

**The Relationship Between Physical Activity Levels and Physical Fitness in
Students at Junior High School 2 Ciwidey****Dafid Ryansyah Wiluya^{1✉}, Surdiniaty Ugelta^{2✉}, Adang Suherman^{3✉}**Universitas Pendidikan Indonesia, Bandung, Indonesia¹²³**Article History**

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Students**Abstract**

Physical activity is a key determinant of physical fitness and plays an essential role in supporting health and functional capacity among adolescents. This study aimed to examine the relationship between physical activity levels and physical fitness among students of Junior High School 2 Ciwidey. A quantitative correlational study with a cross-sectional design was conducted involving 90 eighth-grade students selected using cluster sampling. Physical activity levels were measured using the International Physical Activity Questionnaire–Short Form (IPAQ-SF), while physical fitness was assessed through the Multistage Fitness Test (MFT) to estimate maximal oxygen uptake (VO₂max). Descriptive analysis was used to describe physical activity and fitness profiles, while the Spearman rank correlation test was applied due to non-normal data distribution. The results showed that most students were categorized as having moderate physical activity levels (52%), followed by low (33%) and high (11%) activity levels. Physical fitness assessment revealed that male students generally demonstrated higher VO₂max levels compared to female students, who were predominantly classified in the very low and low categories. Correlation analysis indicated a significant positive relationship between physical activity and physical fitness ($r = 0.217$; $p = 0.040$), although the strength of the relationship was weak. These findings suggest that higher physical activity levels are associated with better cardiorespiratory fitness among junior high school students. Therefore, efforts to increase the frequency and intensity of physical activity through school-based programs and supportive environments are necessary to improve students' physical fitness and overall health.

How to Cite

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INTRODUCTION

Physical activity is an important component in maintaining health and improving quality of life, especially among adolescents who are in a phase of rapid growth and development (Stea et al., 2022). During this period, physiological, psychological, and social changes occur very rapidly, so that the habits formed will have a strong influence on health in adulthood. Regular physical activity has been proven to improve cardiovascular function, strengthen muscles and bones, improve metabolism, and reduce the risk of degenerative diseases in later life (Cheng et al., 2022). In addition to physical benefits, physical activity also plays an important role in supporting adolescent mental health, such as reducing stress, increasing self-confidence, and encouraging positive social interaction. With such a significant role, physical activity needs to be optimally integrated into students' daily lives, especially through habituation in the school environment (Muhsen & Muhsen, 2020).

However, the reality on the ground shows that the level of physical activity among adolescents has been declining year after year. Technological advances and lifestyle changes have led adolescents to spend more time engaging in sedentary activities such as playing with gadgets, watching videos, or sitting for long periods of time both at home and during the learning process (Morris & Roychowdhury, 2020). Data from various national and international surveys confirm this trend, where the majority of adolescents do not meet the WHO standard of at least 60 minutes of physical activity per day. This low level of physical activity has a direct impact on physical fitness, which reflects a person's ability to perform physical activities without causing excessive fatigue (Labrador & Ventola, 2023). Low physical fitness not only hinders students' ability to participate in physically demanding learning activities, but also reduces academic performance, disrupts motor development, and increases the risk of obesity and metabolic diseases in adulthood (Dionisio et al., 2024).

In the context of junior high school students, physical fitness is a very important aspect to consider because this age is a critical period for building long-term health foundations (Candra Dewi et al., 2020). Good physical fitness supports students' stamina, improves their concentration, and supports the development of motor skills that support various academic and non-academic activities (Sepdanius et al., 2022). Previous studies have shown that there is a close relationship

between the level of physical activity and components of physical fitness such as muscle strength, cardiorespiratory endurance, flexibility, and reaction speed (Saleh, 2019). In line with these findings, regular physical activity among junior high school students contributes significantly to improving physical fitness, particularly in terms of cardiorespiratory endurance and muscle strength, which form the basis of students' physical readiness to participate in the learning process at school (Rakasiwi et al., 2024). Thus, students who are physically active tend to have better physical fitness than students with low levels of physical activity (Jasmani et al., n.d.), although fitness levels may vary between schools and individuals depending on the environment, physical education learning patterns, and physical activity habits outside of school.

Junior High School 2 Ciwidey, as one of the schools located in the South Bandung area, has unique environmental characteristics with geographical and social conditions that can influence students' physical activity habits. Variations in family backgrounds, the sports culture in the surrounding environment, and the availability of sports facilities at the school are important factors that influence students' daily physical activity. To date, there has been no empirical study specifically examining the level of physical activity among students at Junior High School 2 Ciwidey and the extent to which this level of activity is related to their physical fitness. Therefore, this study is important as an effort to understand the physical fitness and activity levels of students in greater depth. The novelty of this study lies in its focus on junior high school students at Junior High School 2 Ciwidey, a population that has received limited scholarly attention, and in its use of standardized instruments to examine the relationship between physical activity levels and physical fitness. The results of this study are expected to provide useful information for schools, physical education teachers, and other stakeholders in designing interventions or programs aimed at continuously improving students' physical activity and fitness levels.

