THE 3rd MUHAMMADIYAH INTERNATIONAL PUBLIC HEALTH & MEDICINE CONFERENCE

MIPHMC

THEME
"DEMOGRAPHIC DIVIDEND TOWARDS THE TRANSFORMATION OF HEALTH SERVICES"

25-26 July, 2023

Faculty of Public Health
University of Muhammadiyah Jakarta

https://e-journal.fkmumj.ac.id/

The 3rd Muhammadiyah International Public Health and Medicine Conference (MIPHMC)

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ARTICLES

Volume III, Issue 1, 2023
November 2023

E-ISSN: 2808-5361
http://e-journal.fkmumj.ac.id/

Proceeding The Third Muhammadiyah Internasional-Public Health and Medicine Conference

EPIDEMIOLOGY OF PITYRIASIS VERSICOLOR IN ELEMENTARY SCHOOL CHILDREN IN THE BANTAR GEBANG, BEKASI

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ABSTRACT

Pityriasis versicolor (PV) is a disease caused by a superficial fungus, namely Malassezia furfur. This disease is chronic with skin appearance that has characteristics in the form of well-defined skin lesions and white (hypopigmentation) and pink to brownish (hyperpigmentation). PV disease causes itching and a psychological impact in the form of a decrease in self-confidence. The purpose of this study was to determine the percentage of PV incidence in elementary school children at the Garbage Disposal Site, Bantar gebang, Bekasi, West Java. This type of research is quantitative and descriptive with a cross-sectional design. The research sample consisted of 87 elementary school students in grades 1 and 2 who were selected based on inclusion criteria, namely the presence of hypopigmented and hyperpigmented lesions. The examination was carried out microscopically with the solatip method using 10% KOH. Data analysis was performed by using descriptive statistical tests. The results of this study showed that there were 35 (40%) students who were positively infected with PV, which was confirmed by the presence of spores and hyphae of the fungus M. furfur. The age most affected by PV is 7 years old, with a percentage of 17 (49%) students, while the percentage of the sex most affected by PV is male, with as many as 23 (53%) students. The study concludes that the prevalence of children in grades 1 and 2 at Yayasan Dinamika Indonesia Elementary School around the Bantargebang landfill, Bekasi, West Java, is in the middle category. The factors that influence the incidence of PV in this study are outdoor activities, which cause the facial area to sweat easily, and lack of personal hygiene.

Keywords: *Bantar Gebang, Bekasi, Malassezia furfur, Pityriasis versicolor, West Java*

ABSTRAK

Pityriasis versicolor (PV) merupakan penyakit yang disebabkan oleh jamur superfisial *yaitu Malassezia furfur*. Penyakit ini bersifat kronis dengan penampakan kulit yang mempunyai ciri-ciri berupa lesi berbatas jelas, berwarna putih (hipopigmentasi), dan berwarna merah muda sampai kecoklatan (hiperpigmentasi). Penyakit PV menimbulkan rasa gatal dan dampak psikologis berupa penurunan rasa percaya diri. Tujuan penelitian ini adalah untuk mengetahui persentase kejadian PV pada anak sekolah dasar di Tempat Pembuangan Sampah Bantar gebang, Bekasi, Jawa Barat. Jenis penelitian ini adalah kuantitatif dan deskriptif dengan desain *cross-sectional.* Sampel penelitian terdiri dari 87 siswa sekolah dasar kelas 1 dan 2 yang dipilih berdasarkan kriteria inklusi yaitu adanya lesi hipopigmentasi dan hiperpigmentasi. Pemeriksaan dilakukan secara mikroskopis dengan metode solatip menggunakan KOH 10%. Analisis data dilakukan dengan menggunakan uji statistik deskriptif. Hasil penelitian menunjukkan terdapat 35 (40%) siswa yang positif terinfeksi PV, hal ini dibuktikan dengan adanya spora dan hifa jamur *M. furfur*. Usia yang paling banyak terkena PV adalah 7 tahun dengan persentase 17 (49%) siswa, sedangkan jenis kelamin yang paling banyak terkena PV adalah laki-laki dengan persentase sebanyak 23 (53%) siswa. Hasil penelitian menyimpulkan bahwa prevalensi anak kelas 1 dan 2 SD Yayasan Dinamika Indonesia sekitar TPA Bantargebang, Bekasi, Jawa Barat, berada pada kategori sedang. Faktor yang mempengaruhi kejadian PV pada penelitian ini adalah aktivitas di luar ruangan yang menyebabkan area wajah mudah berkeringat dan kebersihan diri yang kurang baik.

