

## The Knowledge, Attitude and Practice of Mothers and Children on the Indonesian Dietary Guidelines and the Relationship with Children's Nutritional Status

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### ABSTRACT

The aim of this study was to determine the Knowledge, Attitude, and Practice (KAP) of mothers and children on the Indonesian Dietary Guidelines (Balanced Nutrition Guidelines) and its relationship with children's nutritional status. KAP were assessed using a set of questionnaires developed according to the 10 messages of the guidelines. A total of 212 school children from four public schools in Cianjur District along with their mothers participated in this study conducted from August to September 2018. A total of 60-75% of the school children had a nutritional status categorized as normal, 4-7% as thin, and 15-33% as overweight/obese. The majority of mothers had good scores (>80) relating to knowledge, attitude, and practice on balanced nutrition. However, there were no significant differences between the child nutritional status groups. Mothers' knowledge on balanced nutrition was correlated with the nutritional status of elementary school children ( $r=0.316$ ;  $p=0.007$ ). On the other hand, mother's practice on balanced nutrition was correlated with the nutritional status of senior high school children ( $r=0.279$ ;  $p=0.020$ ). Children's knowledge, attitude and practice on the Indonesian Dietary Guidelines were different between the school levels. The knowledge score on balanced nutrition was significantly highest among senior high school children ( $p=0.018$ ), while the attitude score on balanced nutrition was significantly highest among elementary school children ( $p=0.007$ ). The practice score on balanced nutrition was significantly highest among elementary school children ( $p=0.001$ ). Practice on balanced nutrition guideline was correlated with the nutritional status of senior high school children ( $r=0.283$ ;  $p=0.018$ ). Nutrition education should always be improved for mothers and school children to enhance the implementation of the Indonesian Dietary Guidelines in daily life.

**Keywords:** dietary guideline, mother's knowledge, nutritional knowledge, nutritional status, school children

### INTRODUCTION

Globally, at least 1 out of 3 children under five are not developing well due to malnutrition in its more visible forms: stunting, wasting, and overweight; and at least 1 out of 2 children under five suffer from hidden hunger due to deficiencies in vitamins and other essential nutrients. Overweight and obesity continues to rise with the proportion of overweight children (5 to 19 years old) rising from 1 out of 10 in 2000 to almost 1 out of 5 in 2016 (UNICEF 2019). Indonesia is currently struggling with a 'triple burden of malnutrition', an incongruous situation of stunting, wasting, overweight and obesity, and micronutrient deficiencies (hidden hunger).

The triple burden of malnutrition is driven by the poor diet quality of children, shown by the fact that 2 out of 3 children are not fed with the minimum dietary diversity. Many school-aged adolescents consume highly processed foods, 42% drank carbonated soft drinks at least once a day, and 46% ate fast food at least once a week (UNICEF 2019). In Indonesia, a study by Febriani and Sudarti (2019) showed that students who consumed fast food >3 times/week were 2.42 times more likely to be overweight and obese compared to students who consumed fast food ≤3 times/week.

A substantial reduction in the burden of undernutrition can be achieved if low-income populations have access to 10 evidence-

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based nutrition-specific interventions, namely social safety nets, early child development, and schooling to affect the underlying determinants of poor nutrition, including limited access to healthy foods and lack of adequate care (Bhutta *et al.* 2013; Ruel & Alderman 2013). Understanding and implementing a healthy lifestyle are required to prevent undernutrition and overnutrition, as well as meeting dietary patterns according to the principles of balanced nutrition. Balanced nutrition is a daily meal composition containing adequate nutrients in terms of quality and quantity by considering four principles: diversity or variety of food in the diet; hygiene practices; regular physical activity; and monitoring to maintain normal body weight (MoH RI 2014).

Healthy eating during childhood can be one of the most determinant factors of human health and is a growth and developmental booster (Corkins *et al.* 2016). Nutrition knowledge is a fundamental factor for obtaining a healthy diet. Studies have shown that attitudes on diet, food choices, and dietary quality can be influenced by good nutrition knowledge and can later provide a beneficial effect against obesity among children and young adolescents (Ul Haq 2018; Kwol *et al.* 2020; Grosso *et al.* 2013). Moreover, the positive healthy eating attitudes of parents may affect children's consumption of fruit, vegetables, fish, butter, and meat (Romanos-Nanclares *et al.* 2018).

