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The Correlation Between Breakfast Habits and Physical Activity with the Nutritional Status of Adolescents at UPT SMP Negeri 25 Gresik

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ABSTRACT

The high prevalence of poor breakfast habits and low physical activity among adolescents in Gresik, which exceeds national and provincial rates, highlights a nutritional concern requiring further investigation. This cross-sectional study involved 52 randomly selected eighth-grade students at UPT SMP Negeri 25 Gresik. Data on breakfast habits, physical activity, and nutritional status were collected through interviews and anthropometric measurements, then analyzed using the Chi-square test with SPSS. Results showed that 75% had good breakfast habits and 90.4% engaged in light physical activity. Nutritional status indicated 40.4% had normal weight, 38.5% were overweight, 7.7% were obese, and 15.4% were undernourished. There was no significant relationship between breakfast habits and nutritional status (p = 0.084), but physical activity showed a significant association with nutritional status (p = 0.043), confirmed by Fisher's Exact Test (p = 0.008). In conclusion, physical activity was significantly associated with nutritional status, while breakfast habits were not. Schools and parents should promote regular physical activity and healthy eating to support adolescent health and prevent overweight and obesity.

INTRODUCTION

The adolescent period is marked by rapid physical and developmental changes, making this age group more susceptible to nutritional issues if their dietary intake is inadequate. Their nutritional status is influenced by several factors, including breakfast habits and physical activity[1,2]. Breakfast is an essential meal that should contribute 15 to 30 percent of daily nutritional requirements. Skipping breakfast increases the likelihood of frequent snacking and poor appetite regulation, which can lead to overweight and obesity[3]. Moreover, an excessive energy intake without sufficient physical activity may result in weight gain. Changes in adolescent dietary patterns are often influenced by lifestyle transitions that involve high-calorie, high-fat, and high-cholesterol consumption, which are not balanced with adequate physical activity[4].

According to data from the World Health Organization (WHO), more than 1.9 billion adults aged ≥18 years were overweight, and over 600 million people worldwide were obese in 2020[5]. Based on the 2018 Indonesian Basic Health Research (Riskesdas), the prevalence of BMI-for-age among adolescents aged 13–15 years in Indonesia was 11.2% for overweight and 4.8% for obesity. In East Java Province, the prevalence was 13.3% for overweight and 6.02% for obesity, while in Gresik Regency, the rates were 17.24% and 5.67%, respectively. These findings indicate that the prevalence

of overweight and obesity among adolescents in Gresik is higher than both the national and provincial averages[6].

Poor breakfast habits and inadequate physical activity can significantly impact the nutritional status of adolescents[7,8]. Skipping breakfast may lead to decreased concentration, reduced academic performance, and increased consumption of unhealthy snacks throughout the day, contributing to excessive caloric intake and weight gain[9–11]. Furthermore, adolescents who are physically inactive tend to expend less energy, which, when combined with high energy intake, increases the risk of overweight and obesity[12–14]. These conditions not only affect physical appearance but also raise the risk of metabolic disorders such as insulin resistance, hypertension, and dyslipidemia in early life[15,16]. Therefore, consistent breakfast consumption and regular physical activity are crucial for maintaining optimal nutritional status and preventing chronic health issues later in life.

A preliminary survey conducted in November 2021 at UPT SMP Negeri 25 Gresik, involving 35 randomly selected students, showed that 28.57% were undernourished and 25.71% were overweight. Interviews with eighth-grade students revealed that most of those who skipped breakfast did so because they felt lazy or did not have enough time in the morning due to early school schedules. In addition, 85.7% of the adolescents reported engaging in light physical activity. These findings indicate a pattern of poor dietary behavior and low physical activity among students, which may influence their nutritional status. However, there is limited local evidence examining the relationship between breakfast habits, physical activity, and nutritional status among adolescents in Gresik. Therefore, this study aims to analyze the correlation between breakfast habits and physical activity with the nutritional status of adolescents at UPT SMP Negeri 25 Gresik.