Kata Kunci: Bantar Gebang, Bekasi, Jawa Barat, *Malassezia furfur*, *Pityriasis versicolor*

INTRODUCTION

Pityriasis versicolor is a skin disease caused by a superficial fungal infection named *Malassezia furfur*. This fungus was originally known as Pityrosporum and includes lipophilic fungi that are part of the normal human flora. However, it can turn opportunistic under certain conditions and infect human skin, especially the stratum corneum. Skin infected with *Malassezia furfur* will show patches that are lighter, darker or reddish than the surrounding skin area. These spots are lesions in the form of macules, plaques, or follicular papules with various colors, such as hypopigmentation, hyperpigmentation and erythema, with fine scales on top and surrounded by normal skin so that they can be easily distinguished from the surrounding skin. The most dominant body parts affected by Pityriasis versicolor are the chest and back because these parts have many sebaceous glands. However, this disease can also infect other parts of the body, such as the arms, neck, and face (1).

In general, this disease is found almost all over the world in areas with high humidity. Pityriasis versicolor is almost always found worldwide, with a 20-25% prevalence in tropical climates, humidity, and high rainfall (2). One of the countries with a high prevalence of Pityriasis versicolor is Indonesia. Indonesia is located on the equator with a temperature of 30◦C and 70% humidity, so it has the potential to become a country affected by Pityriasis versicolor. Indonesian people call the disease Pityriasis versicolor or Tinea versicolor with Panu disease.

In several cases, patients infected with Pityriasis versicolor will experience symptomatic symptoms in the form of itching in the parts infected with the *Malassezia furfur*. Epidemiological survey results for the last 20 years show that Pityriasis versicolor is included in skin diseases affecting children. Although it does not cause mortality, it affects morbidity and child psychology, affecting children's quality of life (3).

Referring to the problems and impacts caused by Pityriasis versicolor, it is necessary to monitor the area with the incidence of Pityriasis versicolor. Areas that need to be monitored for Pityriasis versicolor are Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek). One of these cities is Bekasi, especially for children who live in the Bantar Gebang Final Waste Disposal Site area. The choice of Bantar Gebang Final Waste Disposal Site area as the sampling location was because Bantar Gebang Final Waste Disposal Site area is the largest waste disposal site in Indonesia with humid and hot environmental conditions. This area is surrounded by residential areas and school facilities at both primary and upper secondary levels, so it can potentially be infected with skin diseases, such as PV. The selection of elementary school children as sampling subjects was because elementary school-age children do many activities that cause sweating and do not care about personal hygiene, supported by poor environmental conditions, making them more susceptible to PV.

Several previous studies that the basis of this research include reported that 13.33% of construction workers in the Sukatani Cimanggis area, Depok, West Java, were infected with

the *Malassezia* sp. and 66.6% of construction workers with hypopigmentation due to *Malassezia* sp. infection (4).. The incidence of Pityriasis versicolor at the Ciputat District Health Center, South Tangerang, Banten, from January 1-December 31, 2020, was 54.8% in the 16-20 age group (5). The monitoring results found that 4.8% of men in the productive age group of RT 1,2,3, Tomang Village, West Jakarta, had Pityriasis versicolor (6). The findings on the results of the examination noted that 32 (51.6%) students at Muthmainnatul Qulub Al-Islami Islamic Boarding School Cibinong Bogor were infected with Pityriasis versicolor (7).

Previous research shows no data regarding Pityriasis versicolor in Bekasi City, West Java, especially at the Bantar Gebang Integrated Waste Disposal Site, Indonesia's largest Waste Disposal Site. This study aimed to determine the percentage of the incidence of Pityriasis versicolor in elementary school children at the Indonesian Dinamika Foundation, Ticketing Udik Village, Bantargebang District, Bekasi City, West Java Province. This research data is expected to provide information about the epidemiology of Pityriasis versicolor at the Bantargebang location so that it can be used as a basis for preparing work programs for local health centers in carrying out efforts to prevent, treat and monitor the spread of Pityriasis versicolor with a wider scale location.