The exposure of a dietary guideline on mothers and children is important to trigger healthy eating habits and good nutritional status. Mothers' Knowledge, Attitude, and Practice (KAP) towards balanced nutrition and a healthy lifestyle are important to support their children's nutritional and health status. Implementation of the Indonesian Dietary Guidelines is widely required in all age groups. The Indonesian Dietary Guideline needs to be introduced and implemented among school children to support their optimal nutritional status and academic achievement. Therefore, the aim of this study was to determine the Knowledge, Attitude, and Practice (KAP) of mothers and children on the Indonesian Dietary Guidelines (Balanced Nutrition Guidelines) and its relationship with children's nutritional status.

## METHODS

### Design, location, and time

The study was conducted with a cross-

sectional design in four selected public schools in Cianjur District, West Java Province, Indonesia. The study period started from January to December 2018 with data collection in August to September 2018.

### Sampling

The inclusion criteria of the subjects was school children aged 10–16 years living with their mothers, while the exclusion criteria was school children who did not complete the questionnaire. The total number of subjects that completed this study was 212 school children (96.78%), consisting of 72 elementary school children (5th grade), 70 junior high school children (8th grade), and 70 senior high school children (11th grade) along with their mothers.

### Data collection

A set of questionnaires were developed and validated. The questionnaires covered the mothers' and school children's characteristics, nutritional status of the school children (body mass index-for-age z score/BAZ), the mothers' and school children's knowledge, attitude, and practice according to the 10 messages of the Balanced Nutrition Guidelines. The ten messages of Balanced Nutrition Guidelines consist of: 1) eat a variety of food; 2) consume vegetables and fruits; 3) consume high-protein foods; 4) consume a variety of staple foods; 5) limit sweet, salty, and fatty foods; 6) eat breakfast regularly; 7) drink enough water; 8) read food labels; 9) wash hands with soap; and 10) conduct regular physical activity (MoH RI 2014).

Anthropometric measurements (body weight and height) were collected from all the school children prior to the interview. Body Mass Index (BMI) was calculated as weight/height<sup>2</sup> (in kilograms per square-meter). Nutritional status was then categorized based on BAZ into severely thin ( $z\text{-score} < -3SD$ ), thin ( $-3SD \leq z\text{-score} \leq -2SD$ ), normal ( $-2SD < z\text{-score} \leq +1SD$ ), overweight ( $+1SD < z\text{-score} \leq +2SD$ ), and obese ( $z\text{-score} > +2SD$ ), calculated by using the WHO-AnthroPlus 1.0.4 Software. Self-administered questionnaires were given to the mothers to be filled at home. The instructions on how to fill the questionnaires were clearly written and explained to the schoolchildren. Completed questionnaires were returned to the interviewers the following day.

The ethical approval was obtained from the Bioethics Committee for Medical/Health Research of the Faculty of Medicine, Sultan Agung Islamic University Semarang (No. 311/VIII/2018/KomisiBioetik), while written informed consents were obtained from all subjects prior to their participating in the study. The anonymity of the subject was preserved.

**Data analysis**

Data processing and analysis were conducted using Microsoft Excel 2007 and IBM SPSS version 22. Quantitative data analysis was done by calculating the mean, standard deviation, frequency, and proportion. The mean differences of the nutritional status of school children among school levels, mothers' and school children's KAP towards the 10 messages of the Balanced Nutrition Guidelines were analyzed by using the Analysis of Variance (ANOVA). Mann WhitneyU Tests were used as Post Hoc tests to

further analyze the differences between the two groups. Pearson correlation tests were used to analyze the relationship between mothers' KAP and nutritional status of school children. The significance level of less than 0.05 was considered as statistically significant.

**RESULTS AND DISCUSSION**

**Subject characteristics**

The characteristics of the school children, including sex and age, as well as the characteristics their mothers, such as age and education level, are shown in Table 1. The mean age of the mothers was in the range of 38–45 years old. Most of the mothers (>45%) were senior high school graduates. Most of the elementary school children were boys, while girls made up the majority for the junior and senior high school children. The mean age of the school children was in the range of 10–16 years old.

