The Effect Of Sleep Quality On The Grade Point Average Of Medical Students At Prima Indonesia University Class Of 2023

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Abstract.

Background: Medical students are exposed to high academic demands, which often lead to poor sleep quality and may impact cognitive function and academic achievement. This study aimed to analyze the relationship between sleep quality and grade point average (GPA) among medical students at Prima Indonesia University, class of 2023. Methods: A quantitative analytic approach with a cross-sectional design was used. The population included all active students from the 2023 cohort, with 162 respondents selected by simple random sampling. Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), and GPA data were obtained from official academic records. Data analysis involved univariate and bivariate statistics, with normality tested using Kolmogorov–Smirnov and correlation assessed by Spearman's rank test. Results: The majority of students (63.6%) had poor sleep quality (PSQI > 5), and the average GPA was 3.29. Spearman analysis showed a moderate negative correlation ($r_s = –0.505$, $p < 0.05$) between sleep quality and GPA, indicating that poorer sleep quality was associated with lower academic achievement. Conclusion: Poor sleep quality significantly affects academic performance in medical students, highlighting the need for sleep hygiene education and time management interventions.

Keywords: *Academic Achievement; Medical Education; Medical Students; Sleep Quality and Time Management.*

I. INTRODUCTION

Medical students face substantial academic demands, ranging from intensive lecture schedules and laboratory practicals to preparation for clinical rotations. These conditions frequently contribute to deteriorating sleep quality, despite adequate sleep being essential for maintaining cognitive function, concentration, and academic performance. Sleep deprivation has emerged as a critical public health concern that disproportionately affects students pursuing demanding professional degrees, with accumulating evidence suggesting its profound impact on learning outcomes and overall well-being.According to the Centers for Disease Control and Prevention, insufficient sleep represents a serious public health challenge affecting adolescents and young adults globally. Data indicate that approximately 73% of high school students in the United States fail to obtain adequate sleep on school nights (less than 8 hours per night), with female students experiencing higher rates of sleep deprivation (71.3%) compared to their male counterparts (66.4%). This pattern of insufficient sleep persists into higher education, particularly among medical students who encounter intensified academic pressures. Recent research has documented poor sleep quality among 67.63% to 88.1% of medical students internationally, with significant consequences for their cognitive performance and academic achievement. Furthermore, sleep deprivation induces neurological dysfunction and impaired cognitive performance, affecting attention, processing speed, working memory, and executive functions that are critical for complex decision-making in clinical contexts.

Multiple investigations have established significant associations between sleep quality and academic outcomes in medical education. A study at Brawijaya University revealed a meaningful relationship between sleep quality and learning outcomes among medical students ($p = 0.007$), while research at Warmadewa University demonstrated that 65.6% to 75.4% of students experienced sleep disturbances with significant correlations to academic performance ($r = 0.216$ to 0.247; $p < 0.01$). Similarly, investigations at STIKes Murni Teguh Medan found that sleep quality exhibited significant associations with academic achievement ($p = 0.001$), and recent studies in Saudi Arabia confirmed that students sleeping 6 to 7 hours nightly achieved higher GPAs compared to those with insufficient sleep duration ($p = 0.034$). However, contrasting findings from UIN Syarif Hidayatullah Jakarta reported no significant relationship between sleep quality and cumulative grade point average ($p = 0.131$), suggesting that the influence of sleep on academic performance may be moderated by various contextual factors, including academic workload, study habits, and

sociocultural environments. The physiological basis for these associations lies in the critical role of sleep, particularly rapid eye movement (REM) sleep, in memory consolidation and information integration, processes fundamental to effective learning and knowledge retention.These inconsistent findings indicate that the relationship between sleep quality and academic achievement is influenced by multiple factors, including academic stress, implemented study strategies, and students' social environmental conditions. Sleep quality is shaped by complex interactions among demographic characteristics, lifestyle behaviors (including screen time, caffeine consumption, and physical activity patterns), academic pressures, and psychological well-being.

Additionally, medical students often lack adequate knowledge regarding sleep hygiene practices, which further exacerbates sleep-related problems and their downstream effects on cognitive performance. Effective interventions targeting time management skills and stress reduction have demonstrated promise in improving both sleep quality and academic outcomes, highlighting the modifiable nature of these factors. This study was conducted to analyze the association between sleep quality and cumulative grade point average among medical students at the Faculty of Medicine, Prima Indonesia University, Class of 2023. The research addresses a critical gap in understanding how sleep patterns specifically affect academic performance within this institutional context, where local factors such as curriculum structure, teaching methods, and student support systems may uniquely influence outcomes. The findings are expected to provide scientific evidence for developing strategic interventions to improve sleep patterns and implement more effective time management approaches that support medical students' academic success. Furthermore, this research contributes to the growing body of literature on sleep health promotion in medical education, emphasizing the necessity for institutional policies that prioritize student well-being alongside academic excellence, ultimately fostering healthier learning environments conducive to optimal cognitive function and professional development.

