



The Relationship Of Physical Activity Levels To The Sleep Quality Of Sport Science Students

Sheva Risetva Al Lukman^{1*}, Sri Sumartiningsih²

¹²Universitas Negeri Semarang, Semarang, Indonesia

Keywords

Physical activity;
sleep quality; final-
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Abstract

Physical activity and sleep quality are important factors that influence students' health and academic performance. Final-year students often face academic demands that may affect both aspects. This study aimed to analyze the relationship between physical activity level and sleep quality among final-year students of the Sport Science Study Program, Faculty of Sport Science, Universitas Negeri Semarang. This research employed a quantitative cross-sectional design involving 40 respondents selected through purposive sampling. Physical activity was measured using the International Physical Activity Questionnaire (IPAQ), while sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using the Spearman Rank correlation test. The results showed that 50% of respondents had high physical activity levels, 32.5% had moderate levels, and 17.5% had low levels. The majority of respondents experienced poor sleep quality (95%). The Spearman Rank test revealed a correlation coefficient of $p = 0.044$ with a significance value of $p = 0.786$ ($p > 0.05$). These findings indicate that there is no significant relationship between physical activity level and sleep quality among final-year students of the Sport Science Study Program. Sleep quality is likely influenced by factors other than physical activity.

✉ Corresponding author :
E-mail: shevarisetva@students.unnes.ac.id

INTRODUCTION

Physical activity is an important factor influencing global public health and is recommended as a preventive measure against various non-communicable diseases, while also playing a role in improving the quality of life of individuals. (Strain et al., 2024). *World Health Organization* (WHO) reported that around 31% of the adult population in the world has not met the minimum standard of physical activity, which triggers an increased risk of chronic diseases and metabolic disorders. Low physical activity can negatively impact an individual's health. In addition to affecting physical fitness and metabolic function, this condition is also associated with various physiological disorders, one of which is a decline in sleep quality (Xu et al., 2023).

The problem of low physical activity has also become a significant public health issue along with the increasing sedentary lifestyle in the adult population. The high proportion of the population that has not met physical activity recommendations according to national data is a concern because this condition can increase the risk of various diseases and chronic health problems (Puspita et al., 2024). In addition to impacting other health aspects, this condition also increases the risk of sleep disturbances and poor sleep quality (Septianingsih et al., 2024). Studies in Indonesia reported that poor sleep quality is associated with fatigue, decreased productivity, and impaired physical and mental functions in the adult population (Sidik et al., 2025). These findings indicate that physical activity and sleep quality are two interrelated health aspects that need to be addressed comprehensively within the context of public health in Indonesia (Irawati et al., 2026). Suboptimal sleep quality can affect an individual's physical and mental condition. Frequently observed impacts include increased fatigue, difficulty maintaining concentration, decreased motivation to learn, as well as an increased susceptibility to psychological problems, including stress and anxiety (Zhang et al., 2024). Various studies show that poor sleep quality can affect cognitive function and physical health, marked by a decline in academic performance, disruptions to the immune system, and an increased risk of metabolic problems (Ruru et al., 2025).

Physical activity and sleep quality play an important role in maintaining an individual's physiological and psychological balance. Physical activity performed regularly has been proven to improve sleep parameters such as sleep latency, sleep duration, and sleep efficiency (Ashari et al., 2021). Empirical research shows a significant relationship between the level of physical activity and sleep quality in various population groups, including adolescents and adults, where increased physical activity correlates with better sleep quality (Wirakhmi & Haniyah, 2023). Another study in Indonesia also found that individuals with higher levels of physical activity tend to have better sleep quality compared to those who are less active (Thoriq et al., 2025). These findings confirm that physical activity is one of the behavioral factors contributing to sleep health.

Several studies indicate that the relationship between physical activity and sleep quality is not always significant. The absence of a relationship between physical activity and sleep quality indicates that sleep quality is a multidimensional phenomenon influenced by various other factors, including academic stress, anxiety, workload, and environmental factors that can have a greater influence on sleep quality (Fadhiil et al., 2024).