Table 1. Characteristics of the mothers and school children

Characteristics	Elementary school (n=72)	Junior high school (n=70)	Senior high school (n=70)
Mothers' age, years	38.7±5.8	41.6±6.2	45.0±6.2
Mothers' education (n (%))			
Elementary school	3(4.2)	6(8.6)	8(11.4)
Junior high school	8(11.1)	5(7.1)	5(7.1)
Senior high school	41(56.9)	38(54.3)	32(45.7)
University	20(27.8)	21 (30)	25(35.7)
School children's sex			
Boys	42(58.3)	30(42.9)	33(47.1)
Girls	30(41.7)	40(57.1)	37(52.9)
School children's age, years			
Boys	10.7±0.5	13.5±0.4	16.6±0.4
Girls	10.5±0.4	13.4±0.7	16.4±0.6

Table 2. Nutritional status of school children

	Elementary school (n=72)	Junior high school (n=70)	Senior high school (n=70)	p
Body weight (kg)	34.3±9.3	46.5±10.7	55.6±13.1	-
Body height (cm)	137.3±7.3	155.2±7.3	161.9±7.2	-
BAZ (n (%))				
Severely thin	0(0.0)	2(2.9)	1(1.4)	
Thin	4(5.6)	3(4.3)	5(7.1)	
Normal	44(61.1)	51(72.9)	53(75.7)	
Overweight	14(19.4)	11(15.7)	6(8.6)	
Obese	10(13.9)	3(4.3)	5(7.1)	
Mean±SD	0.19±1.43	-0.18±1.32	-0.19±1.39	0.172

Severely thin: (z-score<-3SD); Thin: (-3SD≤z-score≤-2SD); Normal: (-2SD<z-score≤+1SD); Overweight: (+1SD<z-score≤+2SD); Obese (z-score>+2SD)

BAZ: Body mass index-for-age z score

### Nutritional status of school children

Table 2 presents the nutritional status of the school children assessed using the body mass index-for-age z score (BAZ). Most (60%–75%) of the school children were of normal nutritional status; the prevalence of thin school children was only 4%–7%. Meanwhile, the prevalence of overweight and obese school children in elementary school (33%) was higher than that those in junior (20%) and senior high school (15%).

### Mothers' knowledge, attitude and practice on the balanced nutrition guidelines

Table 3 presents the mothers' Knowledge, Attitude, and Practice (KAP) on the Balanced

Nutrition Guidelines. The majority of the school children's mothers in all school levels obtained good scores (>80) relating to knowledge, attitude, and practice. However, there were no significant differences between the groups.

A mothers' knowledge on balanced nutrition is essential to improving family health, which affects nutritional status and wellness. Their KAP on balanced nutrition and healthy lifestyles are important to support their children's nutritional and health status. Mothers with good knowledge are expected to have good practice. Knowledge is a construct of beliefs, information, and skills provided from both experience and education (Zarnowiecki *et al.* 2012). In terms

Table 3. Mothers' KAP scores on the balanced nutrition guidelines

KAP	Elementary School (n=72)	Junior High School (n=70)	Senior High School (n=70)	p
Knowledge	92.5±5.5	90.8±5.3	92.0±5.9	0.201
Attitude	88.1±5.6	88.1±5.2	86.9±5.6	0.307
Practice	83.5±6.1	84.2±6.2	83±6.5	0.546

Means differences were analyzed using ANOVA test;

KAP: Knowledge Attitude and Practice

of nutrition and eating, the ability to remember and recall specific information related to the advantages of food and nutrition are considered as knowledge. Meanwhile, eating attitude is recognized as an individual behavior whether or not he/she has knowledge according to their emotional, motivational, perceptive, and cognitive beliefs (Macías & Glasauer 2014). Attitudes on food and nutrition may include positive or negative disposition of the individual's health problems, dietary practices, nutritional recommendations, dietary guidelines, or dietary preferences. Children's eating behavior could be determined by a healthy-eating attitude based on family influence, experience, knowledge, and norm (Kostanjevec *et al.* 2012). In addition, children's diet quality was associated with their parents' diet-related attitudes and beliefs in a family-based behavioral nutrition intervention in children with type 1 diabetes (Eisenberg *et al.* 2017).

