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Relationship between Physical Activity and Fitness Levels of Male Students

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ABSTRACT

Fitness is a measure of physical ability to perform various daily physical activities without fatigue. Physical activity is a fundamental component influencing an individual level of fitness, particularly among medical students who face high academic workloads that may lead to sedentary lifestyles. Physical activity is a complex behavioural process that involves the development and internalization of skills, values, and self-perceptions. This study aimed to examine the relationship between physical activity levels and physical fitness among male pre-clinical students of the Faculty of Medicine, Pasundan University. A cross-sectional design was used in this study. The purposive sampling was administered for the sample selection. The sample involved 50 male respondents. The International Physical Activity Questionnaire - Long Form (IPAQ-LF) assessed physical activity levels, while the Cooper 12-Minute Run Test measured physical fitness (VO2max). Data were analysed by using the Spearman correlation test. The results showed that most participants had high (54%) and moderate (42%) physical activity levels, whereas 44% were categorized as having low fitness levels. A significant positive correlation was found between physical activity and fitness levels ($r = 0.413$; $p = 0.003$). This finding suggests that higher physical activity correlates with better physical fitness among medical students.

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INTRODUCTION

Over the past few years, public awareness of health has increased significantly (Sulaiman, 2022). However, there remains a tendency for this attention to focus more on general health than on physical fitness (Dlis et al., 2020). Furthermore, public health conditions and changes in physical activity patterns following the pandemic have also influenced exercise participations and individual fitness levels (Pertiwi et al., 2022). Previous studies emphasize that, while individuals who are physically fit are undoubtedly healthy, being healthy does not necessarily imply physical fitness (Octova et al., 2023). Additionally, regular physical activity significantly contributes to maintaining overall health, particularly metabolic and cardiovascular functions (Wicaksono & Handoko, 2020). A comprehensive physical fitness education can assist individuals in achieving optimal levels of fitness (Lengkana & Muhtar, 2021). Unfortunately, the physical fitness of adolescents and young adults often receives little attention. Limited access to qualified instructors and inadequate sport facilities are among the contributing factors that reduce interest in improving physical fitness (Prabowo et al., 2022).

Physical fitness is closely related to an individual physical activity level (Adhianto & Arief, 2023). Physical activity is a complex behavioural process that involves the development and internalization of skills, values, and self-perceptions (Batista et al., 2016). Regular physical activity is effective for the primary and secondary prevention of various chronic diseases (Farinola & Bazán, 2011). The frequency and intensity of such activities play a vital role in reducing the risk of non-communicable diseases, morbidity, and premature mortality (Maselli et al., 2018). Exercise, as a form of physical activity, serves as one of the most effective strategies to maintain physical health (Rohmah & Muhammad, 2021). According to the World Health Organization (2022), adults should engage in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week, complemented by muscle-strengthening activities twice weekly. Individuals with higher activity levels generally demonstrate better Maximal Oxygen Consumption (VO2max) values (Anggraeni et al., 2025). Systematic monitoring of physical activity is necessary to ensure the adequacy of exercise intensity and duration so that the activities performed effectively support improvements in physical fitness (Kusumo, 2020).

Among university students, physical activity also plays an essential role in supporting academic performance and well-being. Knowledge and attitude toward physical fitness have been shown to influence the level of fitness (Thibri et al., 2014). Students with better understanding and positive attitudes about physical fitness tend to demonstrate higher levels of physical fitness (Maksum et al., 2022). Integrating knowledge and positive attitudes toward exercise can increase physical fitness levels by 60–70%, while deficiencies in either variable reduce effectiveness by up to 50% (Ailina, 2018). Broader understanding of the benefits of regular exercise can therefore motivate individuals to engage in consistent physical activity, leading to sustained improvements in physical fitness (Septiana, 2019).

High levels of physical fitness are especially crucial among medical students who are expected to possess both theoretical knowledge and practical readiness in providing emergency or life-saving assistance (Rusni et al., 2023). However, studies indicate that medical students often exhibit relatively low physical fitness levels. Socioeconomic factors also appear to influence this condition. Students from higher socioeconomic backgrounds tend to engage in more frequent physical activity (Lindgren et al., 2016). While medical students understand the importance of exercise for preventive health (Kour et al., 2024), their demanding academic workloads often result in sedentary behaviour (Sahlqvist et al., 2022).

