

Physical Activity Level as a Factor Associated with the Nutritional Status of Adolescents at MTs Nurul Islam, Kediri City

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ABSTRACT

Adolescents are an age group vulnerable to nutritional status issues resulting from an imbalance between energy intake and energy expenditure. Physical activity is one of the factors influencing nutritional status. Low levels of physical activity combined with sedentary behavior can disrupt energy balance, thereby increasing the risk of nutritional problems among adolescents. This study aimed to analyze the relationship between physical activity and nutritional status among adolescents at MTs Nurul Islam, Kediri City. A quantitative method with an observational analytic design and a cross-sectional approach was employed. The study sample consisted of 101 adolescents selected using a stratified proportional random sampling technique. Physical activity was measured using the Physical Activity Questionnaire for Adolescents (PAQ-A), while nutritional status was determined based on Body Mass Index (BMI). Data analysis was performed using the Spearman Rank correlation test. The majority of respondents (n=50; 49.5%) fell into the moderate physical activity category, while the largest group regarding nutritional status (n=55; 54.5%) fell into the underweight category. The analysis results indicated a significant relationship between physical activity and nutritional status among adolescents at MTs Nurul Islam, Kediri City ($p=0.007$; $r=0.268$). Physical activity is significantly associated with adolescent nutritional status. These findings demonstrate that physical activity is a factor linked to nutritional status; therefore, it needs to be enhanced through promotive and preventive efforts within the school environment to support optimal nutritional status.

Key words: Adolescents, Body Mass Index, Nutritional Status, PAQ-A, Physical Activity.

INTRODUCTION

Adolescence is a crucial transitional phase in the human life cycle, characterized by rapid physical growth, cognitive development, and behavioral and hormonal changes. Optimal nutrition serves as a vital foundation for adolescents to engage in activities, concentrate on learning, maintain their health, and prevent the onset of non-communicable diseases later in life (Ballarin et al., 2023).

Adolescent nutritional status remains a public health challenge across many countries. (World Health Organization, 2024) reports that over 390 million children and adolescents aged 5–19 are overweight, with approximately 160 million classified as obese. The 2023 Indonesian Health Survey (SKI) also indicates that adolescents continue to face the double burden of malnutrition characterized by the coexistence of undernutrition and a rising prevalence of overweight and obesity. These conditions highlight the need for continued attention to improving adolescent nutritional status by addressing the various influencing factors, one of which is physical activity.

Nutritional status is a key indicator for assessing adolescent health. It is determined by the balance between nutrient intake and energy expenditure through physical activity. An imbalance between these components can lead to nutritional issues ranging from undernutrition to overnutrition which ultimately impact adolescent growth, development, and overall health (Sardi et al., 2025).

Physical activity is a factor closely linked to adolescent nutritional status. Low levels of physical activity result in reduced energy expenditure, potentially disrupting the body's energy balance. If this state persists over an extended period without being balanced by a healthy lifestyle, it can increase the risk of nutritional problems among adolescents (Ashar et al., 2025). Furthermore, physical activity and energy intake are interconnected determinants of nutritional status a longterm imbalance between the two can lead to nutritional issues in adolescents (Anisa et al., n.d.).

Physical activity plays a crucial role in maintaining the body's energy balance, as it is linked to energy expenditure, physical fitness, metabolism, and the maintenance of muscle and bone function (Rifqi et al., 2024). High-quality nutritional intake balanced with adequate physical activity can help maintain an ideal body weight and support overall physical health (Rukmana et al., 2020). However, shifts in adolescent lifestyles characterized by rising sedentary behaviors such as smartphone use, social media engagement, online gaming, and prolonged sitting during study lead to reduced energy expenditure, potentially increasing the risk of nutritional status issues (Fajria et al., 2024). This is supported by studies indicating that low levels of physical activity are associated with an increased risk of nutritional status problems among adolescents (Firmansyah & Kaharina, 2025; Oktaviani et al., 2023).

Research has demonstrated that physical activity is a key factor linked to adolescent nutritional status. A study by Larasati et al. (2021) explains that physical activity plays a role in maintaining energy balance and a healthy body weight. Research by Putri et al. (2024) also shows a significant association between physical activity and the nutritional status of madrasah tsanawiyah Islamic junior high school students. Furthermore, Nurjanah et al. (2025) state that increased sedentary behavior leads to decreased energy expenditure, thereby raising the risk of nutritional status issues among adolescents.

Data from school-based School Health Unit (UKS) activities and preliminary study results indicate low levels of physical activity and physical fitness. This situation has the potential to affect the nutritional status of adolescents. Therefore, research examining the relationship between physical activity and the nutritional status of adolescents at MTs Nurul Islam, Kediri City, is crucial for establishing a foundation to develop nutrition education and physical activity promotion programs within the school. The study's findings are expected to make a scientific contribution and serve as a basis for schools, parents, and health professionals to design more effective and sustainable nutrition education and physical activity promotion programs.

