



The Relationship Between Sleep Quality, Active Lifestyle and The Physical Fitness of Elementary School Students

Haris Ocktavian Adam^{1✉}, Moch Fahmi Abdulaziz²

Department of Sport Science, Faculty of Sport Science, Universitas Negeri Semarang, Semarang, Indonesia¹²

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Abstract

The physical fitness of elementary school students is an important indicator of the success of physical education. However, the era of digitalization and changes in modern lifestyles have led to a decline in physical activity and sleep disturbances in children, which can potentially affect their physical fitness. The purpose of this study was to identify the level of active lifestyle and sleep quality of students, describe their physical fitness status, and analyze the relationship between these two variables and the physical fitness of fifth and sixth grade students at Gondangsari 1 Public Elementary School, Magelang. This study used a quantitative correlational design with a sample of 50 students selected using purposive sampling. The research instruments included the Physical Activity Questionnaire for Children (PAQ-C), the Pittsburgh Sleep Quality Index (PSQI), and the Indonesian Physical Fitness Test (TKJI). The data were analyzed using descriptive statistics and Spearman's correlation. The results showed that the majority of students (54%) were physically inactive, and 90% had moderate to low fitness levels. Correlation analysis found a significant positive relationship between an active lifestyle and physical fitness ($\rho = 0.513$, $p < 0.05$), but sleep quality was not significantly related ($\rho = 0.198$, $p > 0.05$). These findings emphasize the importance of increasing students' physical activity through structured physical education programs.

How to Cite

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✉ Correspondence Author:

E-mail: wayanpak984@students.unnes.ac.id
moch.fahmi.abdulaziz@mail.unnes.ac.id

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INTRODUCTION

A person's level of physical fitness is supported by various factors, including sleep quality and an active lifestyle. Physical fitness is defined as the body's ability to perform physical work without experiencing significant fatigue. Physical fitness is an important factor in achieving physical education goals in particular and national education goals in general. Some ways to maintain or improve physical fitness are by maintaining sleep quality and leading an active lifestyle with regular exercise and daily physical activities that are beneficial to health.

Based on this definition, physical fitness is closely related to sleep quality and an active lifestyle, including that of students. Good sleep quality and an active lifestyle will support students' physical fitness levels. However, in reality, the physical fitness levels of students in Indonesia have not met expectations. Data from the 2023 Sports Development Index (SDI) report shows that the physical fitness level of Indonesians decreased from 18.5% in 2022 to 17.9% in 2023. The Sports Development Index (SDI) (Kementerian Pemuda dan Olahraga RI, 2023) also states that physical fitness measurements conducted on 1,578 children aged 10-15 years spread across 34 provinces in 2023 show that the physical fitness levels of Indonesian children are very concerning. Only 6.79% of children had physical fitness in the good or higher category. Conversely, 77.12% of children had physical fitness in the poor or very poor category (Mutohir et al., 2023). These findings further emphasize the lack of physical fitness among Indonesians, especially children.

Sleep quality is one of the important factors that affect physical fitness, especially in adolescents and children. Quality sleep allows the body to recover and regenerate and maintain optimal physiological functions (Brinkman et al., 2018). In addition to sleep quality, an active lifestyle through regular physical activity also plays an important role in determining the level of physical fitness. Individuals who exercise regularly tend to have higher levels of fitness than those who rarely engage in physical activity (Rohmah & Muhammad, 2021). Regular exercise provides benefits such as increased cardiorespiratory endurance and muscle strengthening (Franklin et al., 2022). There is a reciprocal relationship between sleep quality and physical activity, where regular physical activity can improve sleep quality, and conversely, quality sleep can improve physical activity performance

and accelerate body recovery (Ünal & Özenoğlu, 2025). Thus, the combination of good sleep quality and an active lifestyle through regular physical activity has a positive effect on a person's physical fitness.

Sleep quality and physical activity as part of an active lifestyle are very important aspects for children today, given that poor sleep quality and low levels of physical activity can have a negative impact on their fitness. Poor sleep quality and physical activity in children can lead to various health and fitness problems (Gunarsa & Wibowo, 2021). Some of the fitness problems that can arise due to poor sleep quality and physical activity include obesity, decreased immune system function, and psychological disorders such as stress (Lestyoningsih & Lindawati, 2022). Therefore, it is understandable that sleep quality and an active lifestyle through physical activity have a significant relationship with the fitness quality of each individual, especially in the elementary school age group. A student's social environment at school, particularly peer relationships, is a crucial factor in influencing their psychological development. During childhood, peers serve as sources of support, behavioral models, and feedback providers, which can shape a child's self-perception. Peer support can manifest in the form of encouragement, praise, assistance, or social acceptance. This has significant potential to boost students' self-confidence. In practice, when students perform and are judged in front of others during floor gymnastics, the presence of supportive peers can be a key factor in reducing fear and increasing their courage to participate.