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Considering these findings, this research focused on exploring the relationship between physical activity and physical fitness of male pre-clinical medical students at the Faculty of Medicine, Universitas Pasundan. The study aimed to provide evidence supporting the role of physical activity in maintaining physical fitness within the academic context of medical education, aligning with the faculty mission to promote preventive and promotive health efforts.

METHODS

This study employed a quantitative analytic observational design with a cross-sectional approach. The cross-sectional design allows data collection at a single point in time to analyse the relationship between physical activity and physical fitness among pre-clinical medical students at the Faculty of Medicine, Universitas Pasundan (FK UNPAS). This design is suitable for identifying associations between variables without experimental manipulation.

Participants

The study population consisted of 200 pre-clinical students at FK UNPAS. Participants were selected by using a non-probability purposive sampling technique, targeting individuals who met the predetermined inclusion and exclusion criteria. Based on the correlational sample size estimation using Fisher's Z transformation, a minimum of 40 participants was required.

$$[\frac{Z_\alpha + Z_\beta}{0.5\ln(\frac{1+r}{1-r})}]^2 + 3$$

$$n = [\frac{1.96 + 0.846}{0.5\ln(\frac{1+0.429}{1-0.429})}]^2 + 3$$

$$n = 40.42603$$

To anticipate possible dropouts or incomplete data, an additional 10% was added, resulting in: n=44",rounded up to " 45. Therefore, a total of 50 participants were recruited to reduce the potential bias and to ensure adequate statistical power.

Sampling Procedures

Inclusion criteria included active male medical students who were healthy, well-rested, and willing to participate voluntarily. Students who were ill or injured at the time of testing were excluded. All participants provided informed consent prior to the data collection and ethical clearance was obtained from the FK UNPAS Research Ethics Committee.

Materials and Apparatus

Two validated instruments were used to collect primary data. International Physical Activity Questionnaire–Long Form (IPAQ-LF), this standardized questionnaire measures physical activity across four domains, including occupational, transportation, household, and leisure. Results are reported in MET-minutes per week and categorized into low, moderate, or high levels. The IPAQ-LF has demonstrated high validity and reliability for assessing adult populations (Edelmann et al., 2022). The Cooper Test assesses aerobic capacity by measuring the total distance covered within 12 minutes. The resulting distance is converted into an estimated Maximal Oxygen Consumption (VO2max) (ml/kg/min), reflecting an individual aerobic endurance. Higher VO2max values indicate better cardiorespiratory fitness.

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Data collection was conducted at FK UNPAS in September 2025 under controlled environmental conditions. Each participant completed the IPAQ-LF and subsequently performed the Cooper Test on the university athletic field, supervised by trained observers.

Design or Data Analysis

Descriptive statistics were used to summarize the participant demographic characteristics and physical fitness outcomes. To determine the relationship between physical activity and physical fitness, a Spearman rank correlation test was performed, as it is suitable for ordinal and non-parametric data. Statistical significance was determined at $p < 0.05$ and all analyses were conducted by using SPSS version 25.

RESULTS

The research findings are summarized in Table 1 to Table 4.

Table 1. Participant Characteristics

Age (years)	n	%
17	6	12
18	13	26
19	7	14
20	10	20
21	5	10
22	7	14
23	1	2
24	1	2
Total	**50**	**100**

The participants were predominantly aged 18 years (26%), followed by those aged 20 years (20%). Most respondents were first-year students (46%), indicating high participation from new medical students actively involved in campus activities.

Table 2. Physical Activity Levels (MET-minutes/week)

Category	Frequency	%
Low (<600)	2	4
Moderate (600–3000)	21	42
High (>3000)	27	54
Total	**50**	**100**

The MET analysis indicated that most students (54%) were classified in the high physical activity category (>3000 MET-min/week), while 42% were in the moderate category and 4% were in the low category. These findings suggest that most pre-clinical students at FK UNPAS maintained active physical routines.

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Table 3. Physical Fitness Levels (VO_2max Categories)

Category	n	%
Excellent (>2.80 km)	0	0
Good (2.40–2.80 km)	4	8
Fair (2.00–2.39 km)	7	14
Poor (1.61–1.99 km)	22	44
Very Poor (<1.61 km)	17	34
Total	**50**	**100**

Based on the Cooper Test results, most respondents were categorized as poor (44%) and very poor (34%) in physical fitness. Only 8% achieved good category and 14% achieved fair category. None reached the excellent level, indicating that despite high physical activity levels, overall fitness outcomes remained suboptimal.

