

Association between Sleep Quality and Academic Performance among Undergraduate MBBS Students at a Tertiary Care Teaching Institution in Western Gujarat: A Cross-Sectional Study

Devang Vipulbhai Oza¹, Krupa Jasapara²

¹Medical Officer, Aayush Hospital, Morbi, Gujarat, India

²Medical Officer, Community Health Centre (CHC), Maliya Miyana, Gujarat, India

Received: 01-07-2026 / Revised: 15-08-2026 / Accepted: 21-09-2026

Corresponding author: Dr. Devang Vipulbhai Oza

Conflict of interest: Nil

Abstract

Introduction: Sleep quality plays an important role in cognitive function, memory, concentration, and learning. This study assessed sleep quality and its association with academic performance among undergraduate MBBS students.

Materials and Methods: A cross-sectional observational study was conducted among 100 MBBS students at a tertiary-care teaching institution in Western Gujarat over six months. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), and academic performance was evaluated using examination marks.

Results: Among 100 students, 65% had poor sleep quality and 35% had good sleep quality. Mean examination marks were higher among students with good sleep quality than those with poor sleep quality ($72.4 \pm 8.2\%$ versus $66.8 \pm 9.1\%$). A negative correlation between global PSQI scores and academic performance was reported ($p = -0.32$, $p = 0.001$).

Conclusion: Poor sleep quality was common among undergraduate medical students and was associated with lower academic performance. Promoting healthy sleep habits may support students' academic achievement and overall well-being.

Keywords: Sleep quality; MBBS students; Academic performance; Pittsburgh Sleep Quality Index (PSQI).

DOI: 10.25258/ijcpr.18.10.29

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Sleep is an essential physiological process that plays an important role in maintaining physical health, mental well-being, memory, and cognitive function. [1] Adequate sleep is particularly important for medical students because their academic curriculum involves extensive theoretical learning, practical training, and clinical responsibilities. [2] Poor sleep quality, irregular sleep schedules, and insufficient sleep duration are common concerns among undergraduate medical students due to academic workload, examinations, and lifestyle factors. [3] Sleep quality can influence several cognitive functions, including attention, concentration, memory consolidation, and learning ability. [4] Inadequate or disturbed sleep may lead to daytime sleepiness, fatigue, reduced motivation, and difficulty concentrating during lectures and examinations. These factors may adversely affect academic performance and the ability of medical students to acquire and retain essential medical knowledge. [5] Assessing the association between sleep quality and academic performance among

MBBS students may help identify sleep-related problems and their potential academic consequences. [6] Therefore, the present study aims to evaluate sleep quality among undergraduate medical students and determine its association with academic performance. The findings may help promote awareness regarding healthy sleep habits and support strategies to improve students' academic outcomes and overall well-being.

Materials and Methods

The present cross-sectional observational study was conducted at a tertiary-care teaching medical institution in Western Gujarat, India, among undergraduate Bachelor of Medicine and Bachelor of Surgery (MBBS) students. The study was conducted over a period of six months, from January 2026 to June 2026. A total of 100 MBBS students were enrolled using a convenient sampling technique. Approval was obtained from the Institutional Ethics Committee before the commencement of the study, and written informed

consent was obtained from all participants. Participation was voluntary, and confidentiality of the collected information was maintained throughout the study. Students enrolled in the MBBS course at the study institution who provided informed consent were included in the study. Students who declined participation or submitted substantially incomplete questionnaires were excluded. Data were collected using a structured, pretested questionnaire that included demographic details such as age, gender, and year of study, along with lifestyle and sleep-related information. Factors such as average sleep duration, bedtime routine, screen time before sleep, caffeine consumption, physical activity, and perceived academic stress were also recorded to identify factors potentially associated with sleep quality.

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), a validated questionnaire evaluating sleep patterns over the preceding month. The questionnaire assessed seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component was scored from 0 to 3, and the component scores were summed to obtain a global PSQI score ranging from 0 to 21. A global score greater than 5 was considered indicative of poor sleep quality, while a score of 5 or less indicated good sleep quality. Academic performance was assessed using the most recent available university examination marks or percentage obtained by the students, with appropriate consent and institutional permission. Sleep quality scores were subsequently compared with academic performance to evaluate the

association between the two variables. The collected data were entered into a spreadsheet, checked for completeness, and analysed using appropriate statistical software. Categorical variables, including gender, year of study, and sleep quality categories, were expressed as frequencies and percentages. Continuous variables, including age, sleep duration, global PSQI score, and examination marks, were presented as mean and standard deviation or median and interquartile range, depending on the distribution of the data.