METHODS

This study employed a quantitative method with an observational analytic design using a cross-sectional approach. It aimed to analyze the relationship between physical activity and nutritional status among adolescents at MTs Nurul Islam, Kediri City. The study population consisted of all 132 students at MTs Nurul Islam, Kediri City. A sample of 101 students was selected using the stratified proportional random sampling technique. This study received ethical approval from the Health Research Ethics Committee of Universitas STRADA Indonesia Ethical Approval Number: 0423416/EC/KEPK/1/03/2026.

Physical activity was assessed using the Physical Activity Questionnaire for Adolescents (PAQ-A), which consists of nine items. The physical activity score was calculated as the mean score of items 1–8, while item 9 was excluded from the scoring. Based on the mean score, physical activity was classified into four categories: very low (1.00–1.99), low (2.00–2.99), moderate (3.00–3.99), and high (4.00–5.00). Nutritional status was determined by measuring body weight and height to calculate Body Mass Index (BMI) and was subsequently classified as underweight, normal weight, overweight, and obese according to the Indonesian Ministry of Health guidelines. Data were analyzed using Spearman's rank correlation test with a significance level of $\alpha = 0.05$.

RESULTS AND DISCUSSION

Table 1 : Frequency Distribution of Respondent Characteristics

Age	Frequency	%
13 Years	8	7.9
14 Years	47	46.5
15 Years	31	30.7
16 Years	15	14.9
Total	101	100.0
Jenis Kelamin		
Laki-laki	61	60.4
Perempuan	40	39.6
Total	101	100.00
VII A	18	17.8
VIII A	22	21.8
VIII B	14	13.8
VIII C	14	13.9
IX A	17	16.8
IX B	16	15.8
Total	101	100.0

Table 1 shows that the majority of respondents were 14 years old (46.5%) and male (60.4%). By class, the largest number of respondents came from class VIII A (21.8%), while the fewest came from classes VIII B and VIII C (13.9%).

Table 2 : Frequency and Percentage Distribution of Respondents Physical Activity

Aktivitas Fisik	Frekuensi (F)	Presentase %
Sangat rendah	8	7.9
Rendah	39	38.6
Sedang	50	49.5
Tinggi	4	4.0
Total	101	100.0

Table 2 shows that the majority of respondents engaged in a moderate level of physical activity (49.5%), whereas the smallest proportion fell into the high category (4.0%).

Table 3 : Spearman Rank Correlation Test Results for Physical Activity

Indikator

Variabel	Correlation Coefficient	N	p-value
Aktivitas Fisik dengan Status Gizi (IMT)	0,268	101	0,007

The Spearman rank correlation test results show a correlation coefficient of 0.268 and a p-value of 0.007. A p-value of < 0.05 indicates that there is a relationship between physical activity and nutritional status (BMI).

DISCUSSION

The study results indicate that the largest group of respondents (50 individuals, or 49.5%) engaged in a moderate level of physical activity. Spearman Rank correlation analysis revealed a significant relationship between physical activity and nutritional status among adolescents at MTs Nurul Islam, Kediri City ($p=0.007$; $r=0.268$). The positive correlation coefficient suggests that higher levels of physical activity among adolescents are associated with a tendency toward better nutritional status. Regarding respondent characteristics, the majority of adolescents engaged in moderate physical activity and fell into the underweight category; thus, increasing physical activity has the potential to support the attainment of a nutritional status closer to normal.

This relationship can be explained by energy balance theory, wherein physical activity is a key determinant of the body's energy expenditure. Regular physical activity helps optimize metabolism, enhances muscle and tissue function, and supports nutrient utilization, thereby playing a role in maintaining normal nutritional status. Furthermore, physical activity contributes to maintaining energy balance, improving physical fitness, and sustaining an ideal body weight (Sukma et al., 2022).

These findings align with the study by Nisa & Sari (2025), which states that low physical activity and increased sedentary behavior contribute to various nutritional status issues among adolescents. This consistency in results demonstrates that physical activity is a significant factor in maintaining the nutritional status of adolescents.

A correlation coefficient of 0.268 indicates that the relationship between physical activity and nutritional status is relatively weak. This suggests that adolescent nutritional status is influenced not only by physical activity but also by other factors such as diet, health conditions, family environment, and socioeconomic status. Therefore, efforts to improve adolescent nutritional status need to be comprehensive, taking into account the various factors that influence it.

The study results indicate that increasing physical activity should be a key focus of school-based health promotion programs. Through regular sports activities and the fostering of an active lifestyle, schools can play a role in helping adolescents achieve better nutritional status. These findings are intended to serve as a reference for schools and health professionals when designing health promotion and prevention programs that support adolescent health.

CONCLUSION

This study demonstrates a significant relationship between physical activity and nutritional status among adolescents at MTs Nurul Islam, Kediri City. The majority of respondents engaged in moderate levels of physical activity, and Spearman Rank test results revealed a positive correlation between physical activity and nutritional status. These findings indicate that increased physical activity is associated with a tendency toward better nutritional status

among adolescents. Therefore, efforts to promote physical activity through school-based health programs should be further developed as a strategy to support the achievement of optimal nutritional status. Future research is recommended to involve a larger sample size, expand the study locations, and incorporate additional variables that may influence adolescent nutritional status, thereby providing a more comprehensive overview.

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