II. METHODS

The research utilized a quantitative analytic approach with a cross-sectional design to examine the relationship between sleep quality and cumulative academic achievement among medical students. This design was chosen because it allows for the assessment of associations between variables at a single point in time without manipulating the study environment, which is suitable for health and educational research (Notoatmodjo, 2020; Creswell & Creswell, 2022; Sugiyono, 2021). The cross-sectional method is widely recognized for its efficiency in identifying correlations and is frequently applied in studies investigating behavioral and academic outcomes in student populations (Dharma et al., 2024; Djohar et al., 2023).The study population comprised all active students from the 2023 cohort at the Faculty of Medicine, Prima Indonesia University. The sample was determined using simple random sampling, resulting in 162 respondents who met the inclusion criteria. Inclusion criteria included active enrollment in the 2023 cohort and willingness to participate, while exclusion criteria were current illness or use of medications affecting sleep patterns, such as hypnotics or stimulants (Sutriyawan, 2021; Amalia et al., 2023). This sampling method ensures representativeness and minimizes selection bias, as recommended by Sudaryono (2022) and Emzir (2021).

Data collection involved the Pittsburgh Sleep Quality Index (PSQI) questionnaire, which has been validated and shown to have high reliability in measuring sleep quality among university students (Naryati & Ramdhaniyah, 2021; Buysse et al., 1989). Academic achievement was measured using official GPA records, providing objective and standardized outcome data (Setiawan & Kartika, 2022). All participants provided informed consent before data collection, in accordance with ethical research standards (Hartati et al., 2023).Data analysis was conducted in several stages. Univariate analysis described the characteristics of respondents, sleep quality, and GPA distribution. The Kolmogorov–Smirnov test was used to assess data normality, and because the data were not normally distributed, the Spearman rank correlation test was applied to evaluate the relationship between sleep quality and academic achievement. This non-parametric approach is appropriate for ordinal or non-normally distributed data and is widely recommended in educational and health research (Putra & Santosa, 2021; Sudaryono, 2022; Sugiyono, 2021). The results

were interpreted using correlation coefficients and significance values, with $p < 0.05$ considered statistically significant (Dharma et al., 2024; Djohar et al., 2023).

III. RESULT AND DISCUSSION

Description of Respondent Characteristics

Fig 1. Frequency Distribution by Gender, and Force

		Frekuensi (N)	Persentase (%)
Jenis Kelamin	Laki-laki	40	24.7%
	Perempuan	122	75,3%
Angkatan	2023		100%
Total		162	100%

As can be seen in Table 1, the number of respondents reached 162, with the largest proportion being female (122) (75.3%), while male respondents numbered 40 (24.7%). All respondents in this study were students from the class of 2023, representing 100%.

Sleep Quality Description

Fig 2. Overview of Respondents' Sleep Quality

Kategori	Frekuensi	Persentase
Baik (total skor psqi ≤ 5)	59	36,4%
Buruk (total skor psqi >5)	103	63,3%
Total	162	100%

Based on the results in Table 2, it was recorded that 59 respondents (36.4%) had good quality sleep with a PSQI score ≤ 5. On the other hand, the majority of respondents, namely 103 people (63.6%), were in the poor sleep quality category with a PSQI score > 5. This finding shows that the group with poor sleep quality is more dominant than those with good sleep quality.

Statistical Test Description

Fig 3. Description of descriptive statistical tests between variables

	Indeks Prestasi Kumulatif	Total Skor psqi
Mean	3.29	6.06
Median	3.18	6.00
Modus	3.09	6.00
Minimum	2.78	2.00
Maximum	4.00	14.00

Based on Table 3, the average GPA of respondents was recorded at 3.29. The median score for the overall data was 3.18, with the most frequently occurring score being 3.09. The lowest GPA was 2.78, and the highest was 4.00. These results indicate that respondents' academic achievement ranged from good to excellent.The average sleep quality score, measured using the PSQI, was 6.06. The median score was 6.00, and the most frequently occurring score was also 6.00. The lowest score recorded was 2.00, while the highest score was 14.00. These data illustrate the variation in respondents' sleep quality, with some experiencing good sleep quality while others experiencing poor sleep quality. In general, the descriptive findings show that although respondents' GPAs are relatively high, sleep quality conditions vary, with some respondents experiencing sleep problems.