The association between PSQI scores and academic performance was assessed using Pearson's or Spearman's correlation coefficient, as appropriate. Academic performance was compared between students with good and poor sleep quality using an independent-samples t-test or Mann-Whitney U test, depending on data distribution. The Chi-square test or Fisher's exact test was used for categorical comparisons. A two-sided p-value of less than 0.05 was considered statistically significant. Confidentiality was maintained by assigning unique identification numbers to participants and excluding personally identifying information from the analytical dataset.

Results

A total of 100 undergraduate MBBS students were included in the study to assess sleep quality and its association with academic performance. The results were analysed in terms of sociodemographic characteristics, distribution of sleep quality, comparison of academic performance between sleep-quality groups, and correlation between global Pittsburgh Sleep Quality Index (PSQI) scores and examination marks.

Table 1: Sociodemographic Characteristics of Study Participants (N = 100)

Characteristics	Number (n)	Percentage (%)
Age group (years)		
18–20	35	35.0
21–23	55	55.0
≥24	10	10.0
Gender		
Male	48	48.0
Female	52	52.0
Year of MBBS		
First year	25	25.0
Second year	25	25.0
Third year	25	25.0
Final year	25	25.0
Total	100	100.0

The sociodemographic characteristics of the participants are presented in Table 1. The majority of students belonged to the 21–23-year age group (55%), followed by those aged 18–20 years (35%). Students aged 24 years or older constituted 10% of the study population.

Table 2: Distribution of Participants According to Sleep Quality

Sleep quality	PSQI global score	Number (n)	Percentage (%)
Good sleep quality	≤5	35	35.0
Poor sleep quality	>5	65	65.0
Total		100	100.0

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). A global PSQI score greater than 5 was categorized as poor sleep quality, while a score of 5 or less was categorized as good sleep quality. As shown in Table 2, 65% of students had poor sleep quality, whereas 35% had good sleep quality. Poor sleep quality was therefore more prevalent among the participating medical students.

Table 3: Comparison of Academic Performance According to Sleep Quality

Sleep quality	Number (n)	Mean examination marks (%)	Standard deviation
Good sleep quality	35	72.4	8.2
Poor sleep quality	65	66.8	9.1

Academic performance was compared between students with good and poor sleep quality using examination marks. Students with good sleep quality had a mean examination score of $72.4 \pm 8.2\%$, compared with $66.8 \pm 9.1\%$ among students with poor sleep quality. The difference in mean examination marks was 5.6 percentage points, with higher marks observed among students with good sleep quality.

Table 4: Correlation between Sleep Quality and Academic Performance

Variables	Statistical method	Result
Global PSQI score and examination marks	Spearman's rank correlation	—
Correlation coefficient (ρ)	Spearman's rank correlation	-0.32
Two-sided p-value	Spearman's rank correlation	0.001
Statistical significance	$p < 0.05$	Significant

The relationship between global PSQI scores and examination marks was assessed using Spearman's rank correlation. The correlation coefficient was -0.32, indicating a negative association between PSQI scores and academic performance. The corresponding p-value was 0.001, which was below the predefined significance threshold of 0.05.

Discussion

The present study evaluated sleep quality and its association with academic performance among undergraduate MBBS students at a tertiary-care teaching institution in Western Gujarat. Poor sleep quality was observed in 65% of participants, and students with good sleep quality had higher mean examination marks than those with poor sleep quality ($72.4 \pm 8.2\%$ versus $66.8 \pm 9.1\%$).

These findings are consistent with Maheshwari et al. [7], who reported poor sleep quality in 64.24% of medical students and significantly lower mean grade point averages among poor sleepers. Similarly, Yassin et al. [8] found that sleep disorders, including insomnia and excessive sleepiness, were associated with poorer academic performance among medical students. The similarity in findings suggests that sleep-related problems are common in undergraduate medical education and may be associated with academic difficulties. Poor sleep may affect concentration, attention, memory consolidation, and learning efficiency, which are essential for the demanding MBBS curriculum. Rao et al. [9], in a systematic review and meta-analysis, reported poor sleep

quality in 39.8% of medical students across the included studies. Their analysis also demonstrated a modest but statistically significant association between sleep-quality scores and academic grades ($r = 0.15$, $p = 0.002$). The prevalence of poor sleep quality in the present study was higher than the pooled prevalence reported by Rao et al. [9]. This difference may be related to variations in academic workload, examination schedules, lifestyle habits, psychological stress, and institutional settings. BaHammam et al. [10] also reported associations between sleep habits, daytime sleepiness, and academic performance among medical students. Taken together, these findings emphasize that sleep quality and daytime functioning may be important considerations when evaluating academic performance, although the magnitude of their effects may differ across populations.