METHOD

This type of research is descriptive quantitative with a cross-sectional design, which is carried out by taking 1x fecal sampling on 87 Elementary School Children in classes 1 and 2 in Yayasan Dinamika, Indonesia, around Bantargebang, Bekasi City, West Java. Sample examination was carried out at the STIKES Mitra Keluarga Mycology Laboratory. The tools and materials used in this study included masking tape, glass slides (Sail Brand), microscopes (Olympus), 70% alcohol, alcohol swabs (one swab), and 10% KOH reagent (Merck)

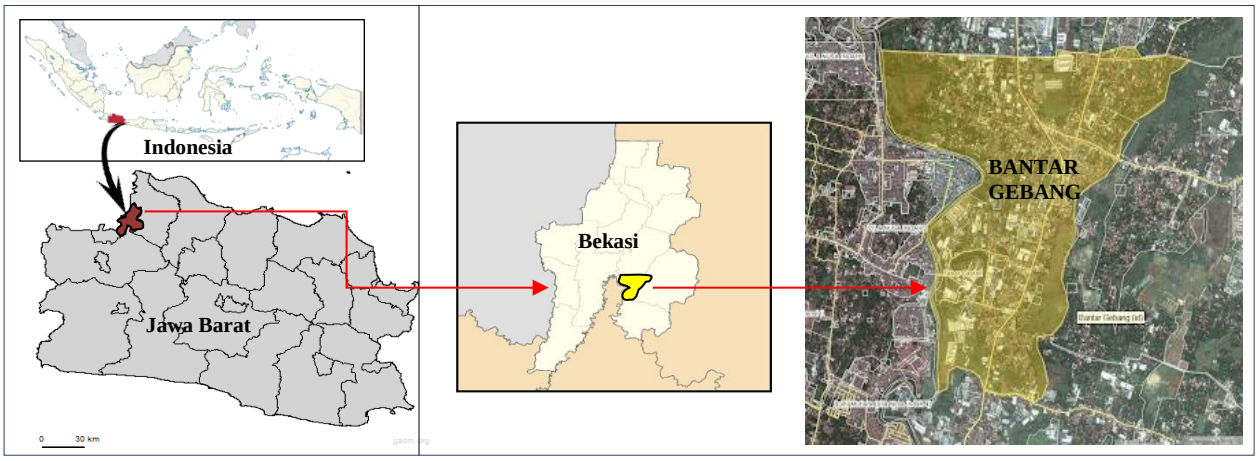


Figure 1. Sampling location in Yayasan Dinamika Indonesia, Bantargebang, Bekasi City, West Java.

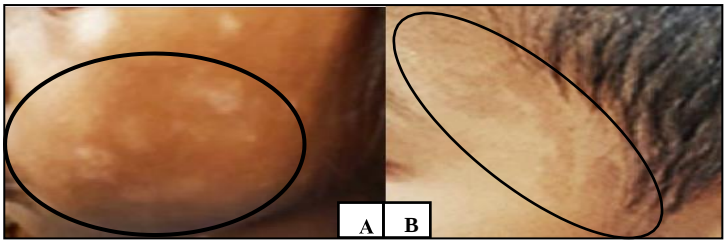
Procedure research consists of 3 stages: pre-analytic, analytical, and post-analytic. The pre-analytical stage includes preparing tools, materials, and sampling techniques by purposive sampling

using inclusion and exclusion criteria. Respondents used as inclusion criteria were elementary school children in classes 1 and 2 with hypopigmented and hyperpigmented skin and confirmed microscopically positive for *M.furfur* fungus. The next stage is the analysis, which examines the skin using the KOH method. The examined skin is sterilized using an alcohol swab to remove grease, dust, and other impurities. Tape is attached to the skin with the lesion/scalp. The tape was affixed to a glass object with 2 drops of 10% KOH and then leveled so that the 10% KOH solution spread to all parts of the tape. Then, *M. furfur* was observed using a microscope. Finally, the analytical stage is carried out by identifying the presence/absence of the *M.furfur* using a light microscope. Identification was confirmed positive if the respondent's sample showed the presence of short, straight, or bent hyphae surrounded by many small round groups of spores (appearances like spaghetti and meatballs). Identification of the morphology of the *M. furfur* based on medical parasitology books.

The data that has been collected is then processed in the form of tables and figures. The data were then analyzed using descriptive statistical tests to describe the incidence of pityriasis versicolor in elementary school children at Yayasan Dinamika Indonesia in Bantargebang, Bekasi, West Java, Indonesia.

