



Sleep Quality as a Determinant of Memory Function in Medical Students at Universitas Muslim Indonesia

Access this article online
 Quick Response Code :



DOI : 10.22487/htj.v12i2.1967

Andi Inas Farhamila Armin^{1*}, Fendy Dwimartyono², Achmad Harun Muchsin³,
 Muh. Alim Jaya⁴, Nevi Sulvita Karsa⁵

¹Medical Education Study Program, Faculty of Medicine, Universitas Muslim Indonesia

²Anesthesiology Department, Faculty of Medicine, Universitas Muslim Indonesia

³Anatomy Department, Faculty of Medicine, Universitas Muslim Indonesia

⁴Faculty of Medicine, Universitas Muslim Indonesia

⁵Psychiatry and Pharmacology Department, Faculty of Medicine, Universitas Muslim Indonesia

Email Corresponding:
 andiinasfarhamilaarmin@gmail.com

Page : 266-274

Article History:

Received: 2025-08-20

Revised: 2025-10-10

Accepted: 2026-04-30

Published by:

Tadulako University,
 Managed by Faculty of
 Medicine.

Website :

<https://jurnal.fk.untad.ac.id/index.php/htj/index>



This work is licensed under a
 Creative Commons Attribution-
 ShareAlike 4.0 International
 License

Abstract

Background: Poor sleep quality is a common issue among medical students and may negatively affect cognitive functions, particularly memory, which plays a crucial role in learning. **Objective:** This study aimed to analyze the influence of sleep quality on memory function among medical students at the Faculty of Medicine, Universitas Muslim Indonesia, from the 2022, 2023, and 2024 cohorts. **Methods:** A cross-sectional design was applied to 91 students selected using proportional stratified random sampling. Sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI), while memory performance was measured using the Everyday Memory Questionnaire (EMQ). Data were analyzed using Two-Way ANOVA. **Results:** Sleep quality significantly affected memory function ($p = 0.000$), with students reporting poor sleep showing higher memory impairment. Cohort level also had a significant effect ($p = 0.000$), where senior students demonstrated the highest prevalence of poor sleep quality (75%) and memory impairment (94.4%). Moreover, a significant interaction between sleep quality and cohort level ($p = 0.018$) indicated that the impact of sleep quality on memory varied across academic years. **Conclusion:** These findings highlight the importance of implementing interventions such as sleep management education, stress regulation, and regular monitoring of sleep quality, particularly for senior students.

Keywords: Sleep Quality; Memory; Medical Students; Cognitive Function.

Introduction

Sleep quality is a critical determinant of physical health, mental well-being, and cognitive performance, particularly in medical fields where sharp concentration, memory retention, and informed decision-making are essential. Globally, more than one-third of adults report experiencing insomnia symptoms, while two-thirds suffer nightly sleep disturbances, with approximately 30% developing chronic insomnia. Poor sleep has been linked to detrimental effects on memory,

attention, and executive functions, all of which are central to healthcare competence^{1,2}. These global trends emphasize the need to understand sleep quality's impact within high-demand populations such as medical students.

Medical students, particularly in Indonesia, experience heightened academic stress, erratic schedules, and lifestyle factors that predispose them to disturbed sleep patterns. Although international studies report inconsistent findings some indicating no significant sleep-memory correlation, others reporting strong associations the Indonesian

context remains underexplored. Notably, research at Udayana University found that 58.3% of preclinical and 74.8% of clinical students reported poor sleep quality^{3,4,5}, while broader student populations in Indonesia have shown even higher rates, up to 86% experiencing poor sleep⁶. This disparity reveals an academic and practical gap in understanding how sleep quality affects memory specifically among Indonesian medical students.

This study is urgent and novel primarily due to its focus on an underrepresented demographic medical students at Universitas Muslim Indonesia who face particular combinations of academic intensity, stress, and lifestyle disruption. Unlike previous studies, our research employs standardized tools like the Pittsburgh Sleep Quality Index (PSQI) for sleep and the Everyday Memory Questionnaire (EMQ) for memory assessment within a cross-sectional design spanning three academic cohorts. Importantly, it also investigates the interaction between academic year and sleep quality in predicting memory performance, adding depth beyond simple correlation analyses.

