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Eating behaviors related to nutritional status among adolescents: a cross-sectional study

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ABSTRACT

Adolescents are still prone to the issues of under and overeating. Eating behaviors are one factor that affects adolescents' nutritional status. This study aimed to look at the relationship between adolescents' eating behaviors and nutritional status. The cross-sectional study was conducted between September and November 2022. The self-evaluation instruments were completed by one hundred seventy-two individuals. Spearman-rank correlation analyses were performed. The findings showed that 84 (48.8%) adolescents had normal nutritional status, compared to 73 (42.4%) adolescents who engaged in low-risk eating. Nutritional status and eating behaviors were substantially associated (r=0.41, p=0.03). This research shows that individuals with bad eating behaviors have a greater risk of experiencing nutritional disorders. This study has certain limitations, such as the sample's composition of adolescents from a particular Yogyakarta area, which restricts the applicability of our findings to other communities. A longitudinal study is required to ascertain the cause-effect relationship between eating behavior and nutritional status. Accordingly, the cooperation of various parties is needed to increase adolescent knowledge about the importance of optimal nutrition during the growth period and understanding related to a healthy diet. It is hoped that there will be further research on other factors that influence the nutritional status of adolescents.

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1. INTRODUCTION

Nutritional problems are prevalent among adolescents. This health concern in adolescents is known as the double burden of malnutrition. The double burden of malnutrition is a condition where many adolescents experience undernutrition and overnutrition. This double burden exists in many countries, especially low-and middle-income countries [1]–[3]. The problem of adolescent malnutrition is spreading across the globe. Adolescence is a crucial time for fostering good food and health behaviors since behaviors learned then often persist into adulthood [4], [5].

The Indonesian Basic Health Research Survey (Riskesdas) reported that in 2018, 25.7% of adolescents aged 13 to 15 were considered stunted, down from 35.1% in 2013. Similarly, the percentage of thin teenagers aged 13 to 15 fell from 14.1% in 2013 to 8.7% in 2018. From 10% in 2013 to 16% in 2018,

more people were overweight or obese. In adult age groups, a similar tendency might be observed. According to a national survey, the rates of stunting (31.2%) and wasting (19.4%) among people aged 16 to 18 decreased from 2013 to 2018. Overweight or obese people increased from 7.3% in 2013 to 13.5% in 2018, which is on the other part of the malnutrition range [6]–[9].

The problem of nutritional status in adolescents has a poor impact now and in the future. According to a previous study [10], malnutrition due to deficiency, excess or imbalance of nutrients can put adolescents at high risk of developing chronic diseases (obesity, high blood pressure, coronary heart disease, stroke, diabetes mellitus, kidney disorders, and bone disorders), especially when combined with other unhealthy lifestyle behaviors, such as smoking. A study [11] revealed although nutritional problems are not usually the direct cause of death, but they can weaken the immune system and make adolescents more susceptible to fatal infections. Based on a previous study [12], if adolescents are malnourished, when they go to school, it will be seen that they experience disturbances in activity, thinking ability, and social interactions. In female adolescents, hormonal disorders occur. According to a previous study [13], malnutrition and poor health are common causes of high absenteeism, early school dropouts and decreased performance and achievement in class.

Many factors, including direct factors and indirect factors, cause these problems. The direct factors are infection and nutritional intake. Many factors underlying food intake include eating patterns/behavior, snacking behavior, knowledge of nutrition, and family economy (parental occupation, food production, housing conditions and parental income). Indirect factors are the host, agent, and environment. Host factors include physiology, metabolism, and nutritional needs. Agent factors include nutrients, namely macronutrients such as carbohydrates, proteins and fats, and micronutrients such as vitamins and minerals. Environmental factors include food ingredients, processing, serving size, personal hygiene, and sanitation [14]–[16].

Adolescents have views about their body (body image) which are often poor. For most young women, an ideal body is a dream. To achieve this dream, many young women usually do strict diets, which cause a lack of balanced and nutritious food, consume medicinal drinks or slimming drugs, take herbal medicine and other efforts to stay thin or become slimmer. These efforts can result in a decrease in nutritional status if not done correctly. Generally, the intake of energy and nutrients is less than the recommended healthy adequacy rate [17], [18].

In Indonesia, the increasing proportion of nutritional problems in adolescents has led to more attention being directed to this age group. However, there has been little implementation of programs targeting youth; most programs focus on young women, mainly involving Fe and folic acid supplementation. Various studies show that the lack of attention over the last decade has led to a lack of data related to nutrition in adolescents in Indonesia. Using evidence from other countries to inform local actions is insufficient because of the significant differences between countries [19], [20].

Based on this background, further studies related to factors that can improve the nutritional status of adolescents are urgently needed. Therefore, the authors intended to conduct a survey on adolescents' nutritional status. This study aimed to examine the relationship between eating behavior based on the Eating Attitude Test (EAT)-26 and the nutritional status of adolescents.