The problem of sleep quality becomes increasingly serious in students who have a high activity level, such as students of the Faculty of Sport Science (FIK). FIK students are required not only to study in the academic field but also to be active in physical activities and sports. Theoretically, One of the benefits of continuous physical activity is that it supports biological functions related to sleep. Through its influence on hormonal regulation and the stability of circadian rhythms, physical activity can help individuals achieve better sleep quality (Troiano, 2023). Although physical activity has health benefits, various demands faced by students, such as completing academic tasks, achieving athletic success, and involvement in organizations, can cause psychological pressure. This pressure has the potential to disrupt healthy sleep patterns and contribute to a decline in sleep quality (Simpson et al., 2024).

The relationship between physical activity and sleep quality has been widely reported in various studies. However, the available scientific evidence still leaves several research gaps, primarily because the majority of previous studies have focused on the general population,

adolescent and elderly age groups, and students from various health disciplines with heterogeneous characteristics (Rajagukguk et al., 2024). Findings regarding the relationship between physical activity and sleep quality have not yet shown a fully consistent pattern. Variations in results across studies can be influenced by various methodological factors, such as the use of different instruments, differing analytical approaches, as well as diverse population characteristics and research environments (Wang & Wang, 2024). A stark inconsistency in findings becomes highly evident when comparing studies that establish physical activity as a primary predictor of better sleep quality (Thoriq et al., 2025; Wirakhmi & Haniyah, 2023) with those that find no significant relationship between the two variables (Fadhiil et al., 2024; Maharani, 2023). This conspicuous literature gap serves as a critical foundation for the present study.

Research that specifically examines students with a sports background is still relatively limited, even though this group theoretically has a better knowledge and understanding of the importance of physical activity. Therefore, this study is directed to fill this gap by analyzing the relationship between the level of physical activity and sleep quality in final-year Sport Science students using standardized instruments, so it is expected to provide more contextual empirical evidence and enrich studies in the field of sports and health. The novelty of this research lies in its attempt to examine these existing inconsistencies within a unique 'population paradox' specifically focusing on final-year Sport Science students. Unlike previous research that generally examined the general population, adolescents, the elderly, or cross-study program students, this study examines a group with an academic background in sports which theoretically has higher literacy and awareness of the importance of physical activity. Furthermore, this study emphasizes the context of the final academic phase, which is characterized by an increase in academic workload and psychological pressure, thus enabling the emergence of a discrepancy between knowledge and active lifestyle practices. Another novelty lies in the use of international standardized instruments, namely the International Physical Activity Questionnaire (IPAQ) and the Pittsburgh Sleep Quality Index (PSQI), which are applied simultaneously to obtain a comprehensive empirical picture of the relationship between physical activity and sleep quality. Thus, this study not only strengthens existing empirical evidence but also provides a new contextual perspective in sports and health studies, especially related to the dynamics of the lifestyle of sports students at the end of their studies.

Based on these problems and gaps, this study aims to analyze the relationship between the level of physical activity and sleep quality in final-year students of the Sport Science Study Program, Faculty of Sport Science, Universitas Negeri Semarang. The proposed hypothesis is that there is a significant relationship between the level of physical activity and sleep quality in final-year students of the Sport Science Study Program, Faculty of Sport Science, Universitas Negeri Semarang, where a higher level of physical activity will be followed by better sleep quality. The proof of this hypothesis is carried out through a correlational quantitative approach to produce objective, accurate empirical evidence that can be scientifically accounted for the development of sports science and public health.

METHODS

This research uses a quantitative approach with a correlational design to analyze the relationship between students' physical activity levels and sleep quality. This approach was chosen because it allows objective measurement of variables in the form of numerical data as well as analysis of the relationships between variables using statistical techniques (Oranga & Matere, 2025). A correlational design was used because the study did not provide treatment to the variables, but rather observed the relationships that occurred naturally (Scholtz et al., 2020).

The subjects of the study were 40 final-year students of the Sport Science (IKOR) Study Program, Faculty of Sport Science, Universitas Negeri Semarang. The sampling technique used non-probability sampling with inclusion criteria of active students, willing to be respondents, and completing the questionnaire fully. The research was conducted from March–May 2026 with data collection carried out online using Google Forms.

