of Accendere Knowledge Management Services, CL Educate Ltd. for their unflinching guidance, continuous encouragement and support to successfully complete this research work.

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Ethical Clearance: Ethical Clearance is Taken from working Department

REFERENCES

1. Lohar V, Singhal S, Arora V. Research Article Prodrug: Approach to Better Drug Delivery. International Journal of Pharmaceutical Research. 2012;4(1):15-21.
2. Omale S, Auta A, Amagon KI, Ighagbon MV. Anti-Snake Venom Activity of Flavonoids From the Root Bark Extract of Parinari curatellifolia in Mice. IJPR. 1955 Apr.
3. Falconer K. Fractal geometry: mathematical foundations and applications. John Wiley & Sons; 2004 Jan 9.
4. George E. Job related stress and job satisfaction: a comparative study among bank employees. Journal of Management Development. 2015 Apr 13;34(3):316-29.
5. Manjunatha MK, Renukamurthy TP. Stress among Banking Employee-A Literature Review. Int. J. Res. Granthaalayah. 2017;5:207-13.
6. Fung MK. Are labor-saving technologies lowering employment in the banking industry?. Journal of Banking & Finance. 2006 Jan 1;30(1):179-98.
7. Gupta A, Raman K, Shang C. Social capital and the cost of equity. Journal of Banking & Finance. 2018 Feb 1;87:102-17.
8. Ahn J. Teenagers' experiences with social network sites: Relationships to bridging and bonding social capital. The Information Society. 2012 Mar 1;28(2):99-109.
9. Brandtzæg PB, Nov O. Facebook use and social capital—a longitudinal study. InFifth International AAAI Conference on Weblogs and Social Media 2011 Jul 5.
10. Utz S, Muscanell N. Social media and social capital: Introduction to the special issue.

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Email: editor.ijphrd@gmail.com | Website: www.ijphrd.com

Published, Printed and Owned: Dr. R. K. Sharma
Printed: Printpack Electrostat, G-2, Eros Apartment, 56-Nehru Place, New Delhi-110019
Published at: Institute of Medico-Legal Publications, Logix Office Tower, Unit No. 1704, Logix City Centre Mall Sector-32, Noida-201 301 (Uttar Pradesh)
Editor: Dr. R. K. Sharma, Mobile: +91 997 188 8542