RESULTS AND DISCUSSION

This research was conducted at elementary school Yayasan Dinamika Indonesia, RT 01/RW05, Pangkalan V, Ciketing Udik Village, Bantargebang District, Bekasi City, West Java Province. The population used in this study was 112 class 1 and 2 elementary schools in Yayasan Dinamika, Indonesia. The number of class 1 is 71 students, and class 2 is 41 students. Sampling was carried out by purposive sampling technique using inclusion and exclusion criteria to obtain a sample of 87 people or respondents. Samples were examined for clinical manifestations, which can be seen in **Figure 2.**



Picture 2. A. White spots (hypopigmentation). B. Brown spots (Hyperpigmentation)

Figures 2. A and B show the clinical manifestations of pityriasis versicolor in the respondents in white spots (hypopigmentation) and brown spots (hyperpigmentation). Pityriasis versicolor or tinea versicolor, occurs due to a superficial fungal infection called *Malassezia furfur*. This fungus is lipophilic yeast that is a normal inhabitant of the skin flora, but under certain conditions (temperature, humidity, sebum gland production, sweat, genetics, immunocompromised conditions, and malnutrition), it can turn into opportunistic fungi that produce compounds that interfere with melanization causing changes pigmentation in the form of skin hypopigmentation or hyperpigmentation (8)

Based on the questionnaire, all samples that had lesions in the facial area were probably caused by the activities of students who had direct contact with the sun. The infected students often play or help their parents look for trash after school. Faces in direct contact with the sun cause the area around the face to become hot to the point of sweating when doing activities outside the home. This condition causes the facial area to become moist due to excessive production of oil glands, and lack of personal hygiene triggers *M. furfur* to grow around the face. The results of the literature review by Radila (2022) state that there is a relationship between personal hygiene and the incidence of pityriasis versicolor. Someone with poor personal hygiene tends to be more susceptible to pityriasis versicolor than individuals with good personal hygiene. In addition, humid and hot environmental conditions can also affect the incidence of pityriasis versicolor (9).

Yayasan Dinamika Indonesia is located in a residential area around the Bantargebang Integrated Waste Disposal Site. Environmental conditions surrounded by garbage can also make pityriasis versicolor infection easy to occur. The natural decomposition process of accumulated waste requires a warm enough temperature for the decomposition process to run quickly. This condition increases the temperature and humidity around the waste pile. Suppose a person has high activity around the environment. In that case, there will be a change in the form of *M. furfur* as the normal flora of the skin in the form of yeast into mycelium (pathogen) in students at Yayasan Dinamika Indonesia (10).

The results of an examination of 87 skin scraping preparations with lesions/scales using the KOH method, which were observed with a light microscope, found that 35 children tested positive for pityriasis versicolor, while 52 students tested negative for pityriasis versicolor. The tabulation of pityriasis versicolor examination results can be seen in **Table 1.**

Table 1. Examination pityriasis versicolor in class 1 and 2 children at Yayasan Dinamika Indonesia Elementary School, Bantargebang, Bekasi

Results	Frequency	Percentage (%)
Positive	35	40%
Negative	52	60%
Total	87	100%

Table 1 shows the percentage of children in classes 1 and 2 at Yayasan Dinamika Indonesia Elementary School, Bantargebang, Bekasi, who tested positive for pityriasis versicolor as many as 35 (40%) while negative as many as 52 (60%). The results of this study complement previous research conducted in several regions and on different subjects, including the study that reported examining skin scrapings using 10% KOH on 139 MTs students at Islamic Boarding School X, Mempawah Hilir District, West Kalimantan, found 18 samples (12.9%) showed the appearance of hyphae and spores in the light microscope (11). The results of a direct examination of tinea versicolor on students at the Muthmainnatul Qulub Al-Islami Islamic Boarding School in Cibinong, Bogor, West Java, with 10% KOH showed as many as 32 (51.6%) were positively infected with tinea versicolor (7)

Meanwhile several factors that affect the distribution of Pityriasis versicolor are age and gender. In this study, the distribution of pityriasis versicolor by age can be seen in **Table 2.**

Table 2. Distribution of Pityriasis versicolor based on age

Result	Age group (year)							
	6		7		8		9	
	N	%	N	%	N	%	N	%
Positive	4	11%	17	49%	8	23%	5	14%
Negative	31	89%	18	51%	27	77%	30	86%
Total	35	100%	35	100%	35	100%	35	100%