The research instruments consisted of the International Physical Activity Questionnaire (IPAQ) to measure physical activity levels and the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality. The assessment of physical activity in this study was conducted using the IPAQ questionnaire, considering the intensity level and duration of activities performed by the respondents over the previous seven days. To measure sleep quality, the PSQI questionnaire was used, which describes the respondents' sleep conditions over the past month. Both instruments have been widely applied in research and are stated to have a good level of accuracy and consistency (Salsabila et al., 2025).

Data analysis was carried out in stages, including descriptive analysis to describe respondent characteristics and variable distributions, as well as inferential analysis to test relationships between variables. A normality test was performed using Shapiro-Wilk to determine the data distribution (Wei, 2022). If the data is normally distributed, the Pearson Product Moment correlation test is used, whereas if the data is not normal, the Spearman Rank test is used (Suherman et al., 2025). All analyses were performed with a significance level of 0.05.

RESULTS AND DISCUSSION

Research data collection regarding the relationship between the level of physical activity and sleep quality was carried out in March–May 2026. The subjects in this study were 40 active final-year students of the Sport Science (IKOR) Study Program, Faculty of Sport Science, Universitas Negeri Semarang. Data were obtained through filling out an online questionnaire using the International Physical Activity Questionnaire (IPAQ) to measure the level of physical activity and the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality.

Distribution of Sample Characteristics

The characteristics of the respondents in this study were grouped based on two main categories, namely age and gender. The frequency distribution of the respondents' characteristics is presented in detail in **Table 1** below:

Table 1. Distribution of Respondent Characteristics Based on Age and Gender

	Category	Frequency	Percent
Age	19	2	5%
	20	8	20%
	21	24	60%
	22	6	15%
Total	40	40	100%
Gender	Male	22	55%
	Female	18	45%
Total	40	40	100%

Table 1 shows that the majority of respondents were in the 21-year-old age group, namely 24 students (60%), followed by the 20-year-old age group with 8 students (20%). Meanwhile, viewed from the gender aspect, male respondents dominated the course of this study with a total of 22 students (55%), while female respondents amounted to 18 students (45%).

Descriptive Analysis of Research Variables Students' Physical Activity Level

The measurement of physical activity using the IPAQ instrument classified respondents into three intensity categories, namely low, moderate, and high. The distribution data of the students' physical activity levels is presented in **Table 2** below:

Table 2. Frequency Distribution of Respondents' Physical Activity Levels

	Category	Frequency	Percent
Physical Activity	Low	7	17,5%
	Moderate	13	32,5%
	High	20	50%
	Total	40	100%

Table 2 shows that half of the total respondents (50%) had a high level of physical activity (20 students). Conversely, respondents who were in the low physical activity category constituted the smallest group, which was only 17.5% (7 students)

Students' Sleep Quality

Evaluation of students' sleep quality over the last one month was measured using the PSQI instrument which was categorized into two groups, namely poor and good sleep quality. The distribution of respondents' sleep quality data can be seen in **Table 3**:

Table 3. Frequency Distribution of Respondents' Sleep Quality

	Category	Frequency	Percent
Kualitas Tidur	Poor	38	95%
	Good	2	5%
	Total	40	100%

Based on the mapping results in **Table 3**, it is known that the majority of final-year Sport Science students have suboptimal rest patterns. A total of 2 respondents (5%) were included in the good sleep quality category, while students who experienced disturbances or poor sleep quality amounted to 38 respondents (95%).

Analysis Prerequisite Test (Normality Test)

Before conducting hypothesis testing, an analysis prerequisite test in the form of a normality test was first conducted to determine the type of statistics that would be used in the correlation test. Considering the number of samples in this study was less than 50 respondents ($N = 40$), the normality test technique used was the Shapiro-Wilk method. The decision-making criteria were based on the significance value (Sig). If the p-value > 0.05 then the data is normally distributed, and if the p-value < 0.05 then the data is declared not normally distributed. The results of the normality test are presented in **Table 4** below:

Table 4. Shapiro-Wilk Normality Test Results

	Variabel	Statistic	df	Sig.
Result	Physical activity	0,693	40	0,000
	Sleep quality	0,972	40	0,429