The central research question is: Does sleep quality influence memory performance among medical students, and does this effect vary across academic years? The study hypothesizes that poorer sleep quality significantly impairs memory functions and that the magnitude of this effect differs between academic cohorts. The objectives are to: (1) evaluate students' sleep quality using PSQI; (2) assess memory performance via EMQ; (3) compare these measures across three cohorts; and (4) analyze both the direct relationship between sleep quality and memory and its interaction with academic year.

Findings from this study will offer several valuable contributions. Academically, they can inform tailored interventions such as time management training, stress reduction, or sleep

hygiene education within medical curricula. From a policy standpoint, results may guide campus health programs to integrate sleep education or cognitive support services. Practically, recognizing sleep quality as not merely restorative but foundational for cognitive efficacy, this research underscores its significance in sustaining memory performance and, ultimately, academic success and future clinical aptitude among aspiring healthcare professionals.

Materials and Methods

Study Design

This research employed an observational analytic study with a cross-sectional design. The aim of this study was to analyze the influence of sleep quality on memory function among medical students within a single observation period. This design was chosen because it is suitable for analyzing the relationship between independent and dependent variables without providing any intervention, making it appropriate for educational and public health research settings.

Sample

The target population consisted of all medical students from the Faculty of Medicine at Universitas Muslim Indonesia, enrolled in the academic years 2022, 2023, and 2024 (total population = 957 students). The study sample was selected using proportional stratified random sampling to ensure representation from each academic cohort. The inclusion criteria were: (1) active medical students aged 18–25 years; (2) officially enrolled in the 2022, 2023, or 2024 cohorts; and (3) willingness to participate by providing informed consent. The exclusion criteria included: (1) incomplete responses to either the Pittsburgh Sleep Quality Index (PSQI) or the Everyday Memory Questionnaire (EMQ); (2) history of head trauma, dysmorphic disorders, or cerebral

palsy; (3) history of epilepsy or long-term use of antiepileptic drugs; and (4) history of intracranial infections. The minimum sample size was determined using Slovin’s formula with a 10% margin of error, resulting in 91 respondents, consisting of 36 students from the 2022 cohort, 32 from the 2023 cohort, and 23 from the 2024 cohort.

Data Collection Technique

Data were collected online through Google Forms to ensure accessibility and efficiency. Two standardized instruments were used in this study: (1) the Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality, where a score ≤ 5 indicates good sleep quality and >5 indicates poor sleep quality; and (2) the Everyday Memory Questionnaire (EMQ) to measure memory performance, categorized as follows: 0–20 = no significant impairment, 21–40 = mild impairment, 41–60 = moderate impairment, and >60 = severe impairment. Data collection was carried out within the Faculty of Medicine at Universitas Muslim Indonesia between April and July 2025.

Data Analysis Technique

Descriptive statistics were used to present the distribution of sleep quality and memory performance across different cohorts. Inferential statistics were performed using a Two-Way ANOVA test to evaluate the effects of sleep quality, academic cohort, and their interaction on memory performance. Data normality was assessed using the Shapiro–Wilk test, while variance homogeneity was tested using Levene’s Test. The level of statistical significance was set at $p < 0.05$. All analyses were performed using SPSS statistical software (IBM SPSS Statistics, Version 26).

Ethical Consideration

This study received ethical approval from the Research Ethics Committee of the Faculty of Medicine, Universitas Muslim Indonesia,

Makassar, under approval number 283/A.1/KEP-UMI/V/2025, issued on May 21, 2025. All participants were informed about the study’s objectives, procedures, potential risks, and benefits before signing the informed consent form. Confidentiality of participants’ identities and data was maintained in accordance with the ethical principles of health research.

