

Dietary Patterns, Physical Activity, and Nutritional Status among Adolescents in Tahfidzul Qur'an Klinterejo Sooko Boarding School in Indonesia

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Abstract: A balanced diet and physical activity are important for maintaining physical health because both affect the body's energy balance and metabolism. An improper diet and lack of physical activity can affect nutritional status, both malnutrition and overnutrition. This study aims to determine whether there is a relationship between diet and physical activity and the nutritional status of adolescents. The research design used was a cross-sectional study with a sample size of 85 people. The data collected included age characteristics, dietary patterns, physical activity, and nutritional status. Dietary patterns were measured using a FFQ instrument, physical activity was measured using a questionnaire, and nutritional status was measured using anthropometry. The sampling method used was random sampling, and the researchers determined the normality of the sample using Spearman's rank correlation test to determine the relationship between the two variables. The results of the study showed that dietary patterns were related to nutritional status in children with a p-value of 0.001. There was a relationship between physical activity and nutritional status in children with a p-value of 0.010. The conclusion of this study is that there is a relationship between dietary patterns, physical activity, and nutritional status.

1 INTRODUCTION

Nutritional status is a measure of success in meeting nutritional needs, as indicated by weight and height. Nutritional status is also defined as a state of health resulting from a balance between nutrient requirements and intake. Nutritional status is determined by measurements based on anthropometric and biochemical data and dietary patterns (Sumarlin, 2021). Food consumption affects a person's nutritional status. Good nutritional status or optimal nutritional status occurs when the body obtains sufficient nutrients efficiently, enabling

physical growth, brain development, work capacity, and overall health at the highest possible level. Poor nutritional status occurs when the body experiences a deficiency of one or more essential nutrients. Excessive nutritional status occurs when the body obtains excessive amounts of nutrients, causing toxic or harmful effects (Noviyanti & Marfuah, 2017).

Based on the Central Statistics Agency 2021, the population of Indonesia is estimated to be around 272,682,500 million people, of which 44.31% are adolescents. The results of the Basic Health Research (Riskesdas) on the nutritional status of adolescents

aged 13-15 in 2013 and 2018 nationally show that the percentage of adolescents who are severely underweight decreased from 3.3% to 1.9%, those who are underweight decreased from 7.8% to 6.8%, those with normal weight decreased from 78.1% to 75.3%, overweight status increased from 8.3% to 11.2%, while obesity status increased from 2.5% to 4.8%. Based on these percentages, it can be seen that the nutritional status of adolescents over a five-year period (2013-2018) was unstable.

Adolescence is a transitional period from childhood to adulthood, so adolescents can no longer be considered children, but on the other hand, they are not yet mature enough to be considered adults (Sodik & Anwar, 2024). Adolescents who have a healthy lifestyle can be assessed based on indicators of their habits, such as a balanced diet and systematic physical activities. The nutritional status of adolescents is influenced by their diet and physical activity. An unhealthy diet accompanied by a lack of physical activity can affect the nutritional status of adolescents (Pakphan et al., 2021).

Previous studies have highlighted the relationship between diet, physical activity, and the general nutritional status of adolescents. However, most studies have been conducted in public schools or communities, with few examining the context of Islamic boarding schools or boarding schools. In fact, Islamic boarding schools have different rules, schedules, and diets than non-boarding schools, so they are likely to have a different impact on nutritional status. The Tahfidzul Qur'an Klinterejo Sooko Mojokerto Islamic boarding school is one such boarding school that has a unique system of regulating food and activities for its students. To date, there has been no research specifically examining the

relationship between diet and physical activity and the nutritional status of adolescents in this boarding school. The purpose of this study is to determine the relationship between dietary patterns and physical activity with the nutritional status of adolescent students at the Tahfidzul Qur'an Klinterejo Sooko Mojokerto Islamic boarding school. This study provides scientific information for institutions and can be used as a reference for conducting further research relevant to this topic.

2 METHOD

This study used quantitative methods. The type of research conducted was analytical research with a cross-sectional design, which emphasizes the relationship between one variable and another, by observing exposure and results or cause and effect simultaneously. The research population consisted of students at the Tahfidzul Qur'an Islamic School in Mojokerto. The population at the Tahfidzul Al-Qur'an Islamic School was 543 students. The sample in this study consisted of 84 samples. The data collected included age characteristics, eating patterns, physical activity, and nutritional status. Eating pattern data was collected using the FFQ instrument, physical activity was measured using a questionnaire, and nutritional status was measured using anthropometry. This study used a simple random sampling method, which is a sampling method where each population has an equal chance of being selected as part of the sample. The purpose of simple random sampling is to obtain a representative sample from the population so that the research results can be generalized (Lenaini, 2021). The data collection instruments used in this study were questionnaires on dietary patterns and

physical activity. The research data were analyzed using univariate analysis with frequency distribution tables and bivariate analysis with Spearman's rank test to determine whether there was a relationship between dietary patterns and physical activity with the nutritional status of adolescent students at the tahfidzul qur'an boarding school.