METHODS

This study used a quantitative approach with a correlational design and cross-sectional design (Cvetkovic-Vega et al., 2021). This design was chosen to determine the relationship between physical activity level as the independent variable and physical fitness as the dependent variable at a single measurement point without providing

any intervention to the participants (Pangestu et al., 2023). The correlational approach was considered most appropriate because this study focused on testing the natural relationship between variables as observed in students at Junior High School 2 Ciwidey.

The population in this study was all eighth-grade students at Junior High School 2 Ciwidey in the current academic year. The sampling technique used was cluster sampling, with a minimum target of 45% of the total eighth-grade population. The population size was 200 students, so 45%/200 was 90 students. Only three classes (C, D, and F) were selected. The selection of samples in the eighth grade was based on the uniformity of the Physical Education, Health, and Sports curriculum, the characteristics of early adolescent development, and the physical readiness of students to take fitness tests.

Physical activity variables were measured using the Indonesian version of the International Physical Activity Questionnaire–Short Form (IPAQ-SF), which has been proven to be valid and reliable for the adolescent population in Indonesia (Dharmansyah, 2020). This instrument assesses the frequency, duration, and intensity of physical activity performed in the last 7 days, including light, moderate, and vigorous activities. Meanwhile, physical fitness variables were measured using the Multistage Fitness Test (MFT) or bleep test, which aims to estimate maximal aerobic capacity ($VO_2\text{max}$). This test is widely used among students and athletes due to its high reliability in assessing cardiorespiratory endurance (Mayorga-Vega et al., 2018). The test results, in the form of levels and shuttles, are then converted into $VO_2\text{max}$ estimates using the applicable standard formula.

The study began with obtaining permission from the school and explaining the purpose and procedures of the study to the students. After that, the students were asked to fill out the IPAQ-SF questionnaire independently under the supervision of the researchers. Physical fitness measurements were conducted on the school grounds following strict MFT procedures, including warm-up, technical instructions, test implementation, and cool-down. All data were recorded systematically and double-checked to avoid input errors.

Data analysis in this study was conducted in several stages, beginning with checking the completeness of data from the IPAQ-SF questionnaire and Multistage Fitness Test results before processing using IBM SPSS Statistics software

version 22. The data were then analyzed descriptively to describe the characteristics of the respondents, including the distribution of physical activity levels and $VO_2\text{max}$ values. Next, a statistical assumption test in the form of a Shapiro–Wilk normality test was conducted to determine the appropriate type of correlation test. If the data were normally distributed, Pearson's correlation was used, whereas if they were not normally distributed, Spearman's rank correlation was used to determine the strength and direction of the relationship between physical activity and physical fitness. A linearity test was also conducted using a scatterplot to ensure a linear relationship between variables.

RESULTS AND DISCUSSION

Table 1. Physical activity level categories

Categories	Norms	Persent
Low	<600	34%
Moderate	600 -3000	54%
High	>3000	12%

Based on the **Table 1** results of processing data on students' physical activity levels, we present the distribution of students' physical activity levels based on MET-minutes/week values according to the IPAQ categories. Of the 90 respondents, 33 students (34%) were in the low physical activity category (<600 MET-minutes/week), indicating that some students had not yet achieved the minimum physical activity recommendation. A total of 47 students (54%) were in the moderate category (600–3000 MET-minutes/week), indicating that the majority of students had sufficient physical activity involvement to support basic fitness components. Ten students (12%) were in the high category (>3000 MET-minutes/week), reflecting a small group that engages in physical activity with higher intensity and regular frequency. Overall, this distribution shows that students' physical activity patterns are dominated by the moderate category, with lower proportions in the low and high categories.

Table 2. $VO_2\text{max}$ level category

Sex	Categories	Norms	Persent
Male	Very low	<37	5%
	Low	37-42	19%
	Fair	43-49	41%
	Good	50-55	16%
	Very good	>55	19%

Female	Very low	<33	55%
	Low	33-37	29%
	Fair	38-43	11%
	Good	44-50	2.5%
	Very good	>50	2.5%

Table 2. The results of physical fitness measurements through VO₂max values show differences in category distribution between male and female students. In the male group, most students were in the “fair” category at 41%, followed by the ‘low’ category at 19% and “very good” at 19%. Only a small proportion were in the “good” category (16%), and 5% of students were in the “very low” category. In contrast, the female group showed a different distribution pattern, with the majority of students in the “very low” category (55%). Then 29% were in the “low” category, 11% in the “fair” category, and 2.5% each in the ‘good’ and “very good” categories. These findings show that the physical fitness of female students is generally lower than that of male students.

