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Sleep Quality and Its Correlates Among Medical Students of a Tertiary Care Hospital: A Cross-Sectional Study from Tertiary Health Care Centre in Southern Rajasthan

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ABSTRACT

Background: Sleep plays a vital role in maintaining physical and mental health, especially among medical students, who often face academic stress, long study hours, and irregular routines. These challenges can compromise sleep quality, affecting academic performance and overall well-being. This study aimed to assess the prevalence of students with poor sleep quality and identify its associated factors among undergraduate medical students in a tertiary care hospital in Southern Rajasthan.

Methodology: A cross-sectional study was conducted among 360 undergraduate medical students using a structured questionnaire, including the Pittsburgh Sleep Quality Index (PSQI). Sociodemographic, academic, and lifestyle factors were collected. Data were analyzed using descriptive statistics and chi-square tests to assess associations between sleep quality and potential correlates. A p-value of <0.05 was considered statistically significant.

Results: Out of 360 participants, 270 (75%) reported poor sleep quality. Significant associations were found between poor sleep quality and domicile (p=0.015), year of study (p=0.032), sleep duration (p <0.001), screen time (p=0.003), academic performance (p=0.029), and presence of self-reported health problems (p=0.050). Factors such as gender, hostel stay, smoking, alcohol use, and physical activity were not significantly associated with sleep quality.

Conclusion: The proportion of poor sleep quality among medical students is alarmingly high. Academic pressure, increased screen time, and inadequate sleep duration were key contributing factors. Interventions promoting better sleep hygiene and stress management are essential to improve the academic performance and mental health of future healthcare professionals.

Keywords: Sleep quality, Medical students, PSQI, Screen time, Academic stress, Sleep hygiene

INTRODUCTION

Sleep is a fundamental physiological process vital for maintaining physical and mental health, cognitive function, and overall well-being across all age groups and professions. It plays a crucial role in memory consolidation, learning, emotional regulation, and immune system functioning.[1] Inadequate sleep, characterized by poor

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quality or insufficient duration, can lead to a myriad of adverse consequences, including impaired academic performance, reduced attention span, irritability, increased stress levels, and a heightened risk of chronic diseases.[2,3]

Medical students represent a unique and particularly vulnerable population when it comes to sleep disturbances. The demanding nature of medical education, encompassing rigorous academic schedules, long study hours, clinical rotations, and often high-stakes examinations, inherently predisposes these students to chronic sleep deprivation and compromised sleep quality.[4,5] The inherent stressors of medical school, coupled with irregular routines and the pressure to excel, often result in lifestyle choices that negatively impact sleep hygiene.[6] Studies globally have consistently highlighted a high prevalence of poor sleep quality among medical students, far exceeding that of the general population and students in other disciplines.[7,8] This issue is of significant concern, as compromised sleep can not only impede their learning and professional development but also negatively influence their future clinical performance and patient care abilities.[9]

Understanding the specific correlates of sleep quality among medical students is therefore crucial for developing targeted interventions. Factors such as academic stress, workload, use of electronic gadgets, caffeine consumption, exercise habits, and the presence of underlying mental health issues (e.g., anxiety, depression) have all been implicated in affecting sleep patterns in this group.[10,11] Given the regional variations in academic structures, cultural practices, and lifestyle factors, it is important to conduct localized studies to gain insights into the unique challenges faced by medical students in specific geographic settings. The present study highlights the prevalence and determinants of poor sleep quality among undergraduate medical students. Our findings demonstrate that sleep quality is influenced by several modifiable factors, particularly sleep duration, screen time, academic performance, and self-reported health conditions. These observations are consistent with, and in some cases diverge from, prior studies conducted in various geographic and academic contexts.

The aim of present study was to evaluate the quality of sleep among undergraduate medical students. The primary objective was to determine the prevalence of poor sleep quality. Secondary objectives included identifying sociodemographic factors associated with sleep quality, and to explore correlations among sleep quality and associated clinical variables.

MATERIALS AND METHODS

This was a cross-sectional study conducted on undergraduate MBBS medical students in Ananta Institute of Medical Science and Research Centre, Rajsamand, (Rajasthan). This was done between April 2025 and May 2025. Undergraduate medical students (1st, 2nd, 3rd, 4th year) in Ananta Institute of Medical Science and Research Centre, Rajsamand, Rajasthan who agreed to participate and fulfilled inclusion-exclusion criteria.