MATERIALS AND METHODS

This study was an analytical observational research using a cross-sectional design, conducted at UPT SMP Negeri 25 Gresik from October 2021 to February 2022. Ethical approval was obtained from the Ethics Committee of the Health Polytechnic of the Ministry of Health Surabaya (Poltekkes Kemenkes Surabaya), ensuring that all research procedures met ethical standards, including informed consent and participant confidentiality. Research permission was also granted by the school authority.

The study population consisted of 219 eighth-grade students, from which 52 respondents were selected using a simple random sampling technique. Data were collected through direct interviews and anthropometric measurements, including height and weight, to assess nutritional status. Breakfast habits were measured using a structured questionnaire that had been previously tested for validity and reliability in a similar population. Physical activity levels were assessed using the Physical Activity Level (PAL) questionnaire, which was also validated prior to use. The collected data were

analyzed using univariate and bivariate analysis, and statistical testing was performed using the Chi-square test with SPSS software.

RESULT

Characteristics of Respondents by Age

Table 1 Age Frequency Distribution in UPT Students of SMP Negeri 25 Gresik

Usia	n	%
13 Years	27	51,9
14 Years	25	48,1
Total	**52**	**100**

Source : Primary Data, 2022

Based on Table 1, the majority of respondents were 13 years old, accounting for 27 students or 51.9% of the total sample. Meanwhile, 25 students, or 48.1%, were 14 years old. This indicates a relatively balanced distribution of age among the eighth-grade students at UPT SMP Negeri 25 Gresik, with a slight predominance of younger adolescents.

Characteristics of Respondents by Gender

Table 2 Distribution: FrequencyType Gender, in UPT Students of SMP Negeri 25 Gresik

Gender	n	%
Man	23	44,2
Woman	29	55,8
Total	**52**	**100**

Source : Primary Data, 2022

Table 2 shows that the majority of respondents were female, totaling 29 students or 55.8% of the sample. In comparison, 23 students, or 44.2%, were male. This indicates that female students slightly outnumbered male students among the participants in this study.

Breakfast Habits

Table 3 Distribution: Frequency of Sarapanj Habits in UPT Students of SMP Negeri 25 Gresik

Breakfast Habits	n	%
Good	39	75
Less	13	25
Total	**52**	**100**

Source : Primary Data, 2022

Table 3 shows that most respondents had good breakfast habits, with 39 students or 75% of the total sample falling into this category. Meanwhile, 13 students, or 25%, were categorized as having poor breakfast habits. This indicates that the majority of students regularly consumed breakfast as recommended.

Physical Activity

Table 4 Distribution of Frequency of Physical Activity in UPT Students of SMP Negeri 25 Gresik

Physical Activity	n	%
Light	47	90,4
Moderate	5	9,6
Total	**52**	**100**

Source : Primary Data, 2022

Table 4 indicates that the vast majority of respondents, totaling 47 students or 90.4%, engaged in light physical activity. Only 5 students, or 9.6%, reported engaging in moderate physical activity. These findings suggest that most students had low levels of physical activity in their daily routines.

Nutritional Status

Table *5* Distribution of Nutritional Status Frequency in UPT Students of SMP Negeri 25 Gresik

Nutritional Status	n	%
Underweight	8	15,4
Normal	21	40,4
Overweight	19	38,5
Obese	4	7,7
Total	**52**	**100**

Source : Primary Data, 2022

Table 5 shows that 21 respondents (40.4%) had normal nutritional status, making it the most common category. Meanwhile, 19 students (38.5%) were classified as overweight, 8 students (15.4%) as underweight, and 4 students (7.7%) as obese. These results indicate that nearly half of the students had excessive nutritional status (overweight or obese), which may reflect imbalanced dietary intake and low physical activity levels among the participants.