Further support for this association was provided by the study of Almojali et al. [11], who investigated sleep quality, psychological stress, and academic performance among medical students. Their findings highlighted the relationship between sleep disturbances and psychological well-being, indicating that stress and sleep quality should be considered together when evaluating student performance. In contrast, a cross-sectional study by Alotaibi et al. [11] involving medical students in Saudi Arabia reported a poor-sleep prevalence of 63.2% but found that poor sleepers had higher academic performance than students with better sleep quality ($p = 0.04$). This contrasting result indicates that the association between sleep quality and academic achievement is not uniform.

Differences in study design, examination measures, stress levels, study habits, and other confounding variables may contribute to these inconsistent findings. Therefore, sleep quality should be interpreted as one of several factors that may influence academic performance rather than as its sole determinant.

Christodoulou et al. [12] studied 177 medical students and reported poor sleep quality in 49.7% of participants. They found significant associations between sleep efficiency and academic scores, as well as between sleep disturbances and morning academic performance. Similarly, Okur et al. [13], in a study published in 2026 involving students from health-related disciplines, reported poor sleep quality in 80.9% of participants but did not find a significant association between the global PSQI score and academic performance. These findings suggest that specific sleep components, such as sleep efficiency, disturbances, and sleep immediately before an examination, may be relevant even when the overall PSQI score does not demonstrate a significant association. In the present study, the higher mean examination marks among students with good sleep quality support the potential importance of healthy sleep habits. However, further studies using verified examination records, larger samples, and multivariable analysis are required to clarify the independent contribution of sleep quality to academic achievement.

Conclusion

The present study found that poor sleep quality was common among undergraduate MBBS students and that students with good sleep quality had higher mean academic scores. These findings suggest a potential association between sleep quality and academic performance. Promoting healthy sleep habits and effective time management may help support students' academic achievement and overall well-being.

Limitations: The study was conducted at a single tertiary-care medical institution in Western Gujarat, which may limit the generalizability of the findings. The cross-sectional design did not allow causal relationships to be established between sleep quality and academic performance. Furthermore, factors such as academic stress, lifestyle habits, screen time, and individual study patterns may have influenced the observed association. Future multicentre longitudinal studies with larger sample sizes are recommended.

Bibliography

1. Baranwal N, Phoebe KY, Siegel NS. Sleep physiology, pathophysiology, and sleep hygiene. *Prog Cardiovasc Dis.* 2023;77:59–69.
2. Buysse DJ, Barzansky B, Dinges D, Hogan E, Hunt CE, Owens J, et al. Sleep, fatigue, and medical training: setting an agenda for optimal learning and patient care. 2003.
3. Azad MC, Fraser K, Rumana N, Abdullah AF, Shahana N, Hanly PJ, et al. Sleep disturbances among medical students: a global perspective. *J Clin Sleep Med.* 2015;11(1):69–74.
4. Hyndych A, El-Abassi R, Mader Jr EC. The Role of Sleep and the Effects of Sleep Loss on Cognitive, Affective, and Behavioral Processes. *Cureus.* 2025;17(5):e84232–e84232.
5. Rajuskar C, Badarke V. Influence of sleep deprivation on cognitive performance. *Int J Multidiscip Res.* 2024;6(1):1–6.
6. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AM, Alhaqwi AI. Sleep disorder among medical students: relationship to their academic performance. *Med Teach.* 2012;34(sup1):S37–41.
7. Maheshwari G, Shaukat F. Impact of poor sleep quality on the academic performance of medical students. *Cureus.* 2019;11(4).
8. Yassin A. Prevalence of sleep disorders among medical students and their association with poor academic performance: A cross-sectional study. *Ann Med Surg.* 2020. doi:10.1016/j.amsu.2020.08.046
9. Rao W. Sleep disruption in medicine students and its relationship with impaired academic performance: A systematic review and meta-analysis. *Sleep Med Rev.* 2020. doi:10.1016/j.smrv.2020.101333
10. BaHammam A, Alaseem A, Alzakri A, Almeneessier A, Sharif M. The relationship between sleep and wake habits and academic performance in medical students: A cross-sectional study. *BMC Med Educ.* 2012. doi:10.1186/1472-6920-12-61
11. Alotaibi A. The relationship between sleep quality, stress, and academic performance among medical students. *J Fam Community Med.* 2020. doi:10.4103/jfcm.JFCM_132_19
12. Christodoulou N. Sleep quality of medical students and relationships with academic performances. *L'Encéphale.* 2023. doi:10.1016/j.encep.2021.09.006
13. Okur A, Keskin A, Aydın Berktaş Ö. The relationship between sleep quality and academic achievement among students in health-related disciplines: A cross-sectional study. *BMC Med Educ.* 2026. doi:10.1186/s12909-026-08861-0.