3 RESULT

Respondent Characteristics

The research that has been conducted obtained data analysis results showing that of the 85 female students, 18 (21.2%) were 15 years old, 35 (41.2%) were 16 years old, 26 (30.6%) were 17 years old, and 6 (7.1%) were 18 years old. For details, see Table I.

Table 1 Frequency Data of Respondents by Age

Respondent Characteristic	Number	
	<i>f</i>	%
Age		
15 Years Old	18	21,1
16 Years Old	35	41,2
17 Years Old	26	30,6
18 Years Old	6	7,1
Total	85	100

Source: Primary Data,2024

Univariate Analysis Result

Dietary Pattern

The research that has been conducted obtained data analysis results showing that out of 85 female students, 9 (10.6%) had an inadequate diet, 33 (38.8%) had an adequate diet, and 43 (50.6%) had a very adequate diet. This can be seen in Table 2.

Table 2 Dietary pattern frequency data

Dietary pattern	<i>f</i>	%
High	43	50,6
Moderate	33	38,8
Low	9	10,6
Total	85	100

Source: Primary Data,2024

Physical activity

The research that has been conducted obtained data analysis results showing that out of 85 female students, 11 (12.9%) had light physical activity, 33 (38.8%) had moderate physical activity, and 41 (48.2%) had heavy physical activity. This can be seen in Table 3.

Table 3 Frequency data for physical activity

Physical Activity	<i>f</i>	%
High	11	12,9
Moderate	33	38,8
Low	41	48,2
Total	85	100

Source: Primary Data,2024

Nutrition Status

The study obtained data analysis results showing that out of 85 female students, 1 person (1.2%) was classified as severely malnourished, 9 (10.6%) were in the mildly underweight category, 47 (55.3%) were in the normal weight category, 20 (23.5%) were in the mildly overweight category, and 8 (9.4%) were in the Obese category. This can be seen in Table 4.

Table 4 Nutritional status frequency data

Nutrition Status	<i>f</i>	%
underweight	1	1,2
Thin	9	10,6
Normal	47	55,3
Overweight	20	23,5
Obese	8	9,4
Total	85	100

Source: Primary Data,2024

Bivariate Analysis Results

The relationship between diet and nutritional status

The results of the Spearman rank test show that there is a significant relationship between dietary patterns and nutritional status, with a p-value of 0.001 (p-value < 0.05). The correlation coefficient of 0.371 indicates a strong correlation. The results of this test show that the null hypothesis is rejected, so there is a significant relationship between diet and nutritional status. can be seen in the table 5

Table 5 The relationship between diet and nutritional status

		Dietery Pattern
Nutrition Status	Correlation Coefficient	0,371
	P-Value	0,001
Number of Respondents		85

The relationship between physical activity and nutrition status

The results of the Spearman rank test show that there is a significant relationship between physical activity and nutritional status, with a p-value of 0.010 (p-value < 0.05). A correlation coefficient of 0.277 indicates a strong correlation. The results of this test show that the null hypothesis is rejected, so there is a significant relationship between physical activity and nutritional status. can be seen in the table 6

Table 6 The relationship between physical activity and nutrition status

		physical activity
Nutrition Status	Correlation Coefficient	0,277
	P-Value	0,010
Number of Respondents		85

4 DISCUSSION

Univariate Analysis

Dietery Pattern

The results of the study in Table 2 on dietary frequency data show that 9 people (10.6%) have an inadequate diet, 33 people (38.8%) have an adequate diet, and 43 people (50.6%) have a very adequate diet. Dietary patterns were measured based on the frequency of meals and the types of food consumed in the past week. The dietary patterns of adolescents aim to determine the amount of nutrients required for their growth and development. Adequate food consumption in line with needs will provide sufficient nutrients for adolescents to engage in physical activities (Musyayyib et al., 2018). According to research (Nabawiyah et al., 2021), the eating patterns of adolescents are characterized by a desire to try new types of food around them because at this age they are easily influenced by new changes in food consumption choices, so it is said that adolescents consume food in an uncontrolled manner.