Table 4. Correlation between Physical Activity and Physical Fitness

Variable	r	p-value
Physical Activity – Physical Fitness	0.413	0.003

The Spearman correlation analysis showed a coefficient of r = 0.413 with a significance level of p = 0.003 (p < 0.05), indicating a moderate positive correlation between physical activity and physical fitness. This suggests that higher physical activity levels are significantly associated with better fitness performance among medical students.

DISCUSSION

The findings of this study reveal that most pre-clinical medical students at Universitas Pasundan demonstrated high levels of physical activity, while their physical fitness levels remained predominantly in the low category. This pattern suggests that engaging in frequent physical activity alone does not necessarily translate into improved fitness outcomes unless supported by other contributing factors such as nutrition, rest, body composition, and lifestyle habits (Rizqillah, 2024). The correlation analysis further confirmed a moderate positive relationship (r = 0.413; p = 0.003) between physical activity and physical fitness, indicating that higher physical activity is associated with better aerobic capacity as reflected in VO_2max scores. These findings align with those of Adhianto and Arief (2023), who demonstrated that regular physical activity significantly contributes to improved cardiorespiratory endurance among students.

A considerable proportion of participants reported engaging in moderate to vigorous intensity activity for 1–5 days per week, showing that students remained physically active despite academic demands (Edelmann et al., 2022). Moderate-intensity activities, including routine movement indoors and outdoors, were the most frequently reported activities, typically performed 3–5 days per week. Such activities likely represent a daily functional movement rather than structured exercise sessions (Maselli et al., 2018). In contrast, light activities, such as walking, were performed more than five days per week, becoming the most

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common form of movement due to their accessibility and time efficiency (Anggraeni et al., 2025). However, light activity provides limited impacts on enhancing cardiorespiratory endurance compared to moderate or vigorous exercise (Martini et al., 2017).

These findings correspond with World Health Organization (2020) recommendations that adults should engage in at least 150–300 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity weekly to maintain health and physical fitness. While most respondents in this study met these recommendations in terms of frequency, their fitness levels were still suboptimal. This discrepancy emphasizes that frequency alone is insufficient. Intensity, duration, and progression are equally critical to achieving optimal physiological adaptations (Ailina, 2018; Kurniawan et al., 2025). The official ACSM guidelines also emphasize that aerobic training and muscle-strengthening exercises are the primary components required to achieve optimal improvements in physical fitness (American College of Sports Medicine, 2022). Physiologically, consistent physical training increases lung capacity, cardiac output, and muscular oxygen utilization efficiency, leading to higher VO_2max values (Anggriawan, 2015; Martini et al., 2017).

Despite adequate activity frequency, many students may not perform exercise with sufficient intensity or regularity to stimulate endurance adaptation. This explains the low to moderate correlation observed between activity and fitness. Similar patterns have been observed in previous studies, where irregular exercise programs and unstructured activity patterns produced insignificant improvements in aerobic performance (Larasati et al., 2021). Furthermore, external factors such as inadequate sleep, irregular eating habits, sedentary behaviour, and academic stress may contribute to reduced fitness outcomes (Rusni et al., 2023; Yusup & Rochmani, 2021). The demanding curriculum of medical education often limits student time for recovery, which is crucial for physiological improvement following physical exertion (Kour et al., 2024).

Overall, the results of this study reinforce the hypothesis that physical activity positively correlates with physical fitness among medical students. However, the relationship remained moderate, implying the need for structured, progressive, and sustainable exercise programs within the academic environment to optimize health and functional performance. Integrating targeted fitness initiatives into the medical curriculum, such as aerobic endurance sessions and health promotion activities, may help improve student fitness levels and serve as a practical model for preventive health behaviours in the future healthcare professionals (Sahlqvist et al., 2022; Rusni et al., 2023).

CONCLUSION

This study concludes that there is a significant positive relationship between the level of physical activity and physical fitness among pre-clinical male medical students at the Faculty of Medicine, Universitas Pasundan. Although most respondents demonstrated high levels of physical activity, the majority still exhibited low physical fitness, indicating that frequent activity alone does not necessarily ensure optimal fitness without sufficient intensity, duration, and consistency. The statistical analysis confirmed that higher levels of physical activity are associated with better physical fitness outcomes. These findings highlight the essential role of structured and consistent physical exercise programs in improving the student physical fitness. Therefore, efforts to promote well-planned and sustainable physical activity routines both within and outside the academic environments are crucial to enhance overall health and achieve optimal levels of physical performance.

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AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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