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Physical Activity, Sleep Quality and Academic Performance among Physiotherapy Students: A Cross-Sectional Study

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ABSTRACT

Introduction: The lockdown due to the COVID-19 leads to changes in health behaviors, including physical activity and sleep quality. The consequence of insufficient sleep among most university students is a decline in their learning ability. Furthermore, insufficient sleep and lack of physical activity can have detrimental impacts on students' physical well-being, such as increased risk of chronic diseases. This study aimed to explore the association between physical activity, sleep quality, and academic performance in Indonesian undergraduate physiotherapy students.

Methods: This study used a cross-sectional design. One hundred and thirty-four students (Female, aged 18-25) were recruited from the Bachelor Program in Physiotherapy at a university in South Sulawesi, Indonesia. The Pittsburgh Sleep Quality Index was used to assess sleep quality. To assess physical activity level, The International Physical Activity Questionnaire-Short Form (IPAQ-SF) was used. Students' academic performance was evaluated based on the final grades of the selected course.

Results: The majority (63%) of physiotherapy students had low physical activity levels. Almost all students (95.5%) suffered from poor quality of sleep. Sleep quality and academic performance were found to be positively correlated, indicating that students with good sleep quality performed better in school. It is noted that 64% of physiotherapy students with A and B grades had low physical activity.

Conclusion: Academic performance is negatively correlated with poor sleep quality. High-achievement students typically have lower levels of physical activity. This study highlights the issue of insufficient sleep quality and the need for promotion of sleep hygiene.

Keywords: Sleep quality; students; universities; academic performance; health behavior

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Introduction

The lockdown due to the COVID-19 causes changes in health-related behaviors, such as physical activity and sleeping habits. Numerous studies have documented how the COVID-19 pandemic affected sleep and physical activity patterns. A study conducted on university students in Spain found that among physically active students, the COVID-19 confinement resulted in a decrease in their level of physical activity and sleep quality.[1] Meanwhile, no significant changes in sleep quality were observed in college students in the city of Seville. However, the study also reported a decrease in the amount of step/day by 68% during home confinement [2]. By contrast, Blanco found that during the COVID-19 lockdown, among Spanish health science students, there was a noticeable rise in their engagement with physical activity. [3] University students commonly reported that sleep is one of the initial health behaviors they neglect. Furthermore, in higher education, sleep deprivation is widely acknowledged and accepted as a feasible choice for students to effectively manage their academic responsibilities and social commitments. The consequence of this lack of sleep among most university students is a decline in their ability to learn and perform academically. Furthermore, insufficient sleep can have detrimental impacts on students' physical well-being, such as increased risk of obesity, hypertension, and diabetes [4].

High levels of daytime drowsiness and poor sleep quality were found to be strongly correlated with low academic performance, according to a recent meta-analysis of sleep disturbance and academic performance. A high number of medical students had excessive diurnal somnolence, inadequate sleep duration, and poor quality of sleep [5]. In addition to sleep quality, individuals with higher physical activity levels tend to have better executive function [6]. A study by Alhazmi et al. also confirmed that compared to physically active students, sedentary students have lower academic performance.[7] A study conducted in Indonesia revealed no correlation between sleep quality and academic performance in Medical Students. A high number of students (73.1%) were reported having poor sleep quality.[8] However another study conducted in first-year medical students showed that sleep quality was significantly correlated with academic performance.[9] Few studies have explored the relationship between physical activity and academic performance of University Students in Indonesia. One study showed no correlation between physical activity and academic performance in university students.[10]

Despite the critical role of sleep and its potential health consequences, physiotherapists are not typically educated about sleep or the health benefits of sleep as part of their entry-level education program. Thus, a physiotherapy education program needs to identify sleep deprivation and develop an early preventive plan to promote optimal health for future physiotherapists. A study conducted on Doctor of Physical Therapy (DPT) students has shown that poor sleep quality was experienced by almost half of DPT students.[11] Meanwhile, many studies have shown that healthcare professionals engage in the same

unhealthy habits as the broader public. It has been shown that health professionals with unhealthy behaviors may be less credible as health promoters [12]. Despite being knowledgeable regarding the benefits of physical activity, a high percentage of physiotherapy undergraduates were "inactive" [13].