Results

This section presents the findings of the study based on the research objectives. The results are presented in descriptive and analytical forms and are supported by tables and figures to provide a clearer overview of the data.

Characteristics of Respondents

A total of 91 respondents participated in this study, consisting of medical students from three academic cohorts (2022, 2023, and 2024) at Universitas Muslim Indonesia. The distribution of respondents across cohorts was 36 (39.6%) from the 2022 cohort, 32 (35.2%) from the 2023 cohort, and 23 (25.3%) from the 2024 cohort. Table 1 presents the basic characteristics of respondents regarding sleep quality.

Table 1. Distribution of Sleep Quality among Respondents by Academic Cohort

Cohort	Good	Poor	Total	% Good	% Poor
2022	9	27	36	25.0%	75.0%
2023	13	19	32	40.6%	59.4%
2024	15	8	23	65.2%	34.8%

Source: Primary Data, 2025

The results show that most respondents from the 2022 cohort (75.0%) reported poor sleep quality, whereas the 2024 cohort had a higher proportion of students with good sleep quality (65.2%).

Descriptive Analysis of Research Variables

The descriptive analysis revealed differences in average memory scores between groups based

on sleep quality and academic cohort. Table 2 displays the mean and standard deviation of memory scores among respondents.

Table 2. Average Memory Scores by Academic Cohort and Sleep Quality

Cohort	Sleep Quality	N	Mean Memory Score	Standard Deviation
2022	Good	9	35.22	12.20
2022	Poor	27	35.14	11.08
2023	Good	13	20.23	6.61
2023	Poor	19	33.26	10.09
2024	Good	15	17.26	4.26
2024	Poor	8	29.00	4.95

Source: Primary Data, 2025

Students with good sleep quality from the 2023 and 2024 cohorts demonstrated lower memory impairment scores compared to their counterparts with poor sleep quality. In contrast, no meaningful difference was observed in the 2022 cohort.

Hypothesis Testing or Relationships between Variables

The inferential analysis was conducted using Two Way ANOVA to assess the effect of sleep quality and cohort on memory function. Table 3 presents the results of the hypothesis testing.

Table 3. Two Way ANOVA Results for Memory Function

Factor	F	p-value	Interpretation
Sleep Quality	15.390	0.000	Significant
Cohort	11.256	0.000	Significant
Sleep* Cohort	4.191	0.018	Significant

Source: Primary Data, 2025

The results indicate that both sleep quality and academic cohort significantly influenced memory function ($p < 0.001$). Additionally, there was a significant interaction effect ($p = 0.018$), suggesting that the impact of sleep quality on memory varied across cohorts.

The distribution of memory impairment across cohorts is illustrated in Figure 1. The 2022 cohort had the highest proportion of

students with memory impairment (94.4%), followed by the 2023 cohort (78.1%), and the 2024 cohort (65.2%). This trend indicates a gradual decline in the prevalence of memory impairment among students across successive cohorts.

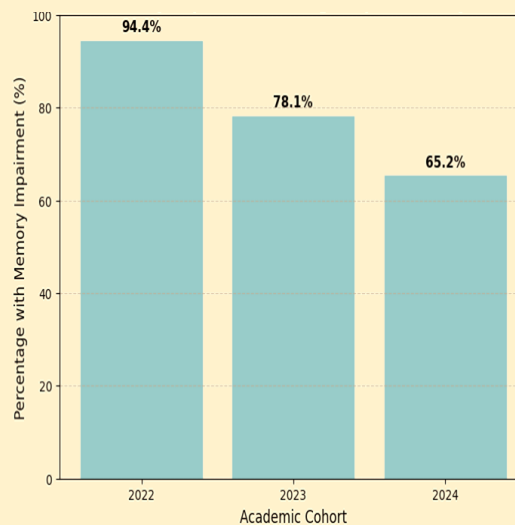


Figure 1. Distribution of Memory Impairment among Respondents by Academic Cohort

The findings demonstrate that sleep quality plays a crucial role in memory performance among medical students. Poor sleep quality was associated with significantly higher memory impairment scores. The 2022 cohort, which reported the highest prevalence of poor sleep quality (75.0%), also showed the highest proportion of memory impairment (94.4%). Furthermore, the significant interaction between sleep quality and cohort indicates that the negative impact of poor sleep quality on memory is more pronounced in senior students compared to junior cohorts.

