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The Relationship Between Physical Activity in Physical Education and Student Academic Achievement

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Keywords

Physical Activity; Academic Achievement; Students; Correlation

Abstract

This study aims to investigate the correlation between physical activity in the context of physical education and students' academic performance. The methodological framework used is a quantitative correlational and cross-sectional design. The study was conducted from April 15 to May 15, 2025, involving 187 participants from elementary, middle, and high schools spread across six educational institutions in North Sumatra. The sampling methodology employed purposive sampling, targeting students actively engaged in physical education (PJOK) and willing to complete an online questionnaire. The study utilized a questionnaire derived from the Global Physical Activity Questionnaire (GPAQ). This instrument assesses the prevalence and duration of physical activity, sedentary behavior, and students' perceptions of the importance of physical activity. Students' academic performance was measured using the average scores from their final semester reports. Data analysis was conducted using descriptive statistics alongside Pearson's correlation test. The study findings revealed a Sig. (2-tailed) value of 0.001, which is less than the 0.05 threshold, indicating a statistically significant correlation between the Physical Activity (X) and Academic Performance (Y) variables. These results suggest that consistent engagement in physical activity has the potential to enhance cognitive function and promote academic success among students. Consequently, the integration of physical activity plays a crucial role in promoting the holistic development of students' academic abilities and overall health.

INTRODUCTION

In today's digital age, technological developments have changed people's lifestyles to be fast-paced and instantaneous. This has led to a decline in physical activity, especially among children and adolescents. A sedentary lifestyle has become the norm, and if not balanced with adequate physical activity, it has the potential to reduce the physical and mental health of the younger generation. In this context, physical activity is a crucial foundation in shaping a healthy, resilient, and character-driven generation. Physical Education, Sports, and Health (PJOK) plays a strategic role in fostering students' awareness of the importance of active movement and a healthy lifestyle. PJOK is not merely about learning physical movements but also encompasses cognitive, emotional, and social aspects that contribute to the holistic development of students. This aligns with the Republic of Indonesia's Law No. 20 of 2003 on the National Education System, which emphasizes the importance of education in shaping individuals who are physically and mentally healthy, independent, and of noble character.

Various studies show that regular participation in physical activities can improve cognitive functions, including concentration, memory, and problem-solving abilities. Students who engage in regular physical activities demonstrate a 30% higher concentration level compared to their less active peers (Sidik et al., 2024). This is supported by findings stating that physical fitness contributes approximately 41.8% to student performance, highlighting its importance in educational settings (Ramayandi et al., 2022). Physical activity increases blood flow and oxygen to the brain, aiding learning processes and stress management.

However, the implementation of physical education in schools still faces various challenges. Limited facilities, restricted time allocation, and monotonous teaching methods pose challenges in optimizing the benefits of physical education. The WHO (2020) recommends a minimum of 60 minutes of physical activity per day for children and adolescents, yet many schools in Indonesia only provide one hour of physical education per week (Harliawan, 2024), far below the recommended standard.

On the other hand, physical activity not only contributes to physical fitness but also enhances social skills such as cooperation, leadership, and communication, all of which play a crucial role in supporting academic success. Several meta-analyses also indicate that moderate to high-intensity physical activity significantly influences academic performance, particularly in subjects like mathematics (Xiang, Wang, 2022; Anindito, Nabillah, 2023).

Although the positive correlation between physical activity and academic achievement has been widely reported, there remains a gap in research regarding the extent to which variations in the frequency and duration of physical activity in physical education classes influence academic achievement across different educational levels. Therefore, this study is important to analyze the relationship between physical activity in physical education learning and students' academic achievement to provide strategic recommendations for schools in developing more effective and comprehensive learning approaches.

METHODS

This study used a correlational quantitative approach with a cross-sectional design. This design was chosen to determine the relationship between physical activity in physical education (independent variable) and student academic achievement (dependent variable) at a single measurement point without intervention. This approach was considered appropriate because it could explain the pattern of relationships between variables based on data collected directly from respondents. The population in this study consists of all elementary and secondary school students participating in physical education classes at several schools in North Sumatra. Purposive sampling was used to determine the sample with the following inclusion criteria: Students actively participating in physical education classes, aged between 10 and 17 years old, willing to complete the questionnaire honestly and in full. The study was conducted from April 15 to May 15, 2025, with a total of 187 students from six schools.

Table 1. Sample

Male	Female	Total
88	99	187

Data was collected using a questionnaire developed by Lee et al. (2011). The IPAQ (International Physical Activity Questionnaire) and academic records were used to collect information. As noted by Lee et al. (2011), the IPAQ was introduced by specialists in 1998 for research on physical activity, developed in accordance with international standards. Based on the Global Physical Activity Questionnaire (GPAQ), which has been adapted to the context of students in Indonesia. This instrument measures the frequency and duration of vigorous and moderate physical activity, sedentary behavior (sitting/using gadgets/studying), students' perceptions of the importance of physical activity, and the average report card grades of students as indicators of academic achievement. The questionnaire consists of 12 questions with a ratio and Likert scale (1-5). The validity was tested by three physical education experts, and the reliability was tested using Cronbach's Alpha with a result of 0.82, indicating that the elements are reliable.

Table 2. IPAQ Norm

Category	METs(minutes/week)
Heavy	≥ 3000
Medium	≥ 600
Light	< 6-00

Source: Lee, et al. (2011)

The information obtained from the IPAQ questionnaire was carefully examined and categorized based on MetS (Metabolic Equivalents). As shown in Table 1, the IPAQ norms were classified into three different categories: heavy, moderate, and light. The heavy category requires individuals to engage in physical activity exceeding ≥ 3000 minutes per week. Next, the moderate category includes those who participate in ≥ 600 minutes per week. Finally, the light category refers to those who are active for less than 600 minutes per week. Meanwhile, student performance levels can be seen from the report scores. Below are the norms used for analyzing the collected data.

