

RESEARCH STUDY

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Assessment of Knowledge, Attitudes and Behaviors Regarding Balanced Nutrition and Nutritional Status Among Adolescents at the Yayasan Bandung Senior High School, Deli Serdang Regency

Penilaian Pengetahuan, Sikap dan Perilaku Gizi Seimbang serta Status Gizi pada Remaja di Sekolah Menengah Atas (SMA) Yayasan Bandung, Kabupaten Deli Serdang

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ABSTRACT**Background:** Malnutrition during adolescence can slow growth and delay puberty. Adequate nutritional knowledge, attitudes, and behavior among adolescents are crucial to prevent health issues that can continue into adulthood.**Objectives:** To assess the knowledge, attitudes, and behaviors related to balanced nutrition and nutritional status among adolescents at the Yayasan Bandung Senior High School, Deli Serdang Regency.**Methods:** The research design used was a cross-sectional design with a total of 80 adolescents aged 14 to 18 years at the Yayasan Bandung Senior High School, Deli Serdang Regency. The subject taking technique was stratified random sampling. Knowledge, attitudes, and behaviors of balanced nutrition were obtained through questionnaires. Height and weight data were analyzed using WHO Anthro Plus to determine the Z-score of Body Mass Index according to age. Data analysis used the Spearman test to determine the relationship between variables.**Results:** Most adolescents had good nutritional status, namely 68.8%, while the percentage of overnutrition and obesity was 18.8% and undernutrition was 12.5%. Adolescents have a high level of knowledge of balanced nutrition of 20 adolescents (25%). Balanced nutrition attitudes were categorized as high, namely 43 adolescents (53.8%), while high category balanced nutritional behaviors were only 6 adolescents (7.5%). The results of the bivariate test (Spearman Correlation) showed a relationship between attitudes and behavior-balanced nutrition ($p < 0.05$).**Conclusions:** There is a relationship between attitudes and behavior of balanced nutrition in adolescence the Bandung Higher Education Foundation High School, Deli Serdang Regency.**INTRODUCTION**

Adolescence is a period of significant body development that begins at the onset of puberty, aged 10 to 19 years¹. Adolescent health aims to prepare them to become healthy, intelligent, qualified, and productive individuals, as well as play a role in maintaining and improving health. Adolescent health also needs to pay attention to physical, psychological, and social conditions. A healthy diet and lifestyle are factors that can support adolescent health. A sign of adolescent health can be seen from the normal nutritional status of the body mass index that is appropriate to their age².

Basic Health Research Data from the Ministry of Health of the Republic of Indonesia in 2018 shows that 1.9% of adolescents aged 13-15 years were severely underweight, 6.8% were underweight, 75.3% were

normal, 11.2% were overweight, and 4.8% were obese. In addition, 1.4% of adolescents aged 16-18 years were severely underweight, 6.7% were underweight, 78.3% were normal, 9.5% were overweight and 4% were obese³.

Poor nutrition knowledge is a factor that can lead to nutritional problems and changes in unhealthy eating behavior⁴. The level of knowledge will affect a person's attitudes and behavior when determining the food eaten, which can have an impact on nutritional status. The better knowledge a person has about nutrition, the better his nutritional situation is expected to be⁵. Nutritional knowledge consists of knowledge related to food and nutrients, nutritional information, and food safety. Adolescents who do not know good nutrition should endeavor to maintain a balance between the nutrients they eat and those they need to reduce the

problem of nutrient deficiency or excess⁶.

Attitude is a factor that influences a person's health behavior⁷. Adolescents who fulfill their nutritional needs by consuming nutritious food have a positive attitude. Conversely, negative attitudes can influence adolescents not to pay attention to food intake to meet their nutritional needs⁸. Someone who has good behavior related to balanced nutritional intake tends to have good knowledge and attitudes. This shows the relationship between knowledge, attitudes, and nutritional behavior in adolescents⁷. According to research, knowledge, attitudes, and behavior are factors that can influence an individual's nutritional status⁹.

Adolescents' nutritional knowledge will have an impact on their attitudes and behavior when determining the food they consume. A person's level of knowledge determines their understanding of the nutritional benefits of the food they consume. Insufficient nutritional knowledge and behavior among adolescents can have an impact on changes in eating habits. This lack of nutritional knowledge and behavior is reflected in their habits of consuming unhealthy foods. Adolescents' good nutritional knowledge will allow them to determine the foods and consume them according to their body's needs. The results of a good assessment of nutritional knowledge, attitudes, and behaviors are expected to prevent the causes of degenerative diseases¹⁰. Previous research found that respondents' knowledge, attitudes, and behaviors about balanced nutrition correlated with their nutritional status¹¹. The results of another study state that there is no significant relationship between knowledge, attitudes, and behaviors toward over-nutrition status¹².

Therefore, this study aimed to assess the knowledge, attitudes, balanced nutritional behavior, and nutritional status in adolescents. The study was conducted among adolescents in a senior high school located in Deli Serdang Regency, a rural area. Geographically, the school is far from the city center and away from fast food producers.