Physical education and fitness are very important for students' lives, both for daily activities and for learning activities at school. In practice, there are several obstacles, such as a lack of sports facilities, uninteresting teaching methods, and low student interest in sports. However, fun learning methods, such as learning through games, can increase students' interest and physical fitness. Recent data shows that most teenagers and children in Indonesia still have low levels of physical fitness. This can have a negative impact on their health and quality of life in the future. Therefore, it is necessary to improve sleep quality and physical activity through better physical education to support students' physical and mental health, as well as to form healthy lifestyle patterns that can last in the long term.

Based on this description, this study was conducted to analyze the relationship between sleep quality and active lifestyle with the physical fitness level of elementary school students. The

Selection of the focus of this study was based on the importance of understanding the relationship between health behaviors (sleep patterns and physical activity) and physical fitness as a basis for designing effective school health programs for students aged 10-12 years. This study aims to obtain empirical evidence on how sleep quality and physical activity contribute to students' physical fitness, so that it can be used as a reference in developing learning strategies that increase students' health awareness and quality. Through this correlational approach, it is hoped that information can be obtained to support health-based physical education learning practices in elementary school.

Despite the growing body of research on physical fitness determinants in children, previous studies have tended to examine physical activity or sleep quality separately, often focusing on adolescent or adult populations in Western contexts. This study addresses these gaps by simultaneously analyzing the relationships between sleep quality and active lifestyle with physical fitness among Indonesian elementary school students aged 10-12 years, using a comprehensive combination of validated instruments (PAQ-C, PSQI, and TKJI). This integrative approach provides empirical evidence that is both locally relevant and internationally comparable, generating baseline data for evidence-based school health interventions.

METHOD

This study used a quantitative approach with a correlational design to analyze the relationship between sleep quality and active lifestyle with physical fitness levels in elementary school students. the study was conducted at SD Negeri Gondangsari 1, Magelang. the research subjects were elementary school students selected using purposive sampling, with the following inclusion criteria: (1) students in good physical health at the time of data collection, (2) students aged 10-12 years, and (3) willing to participate in a series of tests. the total sample used in this study was 50 students, consisting of 29 male students and 21 female students.

The instruments used in this study included the physical activity questionnaire for children (PAQ-C) to measure active lifestyle levels with a score range of 1-5, the pittsburgh sleep quality index (PSQI) to measure sleep quality with a score range of 0-21, and the Indonesian physical fitness test (TKJI) for ages 10-12, which consists of 5

test items including a 40-meter sprint, pull-ups, 30-second sit-ups, vertical jumps, and a 600-meter middle-distance run.

The analytical technique used in this study was correlation. data processing methods used statistical correlation analysis to analyze whether there was a relationship between sleep quality and active lifestyle on physical fitness levels. data was processed using a computerized system with spss 24 version.

RESULTS AND DISCUSSION

Based on the test results and measurements in this study using the Physical Activity Questionnaire for Children (PAQ-C) instrument to measure active lifestyles, the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality, and the Indonesian Physical Fitness Test (TKJI) for ages 10-12 to measure physical fitness, data was obtained which was then analyzed and explained in detail in the following discussion:

Table 1. Frequency Distribution of Active Lifestyles

Category	Frequency	Percentage
Poor	27	54%
Good	23	46%
Total	50	100%

The results of the active lifestyle assessment show that 27 students (54%) are in the less active category and 23 students (46%) are in the good category. This almost balanced distribution indicates variability in students' physical activity levels, with the majority of students still tending to be in the less active category. These findings indicate the need for efforts to increase participation in physical activity.

Table 2. Frequency Distribution of Sleep Quality

Category	Frequency	Percentage
Poor	18	36%
Good	32	64%
Total	50	100%

The results of the sleep quality assessment show that the majority of students have fairly good sleep patterns. A total of 32 students (64%) have good sleep quality, while 18 students (36%) have poor sleep quality. These findings indicate that most students have adequate sleep patterns, although there is still a significant proportion that requires special attention.

Table 3. Frequency Distribution of Physical Fitness

Category	Frequency	Percentage
Very Low	0	0%
Low	21	42%
Medium	24	48%
High	5	10%
Very High	0	0%
Total	50	100%

The results of the physical fitness assessment show that 24 students (48%) were in the moderate category, 21 students (42%) were in the poor category, and only 5 students (10%) achieved the good category. There were no students in the very poor or very good categories. These findings indicate that 90% of students have a physical fitness level in the moderate to low category, highlighting the need for a more structured and sustainable exercise program.