The Relationship of Breakfast Habits to Nutritional Status

Table 6 Cross-tabulation of Breakfast Habits and Nutritional Status in UPT Students of SMP Negeri 25 Gresik

Breakfast Habits	Nutritional Status								Total		P
	Underweight		Normal		Overweight		Obese				
	n	%	n	%	n	%	n	%	n	%	
Appropriate	6	15,4	18	46,2	14	35,9	1	2,6	39	100	0,084
Inappropriate	2	15,4	3	23,1	5	38,5	3	23,1	13	100	
Total	**8**	**15,4**	**21**	**40,4**	**19**	**36,5**	**4**	**7,7**	**52**	**100**	

Source : Primary Data, 2022

Table 6 presents the cross-tabulation between breakfast habits and nutritional status among the respondents. Among students with good breakfast habits, 46.2% had normal nutritional status, 35.9% were overweight, 15.4% were undernourished, and only 2.6% were obese. In contrast, among those with poor breakfast habits, 38.5% were overweight, 23.1% were obese, 23.1% had normal nutritional status, and 15.4% were undernourished. The chi-square test yielded a p-value of 0.084, indicating no statistically significant relationship between breakfast habits and nutritional status ($p > 0.05$). This suggests that breakfast habits alone may not be a determining factor in adolescents' nutritional status within this study population.

The Relationship of Physical Activity with Nutritional Status

Table 7 Cross-Tabulation of Physical Activity and Nutritional Status in UPT Students of SMP Negeri 25 Gresik with *Chi Square Test*

Physical Activity	Nutritional Status								Total		P
	Underweight		Normal		Overweight		Obese				
	n	%	n	%	n	%	n	%	n	%	
Light	8	17	16	34	19	40,4	4	8,5	47	100	0,043
Moderate	0	0	5	100	0	0	0	0	5	100	
Total	**8**	**15,4**	**21**	**40,4**	**19**	**36,5**	**4**	**7,7**	**52**	**100**	

Source : Primary Data, 2022

Table 7 shows the cross-tabulation between physical activity levels and nutritional status among the students. Among those who engaged in light physical activity, 40.4% were overweight, 34% had normal nutritional status, 17% were undernourished, and 8.5% were obese. In contrast, all students who engaged in moderate physical activity (100%) had normal nutritional status, with no cases of undernutrition, overweight, or obesity. The chi-square test resulted in a p-value of 0.043, indicating a statistically significant association between physical activity and nutritional status ($p < 0.05$). These findings suggest that higher levels of physical activity may be associated with healthier nutritional status among adolescents.

Table 8 Cross-Tabulation of Physical Activity and Nutritional Status in UPT Students of SMP Negeri 25 Gresik with *Fisher's Exact Test*

Physical Activity	Nutritional Status				Total		P
	Bad		Good				
	n	%	N	%	n	%	
Light	31	66	16	34	47	100	**0,008**
Moderate	0	0	5	100	5	100	
Total	**31**	**59,6**	**21**	**40,4**	**52**	**100**	

Source : Primary Data, 2022

Table 8 presents the cross-tabulation between physical activity and nutritional status, using Fisher's Exact Test due to the presence of empty cells in the chi-square analysis. Among students with light physical activity, 66% had poor nutritional status, while only 34% had good nutritional status. Conversely, all students with moderate physical activity (100%) had good nutritional status. The Fisher's Exact Test yielded a p-value of 0.008, indicating a statistically significant relationship between physical activity and nutritional status ($p < 0.05$). These results highlight that students who engage in higher levels of physical activity are more likely to maintain a healthy nutritional status.

DISCUSSION

Respondent Characteristics

Most of the respondents in this study were 13 years old (51.9%) and female (55.8%). Early adolescence is an important phase in rapid growth, which requires optimal nutritional support. This period is also characterized by hormonal and behavioral changes that affect diet and daily living habits, including physical activity[17]. Women during puberty generally experience a decrease in

physical activity due to changes in social and cultural preferences, which can indirectly affect their nutritional status[18].

Breakfast Habits and Their Unrelated Nutritional Status

Although most respondents had good breakfast habits (75%), the results of the statistical test showed that there was no significant relationship between breakfast habits and nutritional status (p=0.084). These findings indicate that breakfast as a single meal is not enough to represent the total daily energy and nutrient intake that affects nutritional status.

This is in line with the study of Chandramanda *et al.* (2021) which states that although breakfast is important, nutritional status is more influenced by the balance of daily total energy intake and expenditure. Some respondents may eat a healthy breakfast but still experience overnutrition due to a high-calorie lunch and night diet and low physical activity. In addition, this study did not assess the quality and nutritional content of breakfast specifically, so the possibility of high energy consumption at other mealtimes escaped analysis[19].