In this study, the dietary patterns examined were the adequacy of daily intake. The results showed that the majority (50.6%) of female students at the tahfidzul qur'an Islamic boarding school had a very adequate food intake. The macro nutrients frequently consumed by female students included protein, carbohydrates, fat, and vegetables. Sources of carbohydrates include rice, bread, noodles, and potatoes. The plant-based protein sources consumed by female students are usually tofu and tempeh, while the animal-based protein sources consumed by female students are usually chicken, eggs, and catfish. Protein is a very important nutrient for the body because it functions as a source of energy, a building

block, and a regulator. The protein requirement for adolescent girls aged 14-18 years is 0.85 grams/kgBW/day. The proportion of plant-based protein intake is 60-80% of protein requirements, and animal protein is 20-40% of protein requirements. The human body cannot store excess protein; if protein intake is excessive, it will be stored by the body in the form of triglycerides. This leads to an increase in fat tissue, resulting in a state of overnutrition (Putri et al., 2022).

Physical activity

The results of the study in Table 5.3 show that 11 people (12.9%) had light physical activity, 33 people (38.8%) had moderate physical activity, and 41 people (48.2%) had heavy physical activity. This activity was measured using a questionnaire and categorized as light, moderate, and heavy over the past week. According to the data obtained, most of the female students (41 people, 48.2%) had heavy physical activity. Physical activity plays a very important role in determining the nutritional status of adolescents. As the results show, adolescents in Islamic boarding schools have fairly high physical activity, which involves daily activities such as walking, climbing stairs, cleaning bathrooms, sweeping, ro'an, and worship (such as memorization, prayers that involve body movements), as well as school activities that take place outdoors.

Physical activity is the movement of body parts that causes energy expenditure, which is very important for maintaining physical and mental health and quality of life. A lifestyle that lacks physical activity can negatively impact physical condition. If calorie intake is excessive and not balanced by physical activity, it can lead to overweight or obesity (Rahayu,

2020). Therefore, physical activity is used as the basis for determining nutritional status, such as in healthy adolescents who can perform relatively strenuous activities in a short time and are adjusted to measurement standards. This activity is inseparable from dietary intake patterns (Waluyani et al., 2022).

Nutrition Status

The results of the study in Table 5.4 show that 1 person (1.2%) had a severely malnourished nutritional status, 9 people (10.6%) were in the mildly underweight category, 47 people (55.3%) were in the normal weight category, 20 people (23.5%) were in the mildly overweight category, and 8 people (9.4%) were in the severely overweight category. This study was measured using the body mass index formula to determine an individual's nutritional status category. In this study, the majority of 47 people (55.3%) had a normal nutritional status.

Nutritional status is a condition of an individual's or group's health caused by the food consumed, absorption, and use of nutrients in the body. Nutritional status can be determined using anthropometric parameters as a basis for assessment. Individuals below the normal weight range have a higher risk of infectious diseases, while those above the normal range have a higher risk of degenerative diseases. Therefore, paying attention to dietary intake is crucial across all age groups, from children to the elderly. Therefore, it is recommended to choose food types that contain nutrients so that nutritional needs can be met (Rahayu, 2020).

Bivariate Analysis

The relationship between diet and nutritional status

The results of the study in Table 5 show that the p-value is 0.001 (p-value < 0.05), so it can be statistically concluded that there is a significant relationship between diet and nutritional status. These research results are in line with the results of research by Multazami (2022), Nurholilah (2019), and Musyayyib (2017). Based on the research (Multazami, 2022), the results obtained for the relationship between diet and nutritional status were a p-value of 0.019 (p-value < 0.05), indicating that there is a relationship between dietary patterns and nutritional status because this is caused by the intensity of eating, variety of foods, and amount of food consumed affecting nutritional status, so it is important to increase food intake in terms of quantity, quality, and variety of food. According to research (Nurholilah et al., 2019), the results of this study show a relationship between dietary patterns and nutritional status with a P Value of 0.02 (p-value < 0.05). And according to (Musyayyib et al., 2018), the results show a relationship between dietary patterns and nutritional status in adolescents at the Nahdlatul Ulum Soreang Maros Islamic Boarding School, who have dietary patterns and nutritional status with a p-value of 0.01 (p-value < 0.05), indicating that there is a relationship between dietary patterns and the nutritional status of adolescents. A person's nutritional status can be determined based on nutritional intake and the body's ability to utilize nutrients. Different intake requirements will affect the nutritional status of each individual.