Ethical consideration: Institutional Ethical Clearance was obtained from the Ananta Institutional Ethical Committee (Approval No. IEC/AIMS&RC/2024/323) on 05/11/2024.

Inclusion and Exclusion Criteria: Undergraduate MBBS students from the 1st, 2nd, 3rd, and final years at Ananta Institute of Medical Sciences and Research Centre, Rajsamand, who were aged 18 years or older, were included in the study. Students were excluded if they were under 18 years of age, had a diagnosed psychiatric illness, a history of substance use (excluding caffeine or nicotine), or any serious comorbid medical condition.

Sample size calculation: The sample size was calculated assuming 45% prevalence of good sleep quality, 95% confidence level (Z = 1.96), and 80% power (Z = 0.84), yielding a minimum of 235 participants. After adjusting for a 10%, non-response rate, the final sample size was set at 260.

Study instruments:

A Self designed semi structured proforma on demographic details of the participants (age, sex, religion, domicile, MBBS batch, year of study, staying in hostel or not, marital status, living with partner or not, regularity of attendance, academic score, daily screen time, weekly frequency of fast-food intake, soft drink etc). And clinical variables (Sleep duration, frequency of exercise per week assessed by asking how many days in a typical week the student engages in at least 30 minutes of moderate to vigorous physical activity any diagnosed major psychiatric or medical comorbidity or self-reported health problem, and any substance use).

Pittsburgh Sleep Quality Index (PSQI) [12]: PSQI is a 19-item psychometric instrument was used to assess participants' sleep quality. It is an effective instrument that measures the quality and patterns of sleep-in adults, differentiating poor from good sleep quality by measuring different aspects of sleep disturbance during the past month. This instrument presents a high internal consistency (α=0.81) with a predictive validity cut-off point of a PSQI score>5 showing 89.6% sensitivity and 86.5% specificity for identifying poor sleep quality. In the context of the current study, this tool demonstrated a satisfactory internal consistency (Cronbach's Alpha, α=0.87).

Study Procedure: Participants were explained about the purpose of the study and after their consent were obtained, assessment were carried out using the sociodemographic profiles, clinical variables, Pittsburgh Sleep Quality Index (PSQI).

Statistical analysis:

An MS Excel sheet was prepared from the fully completed questionnaires that were used from analysis by the computer software SPSS 23, and appropriate statistical tools were applied for the analysis.

RESULTS

In the analysis of sociodemographic variables and their association with sleep quality, several patterns were observed. There was no significant association between gender and sleep quality, with both males (25.3%) and females (24.7%) reporting similar rates of good sleep (p = .903). Similarly, marital status did not show a statistically significant difference, although married individuals showed slightly better sleep quality (40%) compared to unmarried ones (24.8%) (p = .435). A statistically significant association was found between domicile and sleep quality (χ^2 = 8.419, p = .015), with individuals from rural backgrounds reporting better sleep quality (40.7%) than those from urban (22%) or semi-urban areas (23.1%) (table 1).

The year of studying as also significantly associated with sleep quality (χ^2 = 8.800, p = .032), where first-year students reported the highest percentage of good sleep quality (36.7%) compared to students in later years. Other variables, including staying in a hostel (p = .547) and living arrangements (p = .817), did not show significant relationships with sleep quality. Overall, domicile and year of study emerged as important sociodemographic factors influencing sleep quality among students.

Table 1: Sociodemographic profile of under graduate students (n=360)

Characteristics	Good sleep quality (%)	Poor sleep quality (%)	Total	*p*-value	OR (95% CI)
Sex					
Male	44(25.3)	130(74.7)	174	0.903	0.97 (0.60-1.56)
Female	46(24.7)	140(75.3)	186		ref
Marital status					
Married	2(40)	3(60)	5	0.435	0.49 (0.08-3.01)
Unmarried	88(24.8)	267(75.2)	355		ref
Domicile					
Rural	22 (40.7)	32(59.3)	54	0.015	ref
Urban	56 (22)	198 (78)	254		2.43 (1.31-4.51)
Semi urban	12(23.1)	40(76.9)	52		2.29 (0.99-5.32)
MBBS joining Batch					
Year of study					
First	33(36.7)	57(63.3)	90		ref
Second	20(22.2)	70(77.8)	90		2.03 (1.05-3.91)
Third	20(20.6)	77(79.4)	97	0.032	2.23 (1.16-4.28)
Fourth	17(20.5)	66(79.5)	83		2.25 (1.13-4.45)
Staying in hostel					
Yes	66(25.9)	189(74.1)	255		0.85 (0.50-1.45)
No	24(22.9)	81(77.1)	105	0.547	ref
Living partner					
Living alone	10 (27)	27(73)	37	0.817	1.04 (0.41-2.65)
Living with family	15 (27.8)	39 (72.2)	54		ref
Living with roommate	65 (24.2)	204 (75.8)	269		1.21 (0.63-2.33)