Normality Test Overview

Fig 4. Normality Test

Variabel	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Indeks Prestasi Kumulatif	.308	162	.000	.823	162	.000
Total skor PSQI	.124	162	.000	.960	162	.000

This study employed the Kolmogorov-Smirnov normality test because the sample size exceeded 50 respondents. The results of the normality test showed that both the GPA and PSQI scores had significance values below 0.05 ($p < 0.05$), indicating that the data were not normally distributed. This indicates that respondents' scores tended to be unevenly distributed, either skewed to one side or with a wider variation than the normal distribution.

Bivariate Analysis Results

Researchers conducted a Spearman correlation test to examine the relationship between sleep quality (measured by the total PSQI score) and students' GPAs. The results of the analysis can be seen in the following table:

Fig 5. Correlation Test

			Indeks Prestasi Kumulatif	Skor PSQI
Spearman's rho	Indeks Prestasi Kumulatif	Correlation Coefficient	1.000	-.505**
		Sig. (2-tailed)	.	.000
		N	162	162
	Skor PSQI	Correlation Coefficient	-.505**	1.000
		Sig. (2-tailed)	.000	.
		N	162	162

Based on the results of the Spearman correlation analysis, a correlation coefficient ($r_s = -0.505$; $p < 0.05$) was obtained. This negative correlation value indicates an inverse relationship between sleep quality and GPA, meaning that the poorer a person's sleep quality (higher total score), the lower their cumulative grade point average. The strength of the relationship is categorized as moderate. Thus, a significant relationship is known between sleep quality and GPA of the Faculty of Medicine, UNPRI, class of 2023.

Discussion

Analysis of the results of this study shows a significant correlation between sleep quality and GPA. Spearman's correlation analysis yielded a coefficient of -0.505 with a significance value of $p < 0.05$. A negative coefficient indicates that poorer sleep quality leads to a lower GPA. The relationship found is moderate, suggesting that sleep quality significantly contributes to academic achievement.These results are in line with the physiological understanding that sleep plays a vital role in memory consolidation, information processing, and the recovery of cognitive functions that support a person's learning ability and academic performance. The Rapid Eye Movement (REM) phase in particular contributes to the strengthening of long-term memory and the integration of new knowledge with previously stored information.(Baranwal et al., 2023)If sleep quality is disturbed, students are more susceptible to decreased concentration, weakened memory, and increased fatigue, which can lead to decreased academic performance.This finding is consistent with previous research conducted by(Dharma, MFA; Pariartha, IM; Ekayani, 2024) At Warmadewa University, which reported a negative correlation between Pittsburgh Sleep Quality Index (PSQI) scores and academic achievement of medical students ($r = -0.247$; $p < 0.01$).

Similarly, research(Sari, RP; Widuri, 2024)Students of Murni Teguh Medan Health College also confirmed that students who have good sleep quality generally show higher academic achievement compared to those who have poor or poor sleep quality ($p = 0.001$).Despite this, the average GPA of students in this study remained in the good to excellent category, with an average score of 3.29. These findings indicate that

sleep quality is not the only aspect that plays a role in influencing academic achievement, as learning outcomes are also determined by various other factors, such as learning motivation, learning strategies, social support, and the individual's ability to adapt to the course load, which also make a significant contribution.(Putri, RA; Lestari, 2021)In other words, some students are still able to maintain their academic performance despite having suboptimal sleep quality. The overall research results confirm that sleep quality is a crucial factor influencing the academic success of medical students. High coursework loads, intense lab workloads, and a busy class schedule can negatively impact sleep quality, which in turn impacts GPA achievement. Therefore, efforts are needed to improve students' sleep quality through education on sleep hygiene, study time management, and stress management to optimize academic success.

IV. CONCLUSION

The findings of this study reveal a significant negative correlation between sleep quality and grade point average among medical students at Prima Indonesia University, class of 2023. The majority of students experienced poor sleep quality, and this was associated with lower academic achievement, as indicated by a moderate negative Spearman correlation coefficient. These results are consistent with previous systematic reviews and meta-analyses, which have shown that poor sleep quality is statistically linked to reduced academic performance in medical students. However, it is important to note that while sleep quality plays a substantial role, academic achievement is also influenced by other factors such as motivation, learning strategies, and social support, which may help some students maintain high performance despite suboptimal sleep.

This research is subject to several limitations, including its cross-sectional design, which limits the ability to infer causality, and the reliance on self-reported data, which may introduce bias. The study was also limited to a single institution and cohort, potentially affecting the generalizability of the results. Future research should consider longitudinal designs, objective sleep measurements, and the inclusion of additional variables such as stress, time management, and lifestyle factors. Practically, these findings highlight the need for universities to implement sleep hygiene education, stress management programs, and support services to promote better sleep and academic outcomes among medical students. Such interventions could contribute to improved well-being and academic success in this population.

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