Another factor that may contribute to this imbalance is the habit of consuming high-calorie snacks and sugary drinks outside of the main mealtimes, which are common in adolescents and are not covered in the measurement of breakfast habits[20]. The intake of these snacks can contribute a significant proportion of energy that exceeds the contribution of breakfast to nutritional status.

From the point of view of energy balance theory, nutritional status is the result of the accumulation of intake and expenditure over a long period of time[21]. Breakfast is important to support cognitive function and keep metabolism stable in the morning, but if it is not balanced with a balanced diet throughout the day and adequate physical activity, then its contribution to nutritional status becomes limited[22].

These findings are important because they highlight that education about healthy breakfast is not enough to only emphasize the frequency or presence of breakfast, but also the quality of nutrients and the role of overall food intake in a single day. This is a special concern in the development of nutrition programs in schools.

Physical Activity and Its Relationship to Nutritional Status

In contrast to breakfast habits, physical activity showed a significant relationship with nutritional status (p=0.008 based on Fisher's exact test). Most of the respondents with over-nutrition status and obesity had light physical activity. These results are in line with a study by Dimas *et al.* (2023) which states that low physical activity contributes to an increased risk of overweight among adolescents[23].

The decline in physical activity in adolescents, especially due to the increased use of gadgets and the dominance of sedentary activities such as playing games and watching TV, are key factors

that increase the risk of excess energy[24]. In fact, based on the recommendations of WHO (2020), adolescents are advised to do moderate to heavy physical activity for at least 60 minutes per day.

Furthermore, physical activity not only affects energy expenditure, but also has a role in regulating appetite, insulin sensitivity, and body composition[25]. Thus, effective nutritional interventions must involve aspects of increasing physical activity, not just regulating diet.

Based on the results of this study, it is important for schools to develop integrated nutrition intervention programs that combine healthy breakfast education with the promotion of physical activity. Counseling involving nutritionists, teachers, and parents can be directed to raise awareness of the importance of nutritional quality and balance throughout the day, not just at breakfast time. Activities such as morning gymnastics, inter-class sports competitions, and the provision of sports facilities can be concrete steps to encourage optimal physical activity.

The healthy canteen program also needs to be aligned so that it not only provides breakfast, but also nutritious healthy snacks and low-sugar drinks. Periodic monitoring and evaluation of students' nutritional status through anthropometric measurements and eating behavior surveys can be carried out every semester for early detection of the risk of overnutrition.

Research Limitations and Potential Bias

This research has several limitations that need to be considered. First, relatively small sample sizes (n=52) may limit the statistical power to detect significant associations, especially on breakfast habit variables. Second, the use of self-report questionnaires to measure breakfast and physical activity habits has the potential to cause social desirability bias, especially since adolescents may report habits that are considered more positive.

In addition, the categorization of breakfast habits only based on frequency without assessing the quality of nutrients is also a limitation in assessing the relationship to nutritional status holistically. Follow-up research should use the 24-hour recall method or food record to obtain more accurate data on daily intake and breakfast quality.

This study reinforces the evidence that physical activity has a significant relationship with adolescent nutritional status, while breakfast habits have not shown a statistically significant relationship. These findings point to the need for a comprehensive nutrition intervention, not only focusing on breakfast, but also integrating approaches to increasing physical activity and monitoring of eating throughout the day. With the prevalence of overnutrition status and obesity higher than the national rate, health promotion programs in schools are a top priority in efforts to prevent adolescent obesity.

CONCLUSION

This study showed that 75% (39 out of 52) of students had good breakfast habits and 90.4% (47 out of 52) engaged in light physical activity. Nutritional status data revealed that 46.2% (23 students) were overweight or obese. There was no significant relationship between breakfast habits and nutritional status (p = 0.084), while a significant association was found between physical activity and nutritional status (p = 0.008). These findings indicate that physical activity plays a more influential role in adolescent nutritional status than breakfast habits. Therefore, schools and parents are encouraged to promote regular physical activity alongside healthy eating to help prevent overweight and obesity in adolescents.

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