Table 2. Shows the number and percentage of distribution of pityriasis versicolor based on age, including 4 (11%) 6 years old, 17 (49%) 7 years old, 8 (23%) 8 years old, and 5 (14%) 9 years old. According to Chandra *et al*. (2019), the age classification in this study is in the 0-10 year age group category. In general, pityriasis versicolor can affect all ages, with an annual incidence reported as much as 5% -8%, but this disease is more dominantly found in individuals aged 15-24 years who live in areas with hot temperatures and high humidity. This age includes the teenage years when hormonal changes occur, and increased physical activity causes the work of the sebaceous (oil) glands to increase so that the body's skin sweats easily. As a result, *M. furfur* easily grows in areas of skin that sweat excessively.

Another factor that influences the incidence of pityriasis versicolor is gender. According to Sudiadnyani (2016), gender is one factor influencing the incidence of pityriasis versicolor, which is relative. Gender is situational because the sex used as the subject of Pitryasis versicolor has different behavior at each incident location. The study of gender distribution affected by pityriasis versicolor can be seen in **Table 3.**

Table 3. Distribution of Pityriasis versicolor based on gender

Gender	Positive	Negative	Number	(%)
Male	23	20	43	53%
Female	12	32	44	27%
Total	35	52	87	100%

Table 3 shows the percentage of the gender affected by pityriasis versicolor, namely 23 (53%) male and 12 (27%) female who were positive for pityriasis versicolor. Research results found that the most common subjects with pityriasis versicolor are caused by males doing outdoor activities more often, which causes excessive sebum (oil) production, which triggers the growth of *M. furfur* as the main cause of pityriasis versicolor. Different results were reported that more female students were exposed to pityriasis versicolor at Islamic boarding schools because female students often use powder and lotion to increase skin moisture when sweating, which triggers the growth of *M. Furfur* (12), (13).

In this study, a positive diagnosis of pityriasis versicolor was established by scraping the infected skin using the KOH method and observing it with a light microscope. The results of microscopic examination with a light microscope can be seen in **Figure 3.**

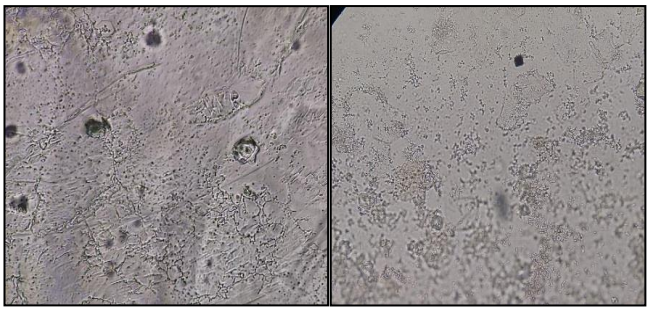


Figure 3. Microscopic morphology of *M. Furfur* on skin scraping preparations using the 10% KOH method (10x magnification)

Figure 3. The result of skin scraping examination documentation using the 10% KOH method using a light microscope shows the presence of short, non-pigmented, unbranched hyphae and spherical-shaped cells. Pityriasis versicolor is caused by the fungus *M. furfur*. On microscopic examination of the skin scrapings of *M. Furfur*, it can be seen in the form of short, straight/bent, grouped hyphae, round, and grouped spores. This shape is known as the spaghetti and meatball appearance (14).

CONCLUSION AND SUGGESTIONS

Based on the results of an examination of skin scrapings using the KOH method, it was found that the number and percentage of incidents of pityriasis versicolor in elementary school children class 1 and 2 Yayasan Dinamika Indonesia, Bantargebang, Bekasi was 35 (40%) in the medium category. The distribution of the incidence of pityriasis versicolor was higher in males, as many as 23 (53%), 7 years old, and as many as 17 (49%). The positive result indicator for pityriasis versicolor was shown by the finding of the *M. furfur*, which was similar to spaghetti and meatball appearance in the form of short, straight/bent hyphae, round, and clustered spores.

ACKNOWLEDGMET

The authors would like to thank the STIKes Mitra Keluarga and Yayasan Dinamika around Bantargebang, Bekasi City, West Java, for allowing them to research pityriasis versicolor in elementary school children living around the final waste disposal site in Bantar Gebang.

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