The results of the Shapiro-Wilk normality test **Table 4** show that the physical activity variable is not normally distributed ($p = 0.000 < 0.05$), while the sleep quality variable is normally distributed ($p = 0.429 > 0.05$). Because one of the variables does not meet the assumption of normality, the Pearson Product Moment parametric correlation test cannot be applied. Therefore, the methodological decision taken was to switch the hypothesis testing to using non-parametric statistics through the Spearman Rank correlation test (Spearman's rho)

Table 5. Spearman's Rank Correlation Analysis Results

Variable Relationship	Correlation Coefficient (ρ)	Sig. (2-tailed)	N	Conclusion
Physical Activity (X) -> Sleep Quality (Y)	0,044	0,786	40	Not Significant

Based on the results of the Spearman's rho correlation analysis presented in **Table 5**, a significance p-value (2-tailed) of 0.786 was obtained. Because the significance value is greater than the set parameter limit ($0.786 > 0.05$), it can be stated that there is no significant relationship between the level of physical activity and sleep quality in the study sample. Meanwhile, the correlation coefficient value (ρ) obtained is 0.044. That number indicates that the level of relationship strength between the two variables is in the very weak category, with a positive relationship direction that is not meaningful. Thus, the research hypothesis (H_a) is declared rejected and the null hypothesis (H_0) is accepted. These empirical results prove that the high or low level of physical activity performed by final-year Sport Science students does not show a statistically meaningful relationship to their sleep quality.

Comparative Analysis of Variables Based on Gender

Prior to hypothesis testing, a Shapiro-Wilk normality test was conducted ($N=40$). The results showed that the residuals for the Sleep Quality variable were normally distributed ($W = 0.975$; $p = 0.525$), so it was tested using the parametric Independent Samples T-Test. Conversely, the residuals for the Physical Activity Score variable ($W = 0.899$; $p = 0.002$) and Total Physical Activity ($W = 0.733$; $p < 0.001$) were not normal, switching to the non-parametric Mann-Whitney U test. The results of the parametric and non-parametric comparative tests are summarized in **Table 6** below:

Table 6. Comparative Analysis of Sleep Quality and Physical Activity Based on Gender

Variable	Gender	N	Mean $\pm$ SD / Mean Rank	Test Value (t / U)	p
Sleep Quality ¹	Male	22	9,96 $\pm$ 3,62	t = -1,116	0,271
	Female	18	11,17 $\pm$ 3,15		
Physical Activity Score ²	Male	22	23,59 (M = 2,55)	U = 266,000	0,045
	Female	18	16,72 (M = 2,06)		
Total Physical Activity ²	Male	22	24,91 (M = 9562,27)	U = 295,000	0,009
	Female	18	15,11 (M = 4089,61)		

Based on the data in **Table 6**, the statistical testing results show that gender does not significantly affect student sleep quality ($t(38) = -1.116$; $p = 0.271$) with a relatively balanced mean score between males ($M = 9.96$) and females ($M = 11.17$). Conversely, a significant difference was found in the physical activity aspect through the Mann-Whitney U test. The male group was proven to have a more active physical activity score ($U = 266.000$; $p = 0.045$) as well as a significantly higher accumulated total volume of physical activity (Total PA) in contrast ($U = 295.000$; $p = 0.009$) compared to the female group. This can be seen from the superiority of the male Mean Rank value in activity scores (23.59 vs 16.72) and total daily activity (24.91 vs 15.11). Empirically, gender is a strong differentiating factor in the quantity of physical activity, but is not a determinant in the sleep quality of final-year Sport Science students.

The research results show that the majority of final-year students of the Sport Science Study Program have a high category level of physical activity. This finding can be understood due to the characteristics of Sport Science students who have greater involvement in sports activities, field practices, and activities demanding physical abilities. Physical activity performed regularly is known to contribute to increased cardiorespiratory fitness, metabolic

health, and psychological well-being (Bull et al., 2020). In addition, the knowledge possessed by students regarding the benefits of sports enables them to be more active compared to students from non-sports study programs.

The high proportion of poor sleep quality even though most respondents have high physical activity indicates that physical activity is not the only factor that determines sleep quality. This condition can be influenced by final semester academic workloads, preparation of final projects, graduation pressure, and the use of electronic devices at night which potentially disrupt student sleep quality (Ayorbaba et al., 2025).