Discussion

This study revealed that sleep quality significantly influences memory function among medical students at Universitas Muslim Indonesia, with poor sleepers consistently demonstrating higher levels of memory impairment compared to their peers with good sleep quality. The effect was most evident in the 2022 cohort, where 94.4% of students

experienced memory disturbances, underscoring a strong association between poor sleep and cognitive decline. These findings support the hypothesis that sleep quality is a key determinant of cognitive performance, particularly memory, as insufficient or fragmented sleep disrupts hippocampal function and impairs memory consolidation processes^{7,8}. Furthermore, the results indicate that memory performance was not only affected by sleep quality but also by academic cohort, with final-year students (2022 cohort) showing the highest prevalence of impairment. This may be attributed to greater academic demands, examination pressure, and psychological stress, which are common among senior students and have been shown to exacerbate sleep disturbances and reduce cognitive efficiency^{9,10,11}. Consequently, these findings highlight the importance of implementing preventive strategies, such as sleep hygiene education, stress management programs, and regular monitoring of sleep quality, particularly targeting senior medical students who face higher cognitive workloads^{12,13}.

The findings of this study are consistent with previous research emphasizing the crucial role of sleep in supporting cognitive processes, particularly memory consolidation. Kuan et al (2025)¹⁴ highlighted that slow-wave sleep (SWS) plays a central role in stabilizing and transferring newly acquired information into long-term memory storage. Similarly, Rai and Sundarakumar (2024)¹⁵ demonstrated that both sleep efficiency and duration were positively associated with memory performance, underscoring the importance of adequate and restorative sleep for optimal cognitive outcomes. Gong et al (2024)¹⁶ further revealed that poor sleep quality impairs visual working memory maintenance, reinforcing evidence that disturbances in sleep architecture can negatively affect short-term cognitive processes. In addition, Aydin and Aydin

(2024)¹⁷ found that poor sleep quality was negatively correlated with academic self-efficacy, thereby indirectly influencing memory and learning performance through reduced confidence in academic abilities. On the other hand, Zavec et al (2020)¹⁸ reported no significant association between subjective sleep quality and memory performance in healthy young adults. Such inconsistencies across studies may be attributed to methodological differences particularly between studies relying on subjective self-reports of sleep versus those using objective measures such as actigraphy or polysomnography as well as variations in population characteristics, including age, academic stress levels, and cultural differences that may modulate the impact of sleep on cognitive function.

These findings underscore the critical role of adequate and high-quality sleep in sustaining optimal cognitive performance, particularly memory, among medical students. Poor sleep hygiene not only disrupts cognitive processes but may also exacerbate academic stress and impair long-term learning outcomes^{19,20}. In a broader context, these results emphasize the urgent need for health promotion initiatives within academic institutions to raise awareness of the cognitive and academic consequences of insufficient or poor-quality sleep. Universities could integrate structured sleep education programs into student wellness curricula, focusing on evidence-based strategies such as time management training, stress reduction techniques, and cognitive-behavioral approaches for improving sleep quality^{21,22}. Moreover, routine sleep assessments could be incorporated into student health services to identify those at risk of sleep disturbances and provide timely interventions. Policymakers and academic administrators should also recognize sleep health as an essential determinant of academic success, making it a priority

alongside physical and mental health in campus health promotion policies^{23,24}.

The strength of this study lies in its focus on a specific population medical students who are particularly vulnerable to sleep disturbances due to high academic stress, heavy workloads, and irregular study schedules. This focus enhances the relevance and applicability of the findings to this group. Another notable strength is the use of both descriptive and inferential analyses, which allowed for a comprehensive examination of the relationship between sleep quality and memory function, thereby providing both an overview and more in-depth statistical insights.

