



ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND SLEEP QUALITY AMONG FIRST-YEAR NURSING STUDENT

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ABSTRACT

Sleep is a biological necessity that is important for physical and mental recovery, especially for first-year students who are undergoing academic transition. Changes in activity patterns, academic workload and organizational involvement affect sleep quality. Physical activity is known to play a role in improving sleep quality, but empirical evidence varies. The study aims to determine the relationship between physical activity and sleep quality among early-level nursing students at STIKes Permata Nusantara. The design of this study is correlational with a cross-sectional approach. The study population consisted of 94 students, with 35 respondents selected using purposive sampling. Physical activity was measured using the Global Physical Activity Questionnaire (GPAQ) demonstrated acceptable validity when correlated with accelerometer data ($r=0,48$) and reability (Cronbach's $\alpha=0,73$). Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) demonstrated acceptable validity ($r=0,45-0,85$) and reliability (Cronbach's $\alpha=0,776$). Bivariate analysis was performed using correlation tests. The results showed that most respondents had light physical activity (42,9%) and poor sleep quality (74,3%). The correlation test results showed a significant negative relationship between physical activity and sleep quality ($p<0,032$). Researchers concluded that physical activity has a significant negative relationship with sleep quality, and excessive physical activity during academic transitions can contribute to sleep disturbances.

Keywords: nursing students; physical activity; sleep quality; transition period

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INTRODUCTION

Poor sleep quality is a common problem among health students, mainly due to academic demands (Alhusami et al., 2024). The high prevalence of sleep disorders among students is associated with academic and organizational activities (Gasril, 2024). This has a negative impact on concentration during study (Wulandari & Pranata, 2024). Sleep disorders are highly prevalent and disrupt normal circadian rhythms (Alruwaili et al., 2023; M. Zhao et al., 2020). The National Sleep Foundation reports that more than half of adults in the United States experience inadequate sleep quality, with 50% falling into the very poor category. A total of 37% are dissatisfied with their sleep, 38% do not feel refreshed upon waking, and 46% frequently wake up during the night (NSF, 2025). Adjaye-gbewonyo et al., (2022) shows that 14,5% of adults have difficulty falling asleep almost every day, and 21% have difficulty staying asleep. The WHO reports that 19,1% of the world population experiences significant sleep disorders, with a prevalence of sleep difficulties of 25-57% per year and 19% of those cases being insomnia. Recorded cases of sleep disorders 83.952 in the United States and 8.712 in Mexico (Padila, 2025). Globally, the prevalence of sleep disorders among university students is quite high with meta-analyses reporting that 55,64% of students experience poor sleep quality (Binjabr et al., 2023; Nakie et al., 2024). A cross-country study of seven countries shows that the prevalence of sleep disorders among medical students is 73,5% (Tahir et al., 2021).

Research shows that 51% of Indonesians do not get adequate sleep, with 21% sleep less than five hours per night (Anggraini et al., 2025; Warastri, 2024). The prevalence of sleep disorders reaches 10% or around 23 million people (Amanda & Nugrahaeni, 2019; Andiani & Udijono, 2024). Research reveals that the prevalence of poor sleep quality among adolescents and young adults is quite high, with 62,9% not meeting good sleep quality standards (Naibaho et al., 2025). Zaiyati & Ridwan (2023) reported that 72,5% of students experienced a decline in sleep quality due to academic workload and stress. Asyari et al., (2024) shows that 68% of students experience poor sleep quality with an average sleep time of less than 6 hours per night, influenced by high academic workload, use of electronic devices late into the night, and psychological pressure. Overall, the study findings confirm that poor sleep quality is influenced by academic demands, stress, and low physical activity.

Low physical activity is associated with poor sleep quality, while regular exercise improves sleep quality (Ibrahim et al., 2024; Yin et al., 2024). Students show a tendency towards low physical activity due to excessive gaming and gadget use before bedtime (Jose & Das, 2024). The habit increases the risk of insomnia and impacts cognitive flexibility (Li et al., 2024). Ahmed et al., (2024) reporting from 1.200 medical students in Saudi Arabia, 38,8% are gamers, with the majority playing before bedtime. Alahmadi et al., (2024) reporting from 7.393 students spent ≥ 7 hours/day in a sedentary position. Octania et al., (2024) shows that 29,2% of students have low physical activity levels, while Octania et al., (2024) reported that 63% of physiotherapy students have low levels of physical activity. Poor sleep hygiene practices such as excessive caffeine consumption, staying up late, exposure to blue light, and irregular eating patterns further worsened sleep quality (Ibrahim et al., 2024; Vijayan et al., 2025). However, research on the relationship between physical activity and sleep quality among early-stage nursing students is still limited, so further study is needed.

First-years students often face challenges adapting to the university environment, which can cause fear, anxiety and academic pressure (Putra & Ahmad, 2020). Academic stress causes emotional and physical symptoms, including sleep disorders (Peranginangin & Rantung, 2024). Risk factors academic stress include social support, self-efficacy, self-adjustment, teaching methods, lecture schedules, relationships with friends, and female gender, which is more vulnerable (Deborah & Immanuel, 2024). First-years students are also vulnerable because their emotions are not yet stable, so stress affects their academic performance (Juniasi & Huwae, 2023). Putu et al., (2025) showed that 70,2% of initial students experienced moderate academic stress, 28,6% experienced high stress and 1,2% experienced low stress. Nappoe & Palupi Triwahyuni (2025) reported that 66,4% of first-year nursing students were in the severe or very severe stress category. Tendean et al., (2022) found that poor sleep quality increases stress, and conversely, the higher the stress, the more difficult it is to maintain sleep quality. Therefore, this study was conducted to determine the relationship between physical activity and sleep quality among early-level nursing students at STIKes Permata Nusantara.