Table 3. The Relationship between Physical Activity and Fitness (VO₂max)

Variable	n	M	SD	1	2
Physical Activity	90	41.84	7.35	-	
Physical Fitness	90	1271.4	1137.1	.040	-

Table 3. The results of Spearman's correlation analysis show that there is a significant relationship between physical activity levels and physical fitness in 90 research respondents. The resulting correlation coefficient is $r = 0.217$ and the significance value is $p = 0.040$ ($p < 0.05$). This positive correlation indicates that an increase in physical activity levels tends to be followed by an increase in students' VO₂max, although the strength of the relationship is in the weak and statistically significant category. These findings show that the higher the students' physical activity levels, the better their physical fitness levels as indicated by their VO₂max values. This positive correlation value emphasizes that physical activity has an important contribution to students' cardiorespiratory system abilities. In addition, the sample size of 90 respondents provided sufficient analytical power to conclude that there was a consistent association between the variables. Overall, these results confirm that physical activity is a significant factor in improving physical fitness in junior high school students, making interventions to increase physical activity highly

relevant to supporting improvements in students' health and physical performance.

The results of the study show that the distribution of physical activity levels among students at Junior High School 2 Ciwidey is dominated by the moderate category, but there is still a significant proportion of students in the low category. This condition reflects a common phenomenon among adolescents related to the increasing prevalence of sedentary behavior, which is influenced by factors such as excessive use of electronic devices, changes in learning patterns, and limited opportunities for spontaneous physical activity in the surrounding environment (Guthold et al., 2020; Tremblay et al., 2017). Although some students already have adequate levels of physical activity, the disparities between groups show that active physical habits have not been internalized evenly.

In terms of physical fitness, VO₂max results show different patterns between genders. Male students show a more favorable fitness profile, with a predominance of “fair” to ‘good’ categories, while female students are dominated by the “very low” and “low” categories. These gender-based differences may be influenced by physiological factors such as higher muscle mass, hemoglobin concentration, and baseline cardiorespiratory capacity typically observed in male adolescents. In addition, psychological and social factors such as differences in motivation, self-efficacy, and participation in moderate to vigorous physical activity also play an important role in shaping physical fitness outcomes among female students (Biddle et al., 2019). Furthermore, the local cultural context and the types of physical activities commonly preferred or socially encouraged among female adolescents may contribute to lower engagement in vigorous physical activity, thereby influencing their overall physical fitness levels (Sallis et al., 2016).

Spearman's correlation analysis shows a positive and significant relationship between physical activity levels and physical fitness ($r = 0.217$; $p = 0.040$). Although the strength of the relationship is relatively weak, these findings still indicate that the higher the students' physical activity, the better their physical fitness capacity. A weak correlation indicates that physical fitness is influenced by various factors other than physical activity, such as sleep quality, nutritional status, frequency of fast food consumption, sedentary habits, and exposure to physical and social environments at school and at home (Utomo et al., 2025). Thus, physical activity is only one determi-

nant, although it remains an important and consistent factor in improving aerobic capacity.

The phenomenon of low physical activity among some students can also be linked to the characteristics of the school environment and the Ciwidey area. Although this region has geographical conditions that support outdoor activities, not all students automatically take advantage of them to be physically active. The use of school sports facilities, physical activity habits through Physical Education, Health, and Sports, and community-based activities are also important factors in shaping students' daily physical activity patterns. The imbalance between student groups indicates the need for more structured school interventions, such as improving the quality of Physical Education, Health, and Sports learning, providing a variety of sports extracurricular activities, and promoting active lifestyles (Van den Berg, van Sluijs & Kriemler, 2024).

Overall, the results of the study underscore that physical activity plays a significant role in shaping the physical fitness of adolescents. However, strengthening physical fitness requires a holistic approach that includes increasing physical activity, managing lifestyle factors, ensuring balanced nutrition, and providing a conducive and supportive school environment. These findings provide an important basis for schools and stakeholders in designing intervention programs to improve physical fitness as part of long-term student health efforts (Wang et al., 2024).

CONCLUSION

Based on the results of research on the relationship between physical activity levels and physical fitness among students at Junior High School 2 Ciwidey, it can be concluded that the students' physical activity levels are generally in the moderate category, although there is still a substantial roportion in the low category. Meanwhile, physical fitness measured through VO_{2max} estimates shows a disparity between male and female students, with the female group dominated by the very low and low categories, while the male group tends to be in the fair to good categories.

The results of the Spearman correlation test show a significant positive relationship between physical activity levels and physical fitness ($r = 0.217$; $p = 0.040$). These findings indicate that the higher the level of physical activity performed by students, the better their physical fitness capacity, even though the strength of the relationship is in the weak category. This relationship reinforces

the understanding that physical activity is an important factor contributing to improved cardiorespiratory endurance in adolescents, especially in the school environment.

Overall, this study confirms that increasing the intensity and frequency of physical activity is essential to promote improvements in students' physical fitness. Schools are expected to strengthen the role of physical education, provide adequate facilities, and create an environment that supports an active lifestyle so that students' physical development can be optimized. Furthermore, the results of this study can serve as a basis for designing more targeted intervention programs or policies to continuously improve students' physical activity and fitness.

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