Nonetheless, several limitations must be acknowledged. First, the cross-sectional study design limits the ability to infer causality; while an association between poor sleep quality and memory impairment was observed, it cannot be concluded that sleep disturbances directly cause memory deficits. Second, the measurement of memory impairment relied on self-reported questionnaires, which are inherently subjective and may introduce recall bias or social desirability bias. Third, potential confounding variables such as caffeine intake, late-night screen exposure, underlying psychiatric conditions (e.g., anxiety or depression), and lifestyle habits were not fully controlled for, despite their known influence on both sleep and memory. These limitations suggest that future studies should adopt longitudinal or experimental designs, use objective sleep assessments (e.g., actigraphy or polysomnography), and account for broader lifestyle and psychological factors to strengthen the evidence base.

Future studies should consider adopting longitudinal research designs to better establish the causal relationship between sleep quality and cognitive function over time²⁵. In addition, the use of objective sleep assessment methods, such as polysomnography or actigraphy, in

combination with standardized neurocognitive performance tests, would provide stronger validity and reduce reliance on self-reported data, which are often prone to bias^{26,27}. Furthermore, incorporating qualitative research approaches could offer valuable insights into medical students' perceptions of sleep, academic workload, and coping mechanisms in managing stress²⁸. Broadening the study sample to include students from different academic disciplines or institutions would also improve the generalizability of the findings beyond medical education settings²⁹. Ultimately, integrating psychological, behavioral, and physiological perspectives in future research is essential for developing comprehensive and evidence-based interventions aimed at promoting healthy sleep patterns, thereby supporting both cognitive performance and academic achievement^{30,31}.

Conclusion

The findings of this study indicate that sleep quality plays a significant role in determining memory function among medical students at Universitas Muslim Indonesia. Students with poorer sleep quality were more likely to experience memory impairment, suggesting that adequate and restorative sleep is essential for maintaining optimal cognitive performance in academic settings. These results highlight the importance of integrating sleep hygiene education and health promotion programs into medical student support systems to enhance learning outcomes and prevent cognitive decline.

From an academic perspective, this study contributes to the growing body of evidence linking lifestyle factors, particularly sleep, with cognitive functioning in young adults. In practical terms, the findings underscore the need for health professionals and educators to prioritize sleep quality as part of

comprehensive strategies to improve student well-being and academic success.

Future research should consider longitudinal designs to establish causal relationships between sleep quality and memory function, as well as explore the impact of targeted sleep interventions on cognitive performance in medical students.

Acknowledgment

This research was supported by the Faculty of Medicine, Universitas Muslim Indonesia, which provided essential facilities and resources throughout the study. The authors would also like to express their sincere gratitude to the academic supervisor, for invaluable guidance, direction, and constructive feedback during the preparation of this research. Special thanks are also extended to all medical students who participated as respondents, whose contributions made this study possible.