METHODS

The design used in this study was a cross-sectional design with adolescent subjects at Yayasan Bandung Senior High School, Deli Serdang Regency. The study was conducted from July to August 2023. Total subjects were 80 adolescents aged 14 to 18 years who did not have physical and mental disabilities. Subject determination was based on stratified random sampling. Data collection was carried out during school breaks. The ethics committee of this study was issued by the research of the Faculty of Medicine, Maranatha Christian University, with decision letter No:137/KEP/VI/2023 on June 13, 2023.

Anthropometric Measurements

Height was measured with a microtoice (SECA) after participants removed their shoes and socks. A digital stepping scale (GEA) was used to measure body weight. Height and weight data obtained from their measurements were then analyzed using WHO's Anthro Plus to determine the Z-score of Body Mass Index by age (BMI/A). The classification of BMI/A categories is based

on the Ministry of Health's reference for Child Anthropometric Standards for aged 5-19 years¹³.

Questionnaire

Subject characteristics were obtained through interviews using a research questionnaire. Knowledge, attitudes, and behavior of balanced nutrition were obtained directly from several questions to adolescents using structured fill-in sheets. The questionnaire used was the result of previous research that had been validated¹⁴. In this questionnaire, the knowledge items (15 questions) measured balanced nutrition knowledge related to breakfast, nutrients, good eating habits, water consumption, and healthy lifestyles. The attitude (10 questions) and behavior (15 questions) sections were scored on a Likert scale. Attitude items measured balanced nutritional attitudes towards consuming a variety of foods, eating habits, checking nutrition labels, and healthy lifestyles. Measuring behavioral items related to balanced nutritional behavior include breakfast habits, consumption of nutritious food, and healthy living habits.

Assessment of balanced nutrition knowledge is by giving correct (score 1) and incorrect (score 0) answers. Balanced nutrition attitudes were divided into three, namely answers of agree, doubt, and disagree. Balanced nutrition behavior was divided into never (score 0), sometimes (score 1), and always (score 2) answers. Knowledge, attitudes, and behavior were categorized as low (score >60%), medium (score 60-80%), and high (score >80%)¹⁵.

Data Analysis

Data were analyzed using IBM SPSS Statistics 25. Subject characteristics, nutritional status (BMI/A), knowledge, attitudes, and behavior on balanced nutrition were presented descriptively. Knowledge, attitude, and behavior scores were obtained by adding up all the scores for each variable. Spearman correlation analysis was used to determine the relationship between knowledge, attitudes and behavior of balanced nutrition.

RESULTS AND DISCUSSION

Subject Characteristics

Subject characteristics of adolescents at Yayasan Bandung Senior High School, Deli Serdang Regency, observed in this study included gender, age, and nutritional status (body mass index according to age). The number of subjects in this study was 80 adolescents, 56.3% of the subjects were male and 43.8% were female (Table 1). This study shows that knowledge of balanced nutritional attitudes and behaviour related to breakfast, who answered correctly and higher in girls than boys. Girls tend to show better nutritional knowledge and eating habits compared to boys¹⁶.

Most of the respondents who participated in this study were 16 years old (28.7%) and only 10% were 14 years old and 18 years old. As age increases, nutritional knowledge and behaviour will improve. The older a person is, the more knowledgeable they will be about nutrition and following a good diet. However, it is also important to provide nutrition interventions to all age groups in schools¹⁶.

Normal and optimal nutritional status is very necessary to support good health, growth, and development of the body so that it can achieve the highest level of education, grow into a productive person, and have a healthy adult life¹⁷. This study shows that the majority of adolescents have good nutrition, namely 68.8%, but this study shows the results of body mass index according to age in adolescents with the percentage of overnutrition and obesity of 18.8% and undernutrition of 12.5 % (Table 1). This suggests that adolescents face multiple nutritional problems. The results of a previous study on nutritional status showed that respondents experienced double nutritional problems, namely underweight and obesity. This happens to adolescents because they are in the transition

phase to adulthood, which involves changes in lifestyle and behavior, as well as experience of determining what foods they should eat¹⁸. Childhood obesity will affect adolescence into adulthood and is a public health problem in developing countries. The consequence of obesity can increase the prevalence of non-communicable diseases such as hypertension, cardiovascular disease, type 2 diabetes mellitus, and osteoarthritis, which are becoming public health problems. These findings are common in developing countries where the double burden of malnutrition is being experienced. This is due to industrialization, urbanization, economic development, and nutritional transition¹⁷.

Table 1. Distribution of subjects based on subject characteristics

Category	n	%
Gender		
Male	45	56.3
Female	35	43.8
Age		
14 years	8	10
15 years	20	25
16 years	23	28.7
17 years	21	26.3
18 years	8	10
Body Mass Index by Age (BMI/A)		
Undernutrition	10	12.5
Well-nourished	55	68.8
Overweight	9	11.3
Obesity	6	7.5

Knowledge, Attitudes, and Behavior of Balanced Nutrition

Knowledge is an important factor that forms the basis for changes in attitudes and behavior to prevent malnutrition¹⁹. Table 2 shows the results of the study, most adolescents have a moderate level of knowledge about balanced nutrition of 51 adolescents (63.7%), and high knowledge of 20 adolescents (25%). This proves that there is low knowledge related to nutrition in adolescents. This result is in accordance with the nutritional knowledge of adolescents in schools in Lubuk Pakam, which shows that most adolescents have moderate and good nutritional knowledge²⁰. Good nutritional knowledge in adolescents is expected to influence their consumption choices that will lead to normal nutritional status²¹.