**Association of mothers' knowledge, attitude and practice on the balanced nutrition guidelines and the nutritional status of school children**

Table 4 shows the relationship between mothers' Knowledge, Attitude, and Practice (KAP) on the Balanced Nutrition Guidelines and the nutritional status of school children. The

mothers' knowledge on balanced nutrition was significantly correlated with the nutritional status of school children in elementary school ( $r=0.316$ ;  $p=0.007$ ). Whereas the mothers' attitude to balanced nutrition had no correlation with the nutritional status of school children, while the mothers' practice on balanced nutrition had a significant correlation with the nutritional status of senior high school children ( $r=0.279$ ;  $p=0.020$ ).

A study by Yabancı *et al.* (2014) involving mothers of 132 male and 170 female school children in Ankara, Turkey, indicated that many mothers with a higher level of nutritional knowledge had children with normal weight. Mothers who have a higher level of nutritional knowledge fed their children more vegetables, fruits, legumes, and less sugary drinks such as juices and fast foods than those with a lower level of nutritional knowledge. Some factors, such as working status, income, age, educational level and the nutritional knowledge level of the mother affected their feeding practices (Ozdogan *et al.* 2012; Ucar *et al.* 2012).

From the study result, it is suggested that a mother's nutritional knowledge was not correlated with the nutritional status of school children. The dietary intake of school children must be taken into account in order to determine its specific effect on nutritional status. A relationship between mothers' nutritional

Table 4. Association between Mothers' KAP and the nutritional status of school children

Mothers' KAP	Nutritional status of school children		
	Elementary school (n=72)	Junior high school (n=70)	Senior high school (n=70)
Mother's knowledge	$r=0.316$ $p=0.007^*$	$r=0.122$ $p=0.315$	$r=-0.086$ $p=0.477$
Mother's attitude	$r=-0.051$ $p=0.669$	$r=-0.071$ $p=0.559$	$r=0.058$ $p=0.633$
Mother's practice	$r=-0.005$ $p=0.968$	$r=0.079$ $p=0.514$	$r=0.279$ $p=0.020^*$

\*Pearson correlation test  $p<0.05$

KAP: Knowledge Attitude and Practice

knowledge and attitude scores and the children's dietary intake was shown in the study by Al Shookri *et al.* (2011). Nutritional knowledge was related to dietary intake, highlighting the fact that the dietary habits of young children were associated with their mothers' nutritional knowledge and attitude (Vereecken & Maes 2010). A number of studies have examined the relationship between the dietary intake of children and the nutrition knowledge of their caregivers, particularly mothers (Vereecken & Maes 2010; Campbell *et al.* 2013; Williams *et al.* 2012). Most studies suggest that the higher the maternal nutrition knowledge promoted, the healthier the dietary intake of the children. It is possible that the nutritional knowledge of children also plays an important role in a child's dietary intake. A study involving 1,210 children in four public primary schools and 319 caregivers showed that higher nutrition knowledge of the caregivers was also associated with a higher vegetable intake of school children (Asakura *et al.* 2017).

According to the study by Romanos-Nanclares *et al.* (2018), the positive healthy eating attitudes of parents supported better children's consumption of fruit, vegetables, and fish and less consumption of butter and meat. Children and adolescent consumption of fruit, vegetables, and fish were positively associated with family environment, education, eating attitudes, and nutritional knowledge (Tognon *et al.* 2014; Antonogeorgos *et al.* 2013; Grunert *et al.* 2012; and Cannoosamy *et al.* 2016). Relationships between mothers' nutritional knowledge and practices with the nutritional status of children may cause an improvement in the eating habits of children (Poh *et al.* 2012).

### School children's knowledge, attitude and practice on the balanced nutrition guidelines

The school children's Knowledge, Attitude, and Practice (KAP) on the Balanced Nutrition Guidelines are shown in Table 5. The knowledge score on balanced nutrition was significantly higher for junior and senior high school children compared to elementary school children ( $p=0.018$ ). This result shows that older students could gain more knowledge compared to younger students. Older students received more exposure in terms of information regarding nutrition and dietary guidelines.