References

1. Clement-Carbonell V, Portilla-Tamarit I, Rubio-Aparicio M, Madrid-Valero JJ. Sleep Quality, Mental and Physical Health: A Differential Relationship. *Int J Environ Res Public Health*. 2021;18(2):460. doi:10.3390/ijerph18020460
2. Ampofo J, Sun B, Bentum-Micah G, et al. Investigating the impact of sleep quality on cognitive functions among students in Tokyo, Japan, and London, UK. *Front Sleep*. 2025;4:1537997. doi:10.3389/frsle.2025.1537997
3. Azad MC, Fraser K, Rumana N, et al. Sleep Disturbances among Medical Students: A Global Perspective. *J Clin Sleep Med*. 2015;11(01):69-74. doi:10.5664/jcsm.4370
4. Salikunna NA, Astiawan WD, Handayani F, Ramadhan MZ. Hubungan Kualitas Tidur dengan Tingkat Konsentrasi pada Mahasiswa. *Healthy Tadulako J J Kesehatan Tadulako*. 2022;8(3):157-163.
5. Sitepu JN. Hubungan Tingkat Stress, Kualitas Tidur, dan Prestasi Akademik Mahasiswa Fakultas Kedokteran Universitas HKBP Nommensen. *Healthy Tadulako J J Kesehatan Tadulako*. 2024;10(3):336-342. doi:10.22487/htj.v10i3.1129
6. Ghafoor A, Abaid M, Ali A, Iqbal F, Tariq M, Suleman A. Impact of Academic Stress on Sleep Patterns among Medical Students of Army Medical College, Rawalpindi, Pakistan. *Pak Armed Forces Med J*. 2025;75(2):394-398. doi:10.51253/pafmj.v75i2.12552
7. Almarzouki AF, Mandili RL, Salloom J, et al. The Impact of Sleep and Mental Health on Working Memory and Academic Performance: A Longitudinal Study. *Brain Sci*. 2022;12(11):1525. doi:10.3390/brainsci12111525
8. Khan MA, Al-Jahdali H. The consequences of sleep deprivation on cognitive performance. *Neurosciences*. 2023;28(2):91-99. doi:10.17712/nsj.2023.2.20220108
9. Khaled A, Almaghaslah D, Siddiqua A, Kandasamy G, Orayj K. Impact of sleep quality on academic achievements of undergraduate medical students: a cross-sectional study from Saudi Arabia. *BMC Med Educ*. 2025;25(1):59. doi:10.1186/s12909-025-06664-3
10. Xu Z, Niu M, Du W, Dang T. The effect of sleep quality on learning engagement of junior high school students: the moderating role of mental health. *Front Psychol*. 2025;16:1476840. doi:10.3389/fpsyg.2025.1476840

11. Agharid D, Nadhiroh SR. Hubungan Tingkat Aktivitas Fisik dan Kualitas Tidur dengan Status Gizi pada Santri Putra Pesantren Al-Qodiri Jember. *Healthy Tadulako J J Kesehat Tadulako*. 2024;10(2):180-186. doi:10.22487/htj.v10i2.1023
12. Alotaibi A, Alosaimi F, Alajlan A, Bin Abdulrahman K. The relationship between sleep quality, stress, and academic performance among medical students. *J Fam Community Med*. 2020;27(1):23. doi:10.4103/jfcm.JFCM_132_19
13. Vidović S, Rakić N, Kraštek S, et al. Sleep Quality and Mental Health Among Medical Students: A Cross-Sectional Study. *J Clin Med*. 2025;14(7):2274. doi:10.3390/jcm14072274
14. Kuan YC, Lin HW, Yang CC, et al. Slow-wave sleep, oxygen desaturation, and memory consolidation in sleep-disturbed individuals. *Int J Clin Health Psychol*. 2025;25(2):100574. doi:10.1016/j.ijchp.2025.100574
15. Rai P, Sundarakumar JS. Shorter sleep duration and lesser sleep efficiency are associated with poorer memory functions among non-demented, middle-aged, and older rural Indians. *Sleep Adv*. 2024;5(1):zpa038. doi:10.1093/sleepadvances/zpa038
16. Gong L, Wang M, Ye C, Liu Q. The impact of sleep quality on visual working memory varied with the duration of maintenance. *Front Psychol*. 2024;15:1404989. doi:10.3389/fpsyg.2024.1404989
17. Aydin F, Aydin A. Relationship among sleep quality, quality of life and academic self-efficacy of university students. *Curr Psychol*. 2024;43(24):21110-21119. doi:10.1007/s12144-024-05929-2
18. Zavec Z, Nagy T, Galkó A, Nemeth D, Janacsek K. The relationship between subjective sleep quality and cognitive performance in healthy young adults: Evidence from three empirical studies. *Sci Rep*. 2020;10(1):4855. doi:10.1038/s41598-020-61627-6
19. Ybañez J, Ebale JM, Bucog J, et al. The Relationship Between Sleep Habits, Academic Engagement, and Motivation in Senior High School Students. *Psychol Educ Multidiscip J*. 2025;35(7):841-847. doi:10.70838/pemj.350710
20. Kim SM, Park HS, Jeong YM, Park C. Comparing the Effects of Adequate and Insufficient Sleep on the Mental Health, Behavioral Outcomes, and Daily Lives of South Korean Adolescents. *Healthcare*. 2025;13(5):471. doi:10.3390/healthcare13050471
21. Johnson J, Bauman C, Pociask S. Teaching the Whole Student: Integrating Wellness Education into the Academic Classroom. *Stud Success*. 2019;10(3):92-103. doi:10.5204/ssj.v10i3.1418
22. Khatri P, Duggal HK, Lim WM, Thomas A, Shiva A. Student well-being in higher education: Scale development and validation with implications for management education. *Int J Manag Educ*. 2024;22(1):100933. doi:10.1016/j.ijme.2024.100933
23. Minghelli B. Sleep disorders in higher education students: modifiable and non-modifiable risk factors. *North Clin Istanb*. Published online 2021. doi:10.14744/nci.2021.44520
24. Ziporyn TD, Owens JA, Wahlstrom KL, et al. Adolescent sleep health and school start times: Setting the research agenda for California and beyond. A research summit