Although most had a moderate level of knowledge, there were still 11.3% of adolescents who had low knowledge of balanced nutrition and a minimum score of 46.67. Only 27 adolescents (33.8%) answered correctly on knowledge related to nutrients contained in vegetables and fruit; meanwhile, only 24 adolescents (30%) answered correctly on knowledge related to food sources of vegetable protein. The less knowledgeable individual is likely to be related to unhealthy eating behavior²².

An attitude is one's readiness to respond to something but not yet an action¹⁹. Table 2 shows the results on balanced nutritional attitudes, namely, most of

the balanced nutritional attitudes in adolescents are categorized as high attitudes, with a percentage of 53.8%. Respondents who answered the attitude statement agreed regarding the willingness to consume a variety of foods, the willingness to eat breakfast, and the consequences of consuming alcohol with a percentage of 83.3%. The statement limiting fast food consumption received the lowest percentage. This shows that adolescents still like fast food in choosing food.

Health behavior is a person's response to act. Health behavior has an impact on healthy indicators, health services, healthy food, and environment¹⁹. The results of assessments related to balanced nutritional behavior can be good information to provide nutrition knowledge interventions for adolescents to change their behavior²³. Table 2 shows that balanced nutritional behavior is in the high category with 6 adolescents (7.5%). The research results showed that only 14 adolescents (17.5%) always consumed fruit, and only 25 adolescents (31.3%) consumed vegetables. The results of this study indicate that respondents who consumed fruit and vegetables were relatively low. According to Riskesdas 2018, a percentage of 95.5% of the Indonesian population aged ≥ 5 years falls into the category of less fruit and vegetable consumption³. Fruits and vegetables are sources of micronutrients (vitamins, minerals), fiber, and various phytochemicals that individually, or in combination, are beneficial for body health²⁴.

Table 2. Categories of knowledge, attitudes, balanced nutrition behavior and nutritional status

Category	n	%
Knowledge of balanced nutrition		
Low	9	11.3
Moderate	51	63.7
High	20	25
Attitude to balanced nutrition		
Low	6	7.5
Moderate	31	38.8
High	43	53.8
Balanced nutrition behavior		
Low	39	48.8
Moderate	35	43.8
High	6	7.5

The Relationship Between Knowledge, Attitudes, and Behavior of Balanced Nutrition

The theory of knowledge, attitudes, and behavior was originally to emphasize the important role of knowledge, attitudes, and behavior in health management²³. High nutrition knowledge is known to influence nutritional intake or behavior. When the level of nutritional knowledge and attitudes is low, it often indicates inappropriate eating behavior¹⁶. This study

shows that there is no relationship between nutritional knowledge, attitudes, and behavior. Similar to previous research^{25,26}. Although adolescents have nutritional knowledge, if they are not committed to healthy eating, they may not have the motivation to adopt a healthy and balanced diet¹⁶. Appropriate knowledge is necessary but not sufficient to improve adolescent behavior. Therefore, a comprehensive health promotion program can be a solution to encourage healthy behavior.

Table 3. Relationship between knowledge, attitudes, and behavior on balanced nutrition

Variable	Balanced nutrition	
	r	p
Knowledge-attitude	-0.181	0.108
Knowledge-behavior	-0.032	0.780
Attitude-behavior	0.224	0.046*

*Spearman test (p<0.05)

Attitudes synergises with behavior. A positive attitude towards health in a person can lead to good behavior. Conversely, a negative attitude will lead to bad behavior. The results of this study showed a significant positive relationship between attitude and balanced nutritional behavior (p<0.05). Previous research shows a similar result that positive attitudes are significantly associated with healthy eating behavior²⁷. Nutritional attitudes can determine food quality and encourage good nutritional behavior²⁸. Although knowledge of balanced nutrition was not correlated with attitudes and behavior, health promotion is still needed to shape good nutritional behavior. Development of nutrition and health education modules effectively improves knowledge, attitudes, and behavior, thereby possibly reducing risk factors associated with pre-adolescent and adolescent malnutrition²⁷.

CONCLUSIONS

The problem of adolescents today is overnutrition and obesity, in addition to undernutrition. So, it is necessary to pay attention to knowledge, attitudes, and behavior of balanced nutrition to avoid nutritional and health problems that occur in adolescents. Some adolescents at school have moderate and high knowledge of balanced nutrition, but the results do not reflect their daily behavior. Therefore, fostering nutrition education in schools may have a major role in shaping healthy eating attitudes and behavior to improve

the current and future well-being and health of adolescents and spreading messages beyond schools to impact families and the wider community.

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Conflict of Interest and Funding Disclosure

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