The attitude score on balanced nutrition was significantly higher for the elementary school children compared to the junior and senior high school children ( $p=0.007$ ). Additionally, the practice score on balanced nutrition was significantly higher among elementary school children than senior high school children ( $p=0.001$ ). Practice on balanced nutrition was better among elementary school children, which may suggest that there was better involvement of the mothers or family at home. A study by Szabo *et al.* (2019) suggests that school-aged adolescents tend to be aware of nutrition, particularly when it is combined with the impact of self-control and health motives which is positively associated with a healthy eating attitude.

### Association between school children's knowledge, attitude and practice on the balanced nutrition guidelines and the nutritional status of school children

Table 6 shows the relationship between the school children's KAP on the Balanced Nutrition Guidelines and their nutritional status. Practice of

Table 5. School children's KAP score on the balanced nutrition guidelines

School Children's KAP	Elementary school (n=72)	Junior high school (n=70)	Senior high school (n=70)	p
Knowledge	72.6±13.6 <sup>a</sup>	77.5±9.7 <sup>b</sup>	77.0±9.6 <sup>ab</sup>	0.018*
Attitude	84.4±5.8 <sup>a</sup>	81.6±5.6 <sup>b</sup>	81.7±6.2 <sup>b</sup>	0.007*
Practice	81.6±8.0 <sup>a</sup>	79.4±6.4 <sup>a</sup>	75.8±6.2 <sup>b</sup>	0.001*

\*Means differences were analyzed using ANOVA test and Mann Whitney U test  $p<0.05$

Different letter means statistically significant difference

KAP: Knowledge Attitude and Practice

Table 6. School children’s KAP score on the balanced nutrition guidelines and its relationship with nutritional status

School Children’s KAP	Nutritional status of school children		
	Elementary school (n=72)	Junior high school (n=70)	Senior high school (n=70)
Knowledge	r=0.185	r=-0.129	r=0.039
	p=0.120	p=0.288	p=0.748
Attitude	r=-0.096	r=-0.212	r=-0.066
	p=0.421	p=0.079	p=0.585
Practise	r=-0.028	r=-0.003	r=0.283
	p=0.816	p=0.981	p=0.018*

\*Pearson correlation test  $p < 0.05$

KAP: Knowledge Attitude and Practice

the Balanced Nutrition Guidelines was correlated with nutritional status among senior high school children ( $r=0.283$ ;  $p=0.018$ ). Meanwhile, the school children’s knowledge and attitude towards the guidelines had no association with their nutritional status.

The essential roles of health and nutrition are linked with care practice, including responsive care, learning opportunities, and security and safety to ensure that children grow and develop to their potential (Black *et al.* 2020). An epidemiology study by Asakura *et al.* (2017) reported that nutrient intake adequacy, dietary habits or practice of diet and nutrition were determined by both the child’s and caregiver’s nutritional knowledge. A higher level of the child’s and caregiver’s nutritional knowledge was associated with the healthy dietary habits of children, such as higher vegetable intake. It is suggested that apart from the children’s knowledge and attitude towards the guidelines, parental responsibility and care on providing healthy food choices as well as environmental factors such as eating or buying food prepared outside the home or school may contribute to the children’s practice on nutrition, particularly among younger students (Moreno *et al.* 2014).

## CONCLUSION

Most of school children have been exposed to the information and visuals related to the Indonesian Dietary Guidelines. The mothers’ knowledge, attitude, and practice on the Indonesian Dietary Guidelines were not different between the school children’s levels. The mothers’ knowledge on balanced nutrition was correlated with the nutritional status of elementary school children; while the mothers’ practice on balanced nutrition was correlated with the nutritional status of senior high school children.

The school children’s knowledge, attitude and practice towards the Indonesian Dietary Guidelines were different among school levels. The knowledge score on balanced nutrition was higher among senior high school children, while attitude and practice scores on balanced nutrition was higher among elementary school children. Practice on balanced nutrition guidelines was correlated with the nutritional status among senior high school children. It can be emphasized that good knowledge, attitude, and practice among mothers may have a positive effect on the implementation of the Indonesian Dietary Guidelines among school children and that the

role of the mothers contributed to the school children's nutritional practice. Further study is needed to extensively determine the factors that may contribute to the optimal implementation of the Indonesian Dietary Guidelines among school children.

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### AUTHOR DISCLOSURES

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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