- summary. *Sleep Health*. 2022;8(1):11-22. doi:10.1016/j.sleh.2021.10.008
25. Chandra SS, Loganathan K, Awuzie BO, Wang F. A Longitudinal Study Examining the Association between Cognitive Behavior and Rational Abilities and the Effect of Sleep Quality on Construction Laborers. *Sustainability*. 2023;15(7):6257. doi:10.3390/su15076257
26. Lehrer HM, Yao Z, Krafty RT, et al. Comparing polysomnography, actigraphy, and sleep diary in the home environment: The Study of Women's Health Across the Nation (SWAN) Sleep Study. *SLEEP Adv*. 2022;3(1):zpac001. doi:10.1093/sleepadvances/zpac001
27. Maynard T, Appleman E, Cronin-Golomb A, Nearing S. Objective measurement of sleep by smartphone application: comparison with actigraphy and relation to self-reported sleep. *Explor Target Anti-Tumor Ther*. Published online September 26, 2021. doi:10.37349/emed.2021.00057
28. Saputri AD, Ritunga I. The effect of sleep quality due to stress on medical students' academic achievement: A cross-sectional study. *Christ J Glob Health*. 2023;10(2):52-57. doi:10.15566/cjgh.v10i2.799
29. Oudenampsen J, Van De Pol M, Van De Zande I, Blijlevens N, Das E. Interdisciplinary Education and Learning: Broadening Students' Perspective on Healthcare Communication. *Int J Interdiscip Educ Stud*. 2024;20(1):1-23. doi:10.18848/2327-011X/CGP/v20i01/1-23
30. Benjamin LS, Pasay-an E, Pangket P, et al. Impact of Sleep and Psychological Well-Being on the Academic and Clinical Performance of Nursing Students in Saudi Arabia. *Psychol Res Behav Manag*. 2024;Volume 17:1355-1364. doi:10.2147/PRBM.S453685
31. Ržman M, Vrečko I, Tominc P. Psychological Factors Impacting Academic Performance Among Business Studies' Students. *Educ Sci*. 2025;15(2):121. doi:10.3390/educsci15020121

Conflict of Interest Statement

The author(s) declare no commercial, financial, or personal conflicts of interest related to this research. All authors approved the final manuscript and consented to its publication in *Healthy Tadulako Journal*.

Copyright and Licensing

© Healthy Tadulako Journal. This open-access article is licensed under the Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0), allowing use, distribution, and reproduction with proper attribution.



Publisher's Note

Healthy Tadulako Journal, a peer-reviewed open access journal, is proudly published by the Quality Assurance Unit, Faculty of Medicine, Tadulako University, Indonesia.