Based on the results of normality tests using Kolmogorov-Smirnov and Shapiro-Wilk, it was found that not all research variables were normally distributed. Thus, data analysis used Spearman's correlation test as a non-parametric alternative. Spearman's rank correlation can be used when the data distribution does not meet the normality assumption or there are outliers, making it more flexible and usable for various types of data with a minimum ordinal scale (ts Prayoga).

Table 4. Spearman's correlation test

		Physical Fitness	Sleep Quality	Active Lifestyles
Physical Fitness	Correlation coefficient	1	0.198	0.513**
	Sig. (2-tailed)	-	0.169	0.000
Sleep Quality	Correlation coefficient	0.198	1	0.203
	Sig. (2-tailed)	0.169	-	0.157
Active Lifestyles	Correlation coefficient	0.513**	0.203	1
	Sig. (2-tailed)	0.000	0.157	-

Based on the analysis results, an active lifestyle has a positive and significant relationship with physical fitness ($\rho = 0.513$; $p = 0.000$), indicating a moderate relationship. These results indicate that the higher the level of physical activity of students, the better their level of physical fitness. Meanwhile, the relationship between sleep quality and physical fitness shows a weak and insignificant positive correlation ($\rho = 0.198$; $p =$

0.169), as does the relationship between active lifestyle and sleep quality ($\rho = 0.203$; $p = 0.157$). These results indicate that sleep quality has no statistically significant relationship with physical fitness or active lifestyle in this research sample.

Sleep quality is a multidimensional condition that encompasses not only sleep duration, but also sleep efficiency, sleep latency, sleep disturbances, and overall subjective sleep quality, and plays an important role in various physiological processes in elementary school children, including protein synthesis, growth hormone release, muscle recovery, and memory consolidation and cognitive function (DelRosso, 2025; Ono et al., 2020). Research findings indicate that the majority of students (64%) have good sleep quality, while 36% experienced poor sleep quality a proportion that still requires serious attention because these variations are influenced by the use of gadgets before bedtime, which inhibits melatonin production and shifts children's circadian rhythms, psychological conditions such as stress and anxiety, and various inconsistent sleep environment and routine factors (Lestari et al., 2024; Monifa, 2022; Kusumawati et al., 2024); while children with poor sleep quality are at risk of decreased concentration, impaired cognitive function, unstable emotional regulation, and an increased risk of obesity and long-term metabolic disorders, so promoting quality sleep needs to be an integral part of comprehensive school health efforts regardless of its direct relationship with physical fitness (Lukman et al., 2025; Kasingku et al., 2024).

In this study, sleep quality did not show a significant relationship with physical fitness levels ($\rho = 0.198$; $p = 0.169$), even though several previous studies on adolescent and adult populations found a significant relationship between the two (Festiawan et al., 2025). this lack of significance can be explained by several factors, namely: the characteristics of the sample of children aged 10–12 years, who have different relationship patterns compared to older populations (Yunanda et al., 2025a); the higher physiological regeneration capacity of children, so that the impact of sleep disturbances on physical performance is less noticeable [fonensa]; the distribution of sleep quality data was dominated by the good category (64%), so the variation was not large enough to detect a significant relationship (Utomo et al., 2025). the limitations of the PSQI instrument, which measures sleep quality subjectively and does not capture objective aspects such as actual sleep duration, efficiency, and sleep architecture which could potentially be overcome through the

use of actigraphy or polysomnography as well as a cross-sectional design that does not capture the long-term cumulative effects that may only be apparent in longitudinal studies (Faudiansyah et al., 2025; Kaczmarek et al., 2025; Sousa-Sá et al., 2024).

An active lifestyle is a pattern of behavior that reflects an individual's involvement in various forms of daily physical activity [Taemin] and plays an important role in shaping movement habits and developing students' motor skills in the context of physical education (Akbar et al., 2025). The low level of active lifestyles among most students in this study is in line with Fitriani's et al. (2020) report that physical activity among elementary school children in Indonesia is still below WHO recommendations, confirming that sedentary lifestyles have become a serious challenge. This condition is influenced by limited time and facilities, increased use of gadgets, and a lack of support from family and school environments, which is consistent with findings that an unsupportive environment can hinder the development of an active lifestyle in children and that students' physical activity levels are closely related to the availability of quality physical education programs and parental support (Simanjuntak et al., 2023; Sales et al., 2023; Kurniawati et al., 2022).