To the best of our knowledge, no research has been conducted to examine the prevalence of physical activity level and sleep quality in undergraduate physiotherapy students in Indonesia. The relationship between physical activity, sleep quality, and academic performance in Indonesian undergraduate physiotherapy students has yet to be examined. Therefore, this study aimed to identify the prevalence of physical activity level and sleep quality, as well as to determine the association between physical activity, sleep quality, and academic performance in Indonesian undergraduate physiotherapy students.

Methods

This study was a cross-sectional design conducted from April to May 2021 among the students of Bachelor of Physiotherapy, Faculty of Nursing, at a university in South Sulawesi, Indonesia. A total of 134 physiotherapy students were enrolled. The following criteria were used for participant recruitment: registered female student of Bachelor of Physiotherapy by the time of recruitment, 17-25 years of age, willing to provide informed consent to participate in the study. Students with chronic diseases were excluded from the study.

Data collection was performed by a self-administered questionnaire posted through social media (WhatsApp Group). Demographic information such as age, academic year, and socioeconomic status were collected. Due to the assessment of physical activity level, the International Physical Activity Questionnaire-Short Form (IPAQ-SF) was administered [14]. IPAQ-SF has been recommended as a cost-effective method for assessing physical activity. The IPAQ-SF contains 7 items that assess the frequency and duration of vigorous-intensity activity, moderate-intensity activity, walking (classified as a moderate-intensity activity), and sitting behavior for the last 7 days.[15] The Pittsburgh Sleep Quality Index (PSQI) was selected to investigate sleep quality [16]. The PSQI had been studied in Indonesian. The Indonesian version of PSQI was validated with the reliability of α=0.79, content validity of 0.89, and specificity of 81% [17]. The academic performance of the participant was evaluated based on the final grades of the selected course [18] due to being the course with the highest credit in each semester during the previous semester. The grades of the students were obtained from the course coordinators.

The statistical analysis in the study was conducted with SPSS 26. A descriptive analysis was performed to present the baseline characteristics of the participants. Mean and standard deviation (SD) were generated for continuous variables. The Kolmogorov-Smirnov test was carried out to assess the distribution of the data. Then, Spearman's correlation was calculated to determine the association between physical activities and sleep quality against academic performance. Significance was set at $p < 0.05$.

This study was approved by The Health Research Ethics Committee, Faculty of Public Health, at a large University in South Sulawesi, Indonesia (3004/UN4/14.1/TP.02.02/2021). The participant were informed about the objective of the study, and they could withdraw at any time.

Result

A total of 134 participants were enrolled in this study. The characteristics of the participants are shown in Table 1. Overall, the mean age of participants was 19.78 years. All participants in this study were in their first, second, third and fourth years at university. Most participants (85.6%) had medium socioeconomic status in this study. We also observed a high prevalence of low physical activity (63%). 67.9% of participants reported insufficient sleep (less than 6 hours). This study also found that 95.5% of participants were classified as poor sleepers (PSQI score > 5). The majority of participants reported having B grades in academic performance.

Table 1. Characteristics of study participants

Characteristics	Total (N=134)
Age, years	19.78 ± 1.31
Year of study, n (%)	
1st year	46 (34.3)
2nd year	34 (25.4)
3rd year	20 (14.9)
4th year	34 (25.4)
Socioeconomic status, n (%)	
Medium	115 (85.8)
High	19 (14.2)
Physical Activity	
Low	84 (63)
Moderate	40 (30)
High	10 (7)
Sleep Duration	
≥6 hours	43 (32.1)
<6 hours	91 (67.9)
Sleep Quality	
Poor	128 (95.5)
Good	6 (4.5)
Academic Performance	
A Grade	14 (10.4)
B Grade	76 (56.7)
C Grade	31 (23.1)
Failing Grade	13 (9.7)

Source: Primary Data, 2021

There is no significant relationship was found between physical activity levels and academic performance. However, sleep quality had a significant correlation with academic performance. Among

PSQI domains, our study also demonstrated that only sleep disturbance was significantly correlated with academic performance (Table 2).

Table. 2 Correlation between Physical Activity, Sleep Quality, and Academic Performance

Variables	Academic performance level	
	r_s	*p*
Physical activity	0.108	0.214
Global sleep quality	0.281**	0.001
Subjective sleep quality	0.124	0.154
Sleep duration	0.152	0.080
Sleep latency	0.053	0.544
Sleep efficiency	0.064	0.465
Sleep disturbance	0.0276**	0.001
The use of sleeping meditation	-0.011	0.902
Daytime dysfunction	0.121	0.162

**: p<0.01

Source: Primary Data, 2021

Discussion

This study revealed that most physiotherapy students (63%) had low physical activity levels. Also, almost all physiotherapy students (studied participants) reported poor sleep quality. Furthermore, our findings revealed no significant correlation was found between physical activity and academic performance in undergraduate physiotherapy students. However, we found that sleep quality was significantly correlated with academic performance.