Table 3. Norms for categorizing learning achievement

Category	Mark
Very Good	≥ 90
Good	76 – 89
Enough	61 – 75
Poor	≤ 60

Source: Leppink, (2020)

The information obtained from the IPAQ questionnaire was carefully examined and categorized based on MetS (Metabolic Equivalents). As shown in Table 1, the IPAQ norms were classified into three different categories: heavy, moderate, and light. The heavy category requires individuals to engage in physical activity exceeding ≥ 3000 minutes per week. Next, the moderate category includes those who participate in ≥ 600 minutes per week. Finally, the light category refers to those who are active for less than 600 minutes per week. Meanwhile, student performance levels can be seen from the report scores. Below are the norms used for analyzing the collected data.

RESULTS AND DISCUSSION

Result

The purpose of this study was to determine the relationship between physical activity in physical education classes and students' academic achievement. The following table illustrates the data. The findings in Table 4 show that the majority of students (178 or 95.2%) were classified as engaging in light physical activity. Only a small proportion of students (9 or 4.8%) were classified as engaging in moderate physical activity, and none (0%) were classified as engaging in vigorous physical activity. This reflects a low level of physical engagement in the daily lives of students.

Table 4. Physical Activity Data

Category	N	Percentage
Heavy	0	0%
Medium	9	4.8%
Light	178	95.2%
Total	187	100%

Table 5. Academic Achievement Data

Category	N	Percentage
Very Good	24	12.8%
Good	139	74.3%
Enough	4	2.1%
Poor	20	10.7%
Total	187	100%

Based on Table 5, most students (139 or 74.3%) had academic achievements in the "Good" category. Meanwhile, 24 students (12.8%) had "Very Good" achievements, and only a small number of students were in the 'Fair' (4 students, 2.1%) and "Poor" (20 students, 10.7%) categories.

Table 6. Correlation Test

Physical Activity	Sig.	Description
Academic Achievement	< 0,001	Significant

The Pearson correlation test results showed a significance value (2-tailed) of 0.001, which is below the threshold of 0.05. Thus, there is a statistically significant relationship between physical activity and student academic achievement. These findings indicate that the level of physical activity has a positive correlation with academic achievement.

Discussion

The cognitive benefits of physical activity improve cognitive functions such as memory, attention, and problem-solving skills, which are crucial for academic success (Mirzabdullayevich, 2024). Regular engagement in physical activity promotes positive psychophysiological changes, thereby enhancing overall mental performance and academic motivation (Mirzabdullayevich, 2024). Creative learning that incorporates physical activity into educational practices can stimulate creative thinking and interpersonal relationships among students, further enriching the learning experience (Hidalgo-Villamil & Bran-Cepeda, 2024). The integration of physical activity into the curriculum is often overlooked, yet it can significantly contribute to the acquisition of interdisciplinary knowledge (Hidalgo-Villamil & Bran-Cepeda, 2024). While the benefits of physical activity in educational settings are clear, some argue that an emphasis on academic performance may overshadow the importance of physical education, potentially leading to neglect of students' holistic development.

Studies consistently show that male students tend to engage in higher levels of physical activity compared to their female peers. This disparity is crucial for understanding the implications for health and academic performance among students. Gender differences in physical activity levels Male students generally report higher levels of physical activity than female students, as evidenced by various studies using the IPAQ. For example, one study found that a significant percentage of female students did not engage in any physical activity, compared to a lower percentage of males (Moscatelli et al., 2023). In another study, male students achieved higher scores in physical activity assessments across various variables, indicating a consistent trend of greater engagement in physical activity (Mulahasanovic et al., 2022).

The distribution of physical activity shows that the majority of students fall into the light physical activity category, with only a small proportion engaging in moderate activity. Previous studies have shown varying levels of physical activity among students, with some reporting higher engage-

ment in moderate to vigorous activity, particularly during non-pandemic periods (Romadhoni et al., 2022; Nurhasan et al., 2020). An overview of academic performance from academic performance data shows that most students achieve good grades, while only a few fall into the lower achievement category.

Research supports the idea that physical fitness can enhance cognitive function, potentially leading to better academic outcomes. Insights into the significant correlation between physical activity and academic performance suggest that promoting physical activity can be beneficial for students' educational outcomes. However, it is important to consider that other factors, such as study habits and socioeconomic status, may also influence academic success, indicating a complex relationship between physical activity and academic achievement.

The relationship between physical activity and student academic achievement is a diverse topic supported by various studies. Overall, evidence suggests a positive correlation between physical activity and academic performance (Loturco et al., 2022; Zhang et al., 2024), although some studies show nuanced results based on demographic factors and the type of physical activity performed.

Positive correlation with academic achievement: General findings from several studies indicate that increased physical activity correlates with higher academic achievement. For example, a study involving 214,808 adolescents found that those engaged in vigorous physical activity daily reported better academic performance (Zhang et al., 2024). Evidence from elementary schools An experimental study showed that sixth-grade students who participated in daily running significantly improved their academic scores across all subjects, highlighting the direct benefits of physical activity on learning outcomes (Zhang et al., 2024).

CONCLUSION

Based on the results of the research and discussion, it can be concluded that there is a significant relationship between physical activity and academic achievement. This finding emphasizes the importance of implementing physical activity programs in educational settings as a strategy to support student academic achievement.

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