The correlation analysis results show a positive and significant moderate relationship between active lifestyle and physical fitness ($\rho = 0.513$; $p < 0.01$), confirming that students with higher physical activity tend to have better fitness because regular physical activity stimulates physiological adaptation in the cardiovascular, musculoskeletal, and metabolic systems, and is consistent with previous studies that found a significant relationship between physical activity and students' physical fitness (Patel et al., 2024; Lagarinda et al., 2024). However, the strength of the correlation, which did not reach the strong category, indicates that physical fitness is still influenced by other factors such as diet, nutritional status, health conditions, genetic factors, and the quality of exercise programs, in line with the view that physical fitness is the result of a complex interaction between various internal and external factors (Putro et al., 2022; Bonilla et al., 2023).

The level of physical fitness among students shows an alarming distribution, with 48% in the moderate category, 42% below average, and only 10% in the good category, in line with the findings of other studies that the physical fitness of elementary school students in Indonesia is generally still low and has the potential to ne-

gatively impact long-term physical health, motor development, and children's quality of life (Junaidi et al., 2020; Sembiring et al., 2025). Physical fitness itself is the ability of the body to perform physical activities without excessive fatigue, which includes components of cardiorespiratory endurance, muscle strength, muscle endurance, flexibility, and body composition (Campbell et al., 2013). Low physical fitness increases the risk of obesity, cardiovascular disease later in life, and difficulties in daily physical activities, making it very important to improve fitness through quality physical education programs and the promotion of an active lifestyle (Burhaein et al., 2024; Ridwan et al., 2025).

Given that an active lifestyle has been proven to be significantly related to physical fitness, interventions need to be directed at increasing students' physical activity both inside and outside of school through quality physical education programs with adequate time allocation, complete facilities, and competent teachers as the main pillars (Mulyana et al., 2024; Setyawan & Gani, 2021). While also integrating physical activity into various aspects of school life, such as active breaks between classes, varied sports extracurricular activities, and the creation of an active school environment, reinforced by educating parents about the importance of physical activity, reducing sedentary behavior, and creating a supportive home environment (Putra et al., 2025; Fahdan et al., 2025). In addition, although sleep quality is not directly related to physical fitness, the promotion of sleep hygiene, consistent sleep routines, and limiting the use of gadgets before bedtime still need to be part of a comprehensive school health approach. Meanwhile, periodic tests and measurements of physical activity, sleep quality, and physical fitness can help identify students who need special attention while monitoring the effectiveness of intervention programs (Kusumawati et al., 2024; Yunanda et al., 2025b).

This study has several limitations that need to be considered. Because it uses a cross-sectional design, this study can only observe conditions at a specific point in time, so it cannot determine whether an active lifestyle and sleep quality actually cause changes in students' physical fitness; to answer this question, a longitudinal study that observes students over a longer period of time is needed (McCoy et al., 2024). In addition, the sample size of only 50 students from one school means that the results of this study may not necessarily apply to students in other schools with different social and economic conditions, so future studies should involve a larger and more

diverse sample (Utomo et al., 2025). The measurement of active lifestyles and sleep quality, which relied on self-administered questionnaires, also had the potential to produce inaccurate data because the students' answers may not have reflected their actual conditions. The use of more objective measuring instruments, such as accelerometers for physical activity and actigraphy for sleep patterns, could be a more reliable solution (Meredith-Jones et al., 2024). Finally, this study did not take into account other factors that also influence physical fitness, such as diet, nutritional intake, hereditary factors, and the general health of students, which should be included in future research designs to produce more comprehensive and thorough results (Putro & Winarno, 2022).

CONCLUSION

This study concludes that active lifestyles and sleep quality play different roles in the health of elementary school students. An active lifestyle has been proven to be directly and meaningfully related to physical fitness, which means that the higher the level of physical activity of students, the better their physical fitness. Conversely, sleep quality does not show a direct relationship with physical fitness or physical activity, even though the majority of students have good sleep quality. These findings indicate that increasing physical activity should be the main focus in efforts to improve student fitness. Schools need to develop quality physical education programs, integrate movement into daily routines, and create an environment that encourages students to be physically active. Although sleep quality does not directly affect fitness, quality sleep is still very important for children's overall health. Sleep plays an important role in physical growth, brain development, emotional regulation, strengthening immunity, and energy recovery. Therefore, schools need to implement a dual strategy that combines the promotion of physical activity with the promotion of healthy sleeping habits through health education, scheduling that is appropriate for children's sleep needs, and cooperation with parents to support healthy lifestyles at home.

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