However, on the contrary, research (Nabawiyah et al., 2021) states that there is no significant relationship between diet and nutritional status.

Nutritional status is the condition of the body resulting from food intake and nutrient utilization. Nutritional status can be measured through the Body Mass Index (BMI), which reflects the balance between calorie intake and energy expenditure. Adolescents who have healthy eating patterns tend to have better nutritional status compared to adolescents who consume unhealthy foods (Nurholilah et al., 2019). The purpose of eating patterns in adolescents is to determine the amount of nutrients needed by adolescents for their growth and development. Adequate food consumption in accordance with needs will provide sufficient nutrients for adolescents to carry out physical activities (Musyayyib et al., 2018).

Inadequate intake in adolescent diets can have a serious impact on nutritional status. When nutritional intake is insufficient, the body cannot build new tissue for growth or repair damaged tissue. This can lead to stunted growth, decreased muscle mass, and impaired height development. In addition, nutritional deficiencies can also affect the immune system, as the antibodies needed to fight infections are largely formed from protein. Long-term nutritional deficiencies can also cause metabolic imbalances in the body (Indrawati, 2021). Therefore, diet is one of the factors that influence nutritional status. The purpose of a diet is to provide energy containing nutrients to meet the body's metabolic needs. Nutrient intake, such as protein, is significantly correlated with the nutritional status of adolescents. In addition to being a source of energy, protein also has its own function that cannot be

replaced by other nutrients, especially in building and maintaining cells and body tissues (Ernalina & Syuryadi, 2023).

The relationship between physical activity and nutrition status

The results of the study in Table 6 show that the p-value is 0.010 (p-value < 0.05), so it can be statistically concluded that there is a significant relationship between physical activity and nutritional status. These research results are in line with Multazami (2022), Kumala et al. (2019), and Roring (2020). Based on the research by Multazami (2022), the results of the relationship between physical activity and nutritional status obtained a p-value of 0.030 (p-value < 0.05), indicating that there is a relationship between physical activity and nutritional status. This study is also in line with the research by Kumala et al. (2019), which states that there is a significant relationship (p < 0.001) between physical activity and nutritional status, and is in line with the research by Roring et al. (2020), which found that the relationship between physical activity and nutritional status obtained a p-value of 0.003 (p-value < 0.05), indicating that there is a relationship between physical activity and nutritional status because physical activity affects nutritional status, one of which is to maintain ideal body weight. In this discussion, it can be revealed that physical activity can increase the body's metabolic process, causing energy reserves stored in the body in the form of fat to be burned as calories. In this process, it is said that there is a relationship between physical activity and nutritional status.

Physical activity is one of the factors that can determine a person's nutritional status. Physical

activity is the movement of a limb that causes energy expenditure, which is important for physical and mental maintenance. The level of physical activity can be categorized based on the amount of energy expended in activities per unit within a 24-hour period (Noviyanti & Marfuah, 2017). One effort to achieve optimal health requires positive lifestyle changes, such as engaging in physical activity to maintain ideal body weight and physical fitness. The role of physical activity influences an individual's fitness level. Low physical activity combined with high energy intake increases the risk of obesity and low fitness levels. Therefore, good and appropriate nutritional status is achieved when an individual regularly exercises and maintains a balanced diet (Ernalina & Syuryadi, 2023). One mechanism linking physical activity and nutritional status is the effect of physical activity on body composition. Physical activity is a form of strength and aerobic exercise, which can increase muscle mass and reduce body fat. Adequate protein intake supports optimal muscle formation, while the role of physical activity is to help reduce visceral fat, which is important for adolescents in the puberty phase to achieve optimal body composition (Soraya et al., 2017).

In Yolanda (2014) states that physical activity is beneficial for everyone because it can improve fitness, prevent obesity, improve heart, lung, and muscle function, and slow down the aging process. Exercise must be done regularly (Soraya et al., 2017). In this study, the respondents were in a boarding school environment where activities were predetermined, starting from waking up until going back to sleep. Physical activity in this study at the tahfidzul Qur'an boarding school was categorized as heavy physical activity because all activities were

done independently and had been tested in this study, which stated that there was a significant relationship between physical activity and nutritional status.

5 CONCLUSIONS

This study shows a relationship between diet, physical activity, and the nutritional status of adolescents at the Tahfidzul Qur'an Islamic boarding school. Recommendations for future researchers include conducting ongoing interventions on balanced nutrition and regular nutritional monitoring.

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