The results of the Spearman correlation analysis show a correlation coefficient value of $\rho = 0.044$ with a significance value of $p = 0.786$. These results show that there is no significant relationship between the level of physical activity and sleep quality in final-year Sport Science students. The very low correlation coefficient value indicates that the relationship between the two variables is in the very weak category. Thus, the hypothesis stating that there is a relationship between physical activity and sleep quality cannot be accepted.

Theoretically, physical activity has a relationship with sleep quality through various physiological mechanisms. Physical activity can increase energy expenditure, affect core body temperature, regulate the secretion of hormones such as cortisol and melatonin, and assist in the synchronization of circadian rhythms which play an important role in the sleep process and sleep quality (Nys et al., 2022). Individuals who are physically active generally have a tendency to obtain better sleep duration and efficiency compared to individuals who are less active. However, this relationship is not always found consistently in every population because sleep quality is a multidimensional phenomenon influenced by various other factors outside of physical activity (Nakie et al., 2024).

The non-discovery of a significant relationship in this study indicates that student sleep quality is likely more influenced by other factors such as academic stress, pressure to complete final projects, anxiety about the future, use of electronic devices before bed, caffeine consumption, and irregular sleep patterns. Psychological factors in final-year students often become a more dominant determinant compared to physical activity, because high academic stress, anxiety, and pressure in completing final projects can have a greater influence on sleep quality (Siregar & Rengkuan, 2025). Therefore, even though respondents have a high level of physical activity, sleep quality does not always show a corresponding pattern.

The results of this study are in line with research conducted by (Syifa Shabrina Maharani, 2023) on students of the Faculty of Medicine, Universitas Tarumanagara, which showed that the relationship between physical activity and sleep quality is not always strong because sleep quality is influenced by various other complex factors. Furthermore, international research conducted on university students also shows that the relationship between physical activity and sleep quality is often mediated by mental health conditions, quality of life, and other behavioral factors (Moussa-Chamari et al., 2024).

However, the results of this study differ from the research (Alhusami et al., 2024) on Health Students at Mohammed Bin Rashid University which found a relationship between physical activity and sleep quality, but the strength of the relationship was influenced by respondent characteristics and other lifestyles. The study showed that students with better physical activity tend to have better sleep quality. This difference in results can be caused by differing respondent characteristics, sample sizes, measurement instruments, and research environmental conditions. Research conducted by (Sofyan et al., 2025) on sports students at Universitas Negeri Surabaya also reported a relationship between physical activity and sleep quality, thus showing that the relationship between the two variables still yields varying results across different student populations.

The findings of this study indicate that efforts to improve student sleep quality cannot be focused solely on increasing physical activity. A more comprehensive approach needs to be taken by paying attention to psychological factors, stress management, gadget usage habits before bed, and the application of good sleep hygiene (Chu et al., 2023). Given that sleep quality is influenced by various factors, efforts to improve it among students need to be carried out through a comprehensive approach, including lifestyle management and support for psychological well-being

The comparative analysis shows that male students have a higher level of physical activity compared to female students. This finding is consistent with various studies showing that males tend to have greater involvement in moderate to vigorous-intensity physical activity. Nevertheless, no significant difference in sleep quality was found between the two groups, thereby indicating that the gender factor is not a main determinant of sleep quality in final-year students.

CONCLUSION

This study aims to analyze the relationship between the level of physical activity and sleep quality in final-year students of the Sport Science Study Program, Faculty of Sport Science, Universitas Negeri Semarang. The research results show that the majority of respondents have a high level of physical activity (50%), yet the majority of respondents experience poor sleep quality (95%). Based on the Spearman Rank correlation test results, a correlation coefficient value of $\rho = 0.044$ was obtained with a significance value of $p = 0.786$ ($p > 0.05$), so it can be concluded that there is no significant relationship between the level of physical activity and sleep quality in final-year Sport Science students. Thus, the research hypothesis which states that there is a relationship between physical activity and sleep quality is rejected. These findings indicate that student sleep quality is likely not only influenced by physical activity, but also by other factors not measured in this study, such as academic stress, final project workload, use of gadgets before bed, irregular sleep patterns, as well as psychological and environmental factors.

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