To be a credible future health promoter in the community, undergraduate physiotherapy students should demonstrate high physical activity. Furthermore, physiotherapy students are expected to know about recommended physical activity and its benefits. However, our study revealed that most physiotherapy students (63%) had low physical activity levels. Only 7.5% of students participated in high physical activity. Our findings agree with another study conducted in Poland which reported that most Polish Physiotherapy students (40.4%) had low physical activity levels [19]. We assumed that the COVID-19 pandemic also reduced physical activity levels in physiotherapy students. However, in 2013, a study conducted in Sri Lanka found that a larger percentage of undergraduate physiotherapy students were classified as inactive (48.7%), while only 15.9% were falling into the highly active group [13]. We can conclude from the previous studies that even before the COVID-19 pandemic, the proportion of physiotherapy students with low physical activity levels was very high. However, our results contrast to those of previous researchers who reported that physical therapist students in Poland demonstrated the highest level of physical activity, 54% had moderate physical activity level, and none had low physical

activity level [20]. To the authors' knowledge, our study reported the highest percentage of physical therapy students with low physical activity levels compared to those in other countries. Many factors contribute to physical inactivity in physical therapy students. One study indicated that the primary contributing factors include insufficient time, lack of motivation and support, inadequate facilities, and other personal reasons[13]. Because physical therapy students are the future physical therapists who play a role in promoting physical activity in the community, this study encourages the urgent need to diminish the knowledge-practice gap about physical activity in studied participants. In this study, we also observed no significant correlation between physical activity level and participants' academic performance. However, it is noted that 64% of students with A and B grades had low physical activity levels. It indicates that students with better grades tend to have low physical activity levels. However, future research is warranted to investigate the causal relationship between physical activity and academic performance.

One published article has shown that as healthcare professionals, physiotherapists should integrate sleep into health prevention, promotion, and wellness. In addition, physiotherapy education programs should include sleep health in their curriculum [21]. Thus, physiotherapy students are expected to have knowledge and awareness of the importance of sleep health. In fact, our study indicated that almost all physiotherapy students (studied participants) reported poor sleep quality. Only one-third of the participants had adequate sleep (≥6 hours). Both inadequate sleep and poor sleep quality are health problems among university students. Despite the importance of sleep duration, sleep quality appeared to be a main concern in this population. A study observed that nearly 45% of students reported sleeping more during COVID-19 [22]. Several factors might contribute to poor sleep quality. A study conducted on university students indicated that being female, having less sleep a night, and spending more than an hour using social media before sleep were significant predictor for poor sleep quality [23]. Another study reported that body mass index and lack of sleep hygiene practice were associated with poor sleep quality [24].

Research revealed a correlation between sleep issues and lower declarative and procedural learning, neurocognitive function, and academic success.[25] The results of our study indicated a significant correlation between academic achievement and sleep quality. Students who slept poorly performed worse academically. It is well recognized that getting enough sleep is crucial for memory consolidation, which in turn helps students succeed academically. Insufficient sleep has been connected to issues with focus and working memory. [26] In general, long-term sleep deprivation has an impact on quality of life and an increase in risk of health issues including obesity, diabetes, and cardiovascular disease.[27] At the same time, low physical activity levels or physical inactivity can increase the risk of a range of diseases.[28]

Several limitations are worth noting in this study. The cross-sectional design of the study could not confirm the causality between sleep quality and academic performance. Also, objective measurement of

physical activity was not used in this study, therefore it could not reflect the objective physical activity level of participants. Using self-administered questionnaires may have the potential for over or underreporting.

Conclusion

This study showed a significant association between sleep quality and academic performance. Students with poor sleep quality had lower academic performance. Although no significant correlation was found between physical activity level and participants' academic performance, it is noted that 64% of students with A and B grades had low physical activity levels. This shows that students with better grades tend to be less physically active. Future studies should evaluate what factors may impact physiotherapy students' sleep duration and quality. In addition, physiotherapy education programs should provide promotion on sleep hygiene practices to improve sleep quality in their students. By doing so, we can expect better academic performance in physiotherapy students.

Conflicts of Interest

There is no conflict of interest.

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