2. RESEARCH METHOD

This analytic observational research was conducted with a cross-sectional design in September-November 2022. The population in this study were all adolescents at a private senior high school in Yogyakarta, and one hundred seventy-two students were recruited. The sampling technique in this study was total sampling. This study's sample was adolescents aged 15-18 years old. Data analysis was performed by testing the proportions and hypothesis using the Spearman-rank correlation test.

The research instrument was the eating attitude test 26 items EAT-26 questionnaire and anthropometric measures. EAT-26 is an instrument for assessing eating behavior consisting of 26 items divided into 3 factors namely dieting behavior, oral control, and bulimia nervosa-food preoccupation. Dieting behavior is factor I, with thirteen items, bulimia nervosa- food preoccupation is factor II, with six items, and oral control is factor III, with seven items. This instrument has been tested for construct validity and reliability and the factor loadings ranged from 0.14 to 0.97 and the inter-factor correlations were between 0.04 to 0.74. Reliability test results of 0.73 [21], [22].

In this study, respondents were asked to completely fill out the EAT-26 questionnaire accompanied by the research team. Six-point likert-type scale, from "always" to "never used,"was utilized for scoring the value. A score of 3 was assigned for "always,"2 for "usually,"1 for "often,"and 0 for"sometimes," "rarely," and "never" for all items other than item-26. For item number 26, 0 was awarded for "always," "usually,"and "often,"while 1, 2, and 3 were given for "occasionally," "rarely," and "never,"respectively. As a result, a final

score that ranged from 0 to 78 was determined by adding up all of the participants' answers [22]. The established EAT-26 cutoff score of ≥20 was used to identify participants as having elevated risk for disordered eating attitudes and behaviors [23].

Nutritional status is assessed by measuring body weight and height, which are then determined by the Body Mass Index (BMI) using a formula: weight (kg)/height $(m)^2$. Nutritional status is grouped into underweight (BMI <18.5 kg/m2), normal weight (BMI=18.5–24.9 kg/m^2), overweight (BMI=25.0–29.9 kg/m^2) and obese (BMI >30 kg/m^2) [23]. Ethics approval was obtained from an institutional research ethics committee in STIKES Surya Global Yogyakarta (Approval number: 1.30/KEPK/SSG/VII/2022). Informed consent was provided by all participants.

3. RESULTS AND DISCUSSION

3.1. Respondents characteristics

Respondents in this study amounted to one hundred seventy-two students at a private senior high school in Yogyakarta. Respondents were obtained by researchers directly and had characteristics that can be classified according to age and gender. The features of the respondents in this study are presented in Table 1.

Table 1. Characteristics of participants (n=172)

Variables	f	%
Gender		
Female	90	52.3
Male	82	47.7
Age		
15-16	85	49.4
17-18	87	50.6
Eating behavior education		
Never	117	68.1
Ever	55	31.9
Had illness in the last month		
Yes	4	2.3
No	168	97.7

Table 1 shows that more respondents were female, namely 90 adolescents (52.3%). The majority had never received counselling about eating behavior, namely 117 adolescents (68.1%), and most had not been sick in the last month, namely 168 adolescents (97.7%).

3.2. Eating behavior of adolescents

This analysis is intended to see the frequency distribution of risky eating behavior based on the EAT-26. The eating behavior of adolescents is presented in Table 2. Table 2 shows that most adolescents have risky eating behaviors in the low category, namely 73 students (42.4%). The table shows that not a few also have risky eating behaviors in the medium and high categories, respectively, 56 adolescents (32.6%) and 43 adolescents (25%).

Table 2. Frequency distribution of risky eating behavior based on the EAT-26 (n=172)

Risk level	f	%
Low	73	42.4
Medium	43	25
High	56	32.6

3.3. The nutritional status of adolescents

This analysis is intended to see the distribution of adolescents' nutritional status frequency. Table 3 as shows in the nutritional status of adolescents. Table 3 shows that the nutritional status of the respondents is mainly in the normal category, namely 102 adolescents (59.3%). Some of them are underweight, overweight, and obese.

Table 3. Distribution of the frequency of nutritional status of adolescents (n=172)

Nutritional status	f	%
Underweight	38	22.1
Normal weight	102	59.3
Overweight	20	11.6
Obese	12	7.0

3.4. Correlation of risky eating behavior based on EAT-26 with the nutritional status of adolescents

This analysis is intended to find out whether statistically there is a relationship between risky eating behavior based on the EAT-26 and the nutritional status of adolescents. For this reason, statistical tests were done with the SPSS statistical program to conduct cross-tabulation and Spearman-rank correlation analysis. The results of the cross-tabulation of eating behavior with nutritional status in adolescents are presented in Table 4.