The study investigated the relationship between sleep quality and various clinical and lifestyle parameters among participants. It revealed a statistically significant association between sleep duration and sleep quality, with shorter sleep durations correlating with poorer sleep quality (p = .000) (table 2). Notably, individuals sleeping less than 5 hours reported the worst sleep quality (97.1% poor). Academic performance also showed a significant link, where those with higher self-reported academic scores (>80%) paradoxically exhibited poorer sleep quality, although the difference across categories was statistically meaningful (p = .029). Additionally, screen time was a significant predictor, as participants with less than 2 hours of screen exposure had markedly better sleep quality compared to those with higher usage (p = .003). While factors like smoking, alcohol use, exercise frequency, fast food or soft drink intake, and bedtime coffee consumption did not show statistically significant associations, a notable correlation was found between the presence of self-reported health problems and poor sleep quality (p = .05). These findings emphasize the multifactorial nature of sleep quality, highlighting sleep duration, screen time, and health status as key contributors.

DISCUSSION

The present study highlights the prevalence and determinants of poor sleep quality among undergraduate medical students. Our findings demonstrate that sleep quality is influenced by several modifiable factors, particularly sleep duration, screen time, academic performance, and self-reported health conditions. These observations are consistent with, and in some cases diverge from, prior studies conducted in various geographic and academic contexts.

To begin with, the most prominent association in our study was between sleep duration and sleep quality (p = 0.000).

Table 2: Clinical Parameters of undergraduate students

Characteristics	Good sleep quality n (%)	Poor sleep quality n (%)	Total	*p*-value	OR (95% CI)
Sleep duration					
More than 7 hours	37 (40.7)	54 (59.3)	91	<0.001	ref
6-7 hours	35 (27.3)	93 (72.7)	128		1.82 (1.03-3.22)
5-6 hours	17 (16)	89 (84)	106		3.59 (1.84-6.99)
Less than 5 hours	1 (2.9)	34 (97.1)	35		23.3 (3.05-177.76)
Class attendance					
Regular attendance	76 (25.3)	224 (74.7)	300	0.744	ref
Irregular attendance	14 (23.3)	46 (76.7)	60		1.11 (0.58-2.14)
Studying in team					
Sometimes	44 (22.1)	155 (77.9)	199	0.276	ref
All the time	7 (35)	13 (65)	20		1.9 (0.71-5.04)
Only during group assignment	12 (22.2)	42 (77.8)	54		1.88 (0.61-5.78)
Never	27 (31)	60 (69)	87		1.2 (0.43-3.33)
Self - reported academic score (%)					
In previous year (not applicable for 1st year)					
50-60	16 (18.2)	72 (81.8)	88	0.029	ref
61-70	32 (23)	107 (77)	139		1.35 (0.69-2.63)
71-80	6 (20.7)	23 (79.3)	29		1.15 (0.43-3.06)
>80	2 (15.4)	11 (84.6)	13		1.64 (0.35-7.81)
Currently smoking					
Yes	3(13.6)	19(86.4)	22	0.20	ref
No	87(25.7)	251(74.3)			2.2 (0.63-7.6)
Current alcohol users					
Yes	4(14.8)	23(85.2)	27	0.20	ref
No	86(25.8)	247(74.2)	333		2.0 (0.67-5.95)
Any self - reported health problem					
Yes	7 (14.9)	40 (85.1)	47	0.05	ref
No	83 (26.5)	230 (73.5)	313		2.06 (0.89-4.78)
Body mass index					
Underweight	10 (27.8)	26 (72.9)	36	0.073	ref
Normal	73 (27.1)	196 (72.9)	269		1.03 (0.47-2.25)
Overweight/Obese	7 (12.7)	48 (87.3)	55		2.64 (0.9-7.75)
Exercise per week					
<3 times	28(22)	99(78)	127	0.52	ref
>=3 times	62(26.6)	171(73.4)			1.28 (0.77-2.14)
Screen time per day (mobile/laptop)					
<2hrs	17(47.2)	19(52.8)	36	0.003	ref
2-4 hrs	35 (26.9)	95 (73.1)	130		2.43 (1.14-5.2)
4-6 hrs	27 (22.9)	91 (77.1)	118		3.02 (1.38-6.6)
6-8 hrs	11 (14.5)	65 (85.5)	76		5.29 (2.12-13.2)
Fast food consumption per week					
<3times	60 (23.4)	196 (76.6)	256	0.283	ref
>=3times	30 (28.8)	74 (71.2)	104		1.32 (0.79-2.21)
Soft drink consumption per week					
Nil/Once	61 (26.9)	173 (73.9)	234	0.523	ref
More than once	29 (23)	97 (77)	126		1.18 (0.71-1.96)
Bedtime coffee intake					
Yes	9(17.6)	42(82.4)	51	0.19	ref
No	81(26.2)	228(73.8)	309		1.66 (0.77-3.56)