METHOD

This study is a correlational study with a cross-sectional approach. The study was conducted at STIKes Permata Nusantara in February-March 2026. The study population consisted of all early-level nursing students (N=94), with 35 respondents meeting the inclusion criteria and selected using purposive sampling. Physical activity was measured using the Indonesian version of the Global Physical Activity Questionnaire (GPAQ) demonstrated acceptable validity when correlated with accelerometer data $r=0,48$ and reability Cronbach's $\alpha=0,73$ (Cleland et al., 2014; Tahlil., 2021). Sleep quality was measured using the Indonesian version of the Pittsburgh Sleep Quality Index (PSQI) demonstrated acceptable validity $r=0,45-0,85$ and reliability Cronbach's $\alpha=0,776$ (Adawiyah, 2022). The data were analysed using correlation tests. The value of $p<0,05$ was considered significant.

RESULT

Table 1.
Respondent characteristics (n= 35)

Respondent characteristics	f	%
Gender		
Male	9	25,7
Female	26	74,3
Age		
17-18 years old	22	62,9
19-20 years old	13	37,1
BMI Category		
Underweight	9	25,7
Normal	19	54,3
Overweight	2	5,7
Obese	5	14,3
Physical Activity		
Light	15	42,9
Moderate	13	37,1
Heavy	7	20,0
Sleep Quality		
Good	9	25,7
Poor	26	74,3

Univariate analysis in table 1. Shows that the majority of respondents were aged 17-18 years 22 people (62,9%), while the rest were aged 19-20 years 13 people (37,1%). In terms of gender, female respondents were more dominant 26 people (74,3%) than male respondents 9 people (25,7%), in line with the characteristics of nursing study programmers, which are generally dominated by female students. Nutritional status based on Body Mass Index (BMI) shows that most respondents were in the normal category (54,3%) although there were still respondents in the underweight (25,7%), overweight (5,7%) and obese (14,3%) categories. The respondents physical activity was mostly in the light category (42,9%), followed by moderate activity (37,1) and heavy activity (20,0%). Meanwhile, the respondents sleep quality showed that the majority had poor sleep quality (74,3%), while only a small portion has good sleep quality (25,7%)

Table 1.
Association between physical activity and sleep quality

Physical activity	Sleep quality						p
	Good		Poor		Total		
	f	%	f	%	f	%	
Light physical activity	7	20,0	8	22,9	15	42,9	0,032
Moderate physical activity	1	2,9	12	34,3	13	37,2	
Heavy physical activity	1	2,9	6	17,1	7	20,0	

Table 2. shows the results of bivariate analysis between physical activity and sleep quality, with a p= value of 0,032, which means $p < 0,05$. This indicates that there is a statistically significant negative relationship between physical activity and sleep quality. However, the distribution pattern shows that the proportion of poor sleep quality is higher in the moderate and low physical activity groups compared to the high physical activity group.

DISCUSSION

The results of the analysis indicate a significant negative correlation between physical activity and sleep quality. These findings are consistent with Rahma's (2022) entitled 'physical activity is related to sleep quality in students', where the results of the spearman's rank correlation analysis showed a significant value of 0,001, which is less than 0,005 ($0,000 < 0,005$), meaning that there is a relationship between physical activity and sleep quality of students. Similar findings by Zhu et al., (2025) in China show that regular physical activity has a positive effect on students' sleep quality, with a mediating mechanism through health literacy and life satisfaction. Research by Saat et al., (2021) also shows a significant relationship between physical activity, sleep quality, and cardiovascular risk factors in students.

Additionally, research by Sofyan et al., (2025) indicates that students with moderate to high levels of physical activity have better sleep quality compared to students with low physical activity. Another study by Putri (2024) reported that physiotherapy students with regular physical activity had better sleep quality, while students with low physical activity were more prone to sleep disorders, with the results of the spearman's test yielding a p-value of $p=0,028$ ($p<0,05$) and a correlation value of $-0,317$. Overall, evidence from previous studies indicates that regular physical activity acts as a protective factor against sleep disorders.

Excessive physical activity forces the body to rely on anaerobic glycolysis to produce quick energy. This process produces lactic acid as a by-product. The accumulation of lactic acid in the muscles disrupts cellular chemical reactions, causing fatigue, muscle tension, and even injury. This condition makes it difficult for the body to relax, thereby disrupting sleep onset, maintaining sleep, and increasing the risk of waking up early (McCarthy et al., 2023). Research by Quittmann et al., (2026) confirms that lactate accumulation due to high-intensity exercise has an impact on poor physiological recovery. Meanwhile, research by Zhu et al., (2025) shows that moderate physical activity does not always guarantee good sleep quality, as psychosocial factors such as academic stress and life satisfaction also play a role. On the other hand, Zhao et al., (2023) emphasise that consistent light activity can actually improve sleep quality, as the body does not experience excessive fatigue and is still able to maintain energy homeostasis.

Physiologically, physical activity plays a role in the accumulation of adenosine in the brain, which induces sleep pressure (Ma et al., 2023; Reichert et al., 2022). Physical activity also helps synchronise circadian rhythms and regulate core body temperature, where a decrease in temperature after exercise facilitates the sleep onset process (Harding et al., 2020; Healy et al., 2021). Thus, physical activity has a dual mechanism that can improve sleep quality when performed at the right intensity, but can reduce sleep quality when performed excessively.

CONCLUSION

The study shows that there is a significant negative correlation between the level of physical activity and the quality of sleep among first-years nursing students at STIKes Permata Nusantara ($p=0,032$). The higher the level of physical activity, the greater the proportion of students who experience poor sleep quality. This indicates that excessive physical activity during the academic transition period can contribute to sleep disturbances, thus requiring balanced physical activity to support optimal sleep quality.

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