Table 4. Descriptive statistics and correlations among study variables

Risky eating behavior based on the EAT-26	Nutritional status								Total		*P*-value	R-value
	Underweight		Normal weight		Overweight		Obese					
	f	%	f	%	f	%	f	%	f	%		
Low	15	8.7	80	46.5	2	1.2	0	0.0	97	56.4	0.033	0.413
Medium	9	5.3	13	7.6	3	1.7	3	1.7	28	16.3		
High	14	8.1	9	5.2	15	8.7	9	5.3	47	27.3		

Table 4 shows that adolescents whose eating behavior is at risk in the low category will tend to have nutritional status in the normal category, namely 80 adolescents (46.5%). Based on the results of the correlation test using the Spearman-rank statistical test, *p*-value=0.033 (*p*-value <0.05) and r-value=0.413. Because the *p*-value <0.05, it is statistically concluded that there is a significant relationship between risky eating behavior and nutritional status in adolescents.

3.5. Discussion

This research was conducted on 172 adolescents, showing that most respondents had poor/low eating behavior, namely 73 adolescents (42.4%). However, there were also respondents in the medium and high categories, namely 43 adolescents (25%) in the medium category and 56 adolescents (32.6%) in the high category. This finding shows that adolescents have a serious health problem that needs to be addressed. This research is in line with a previous study [24], which showed that healthy eating behavior could be realized by choosing foods that are healthy and balanced in nutritional value. Healthy eating behavior is also related to the recommended or nutritious diet, namely eating foods low in fat and high in fiber and increasing consumption of vegetables and fruits. Most respondents have a high and moderate risk of experiencing an eating disorder. This is due to a person's obsession with being thin and the fear of being overweight, such as addressed in the questions no. 1 and 11 in the EAT-26 questionnaire.

According to a previous study [25], as long as the ideal body image is thin, many people are at high risk of experiencing eating disorders. For some adolescents, during the developmental period, many factors play a role in eating disorders, namely individual, family, biological, and psychological factors. Eating disorders can harm physical and social health. The most serious effects of disordered eating behavior include body image disturbance and death. Adolescents' high risk of eating disorders is possible because of their young age. According to Table 4, the majority aged 15-18 years have an increased obsession with losing weight through inappropriate dieting (fad diets). As a result, if many adolescents are at high risk of eating disorders, they cannot accept their physical condition well.

The current research shows that these health problems still need to be overcome in adolescents. According to a previous study [26], several factors significantly influence nutritional status, namely knowledge and family economic status. Generally, the higher the knowledge and financial status of the family, the better the level of family nutritional status. Family economic status is also related to food availability, food prices and family purchasing power, as well as knowledge about nutrition and health. The researchers assume that a large number of respondents with normal nutritional status is due to the family's better level of knowledge and economic status, so the family can meet food needs and provide nutritious food. In addition, the factor of the school environment as a place that has been lived for a long time in a child's life also has an effect. It is not the children's responsibility to decide what to eat. Instead, kids are reliant on the education and dietary habits of their guardians in educational environments [27]. Knowledge possessed by parents or caregivers regarding childcare will be related to the quality of care provided and ultimately have an impact on the child's growth. Nutritious food will certainly affect the growth and development of adolescents [28].

This research is in line with a previous study [15], which revealed that nutritional status in adolescents is similar to or a continuation of nutritional problems at a young age, namely iron deficiency anemia and excess and underweight. The environment very quickly influences adolescents. Unusual hobbies,

such as the choice to become vegetarian or food faddism, are some examples of this influence. Anxiety about body shape keeps adolescents from eating, often leading to anorexia nervosa [29]. The researcher assumes that for respondents with thin nutritional status, it can be caused by excessive dietary behavior in adolescents. Adolescents are worried about their body shape, so they do not eat properly because they are afraid, they will get fat. In addition, it can also be caused because there are still groups of people with less knowledge and family economic status, so they cannot meet their daily food needs, which then impacts the nutritional status of adolescents. Some adolescents are in the less category (30.8%) due to their inability to maintain weight and constantly applying the wrong diet. Many factors affect a person's body mass index, including gender and diet. This developmental time is a strategic period because it gives opportunity for adolescents to form a healthy lifestyle and determine patterns of behavior, values, and traits that will become prevalent as adults.

This research coincides with a previous study [30], found that there is a relationship between eating behavior and nutritional status in adolescents. This finding is supported by the scientific theory that eating behavior in a group will impact that group's nutritional status. Therefore, in nutrition improvement programs, efforts must be made to preserve good eating habits to support the government's food diversification program. Meanwhile, bad eating habits must be replaced with new ideas to support the achievement of healthy nutrition. The limitation of this research is the extent of the research area/area, which is only in the scope of the area which is limited to one place in Jogja so it cannot be generalized to other regions. Future research is expected to expand the research area so that the results can be generalized to a country or region.

4. CONCLUSION

Based on this study, it can be concluded that there is a relationship between eating behavior based on the EAT-26 and the nutritional status of adolescents. This research shows that individuals with bad eating habits have a greater risk of experiencing nutritional disorders. Accordingly, the cooperation of various parties is needed to increase adolescent knowledge about the importance of optimal nutrition during growth and understanding related to a healthy diet. It is hoped that in the future, there will be further research on other factors that influence the nutritional status of adolescents.

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