Students sleeping less than 5 hours per night had a 97.1% prevalence of poor sleep. This pattern aligns with findings by Alsaggaf MA et al.[13], who reported a similar decline in sleep quality with reduced sleep duration among Saudi medical students. Curcio G et al.[14] and Giri P et al.[15] also documented that insufficient sleep adversely affects cognitive function and academic performance, suggesting a potential cyclical relationship between academic stress and sleep deprivation.

Another strong predictor was screen time, where increased usage (especially more than 4 hours daily) was linked to poorer sleep quality (p = 0.003). This is supported by Demirci K et al.[16] and Zhou SJ et al.[17], who found that nighttime exposure to electronic devices delays sleep onset and impairs overall restfulness. In contrast, a study by Alotaibi AD et al.[18] reported no statistically significant correlation, possibly due to cultural or academic lifestyle differences in their sample.

Regarding academic performance, students with lower self-reported scores (50-60%) exhibited significantly poorer sleep. These results corroborate the studies of Giri P et al.[15] and Toscano-Hermoso MD et al.[19],

which revealed a reciprocal relationship between academic success and adequate sleep. However, Ibrahim NK et al.[20] did not find a consistent pattern, suggesting that individual coping mechanisms and stress resilience might mediate this relationship.

The presence of self-reported health issues was also significantly associated with poor sleep ($p = 0.05$), which aligns with findings by Attal BA et al.[21] and Lemma S et al.[22], where students with chronic or psychological conditions were more likely to experience sleep disturbances.

Conversely, our study did not find significant associations with factors such as BMI, smoking, alcohol use, caffeine intake, exercise, or dietary habits. While Lemma S et al.[22] found links between caffeine and sleep latency, and a correlation with physical inactivity, our findings suggest that sleep quality in medical students may be more sensitive to academic stressors than to lifestyle habits alone.

Among sociodemographic variables, urban residence and year of study were significant. Students from urban areas and those in advanced academic years reported poorer sleep quality, likely due to increased academic load and environmental stressors. However, variables such as sex, marital status, hostel stay, and living arrangements did not show statistically significant associations, which is consistent with Zailinawati AH et al.[23] and Puthran R et al.[24].

The implications of these findings are critical. Poor sleep is a modifiable risk factor affecting academic, psychological, and physical health. Early interventions in the form of sleep hygiene education, stress management training, and academic workload balancing may be beneficial. The consistency of our findings with multiple international studies strengthens their validity, though local interventions should account for cultural and institutional differences.

LIMITATIONS

This study has several limitations. Its cross-sectional design prevents causal inferences, and reliance on self-reported data may introduce recall and response bias. Being a single center study limits generalizability. Small subgroup sizes reduced statistical power for certain analyses. Additionally, mental health factors and objective sleep assessments were not included, which may have impacted the findings.

CONCLUSION

This study highlights a high prevalence of poor sleep quality among medical students in a tertiary care institution in Southern Rajasthan, with approximately three-fourths of participants affected. Significant associations were found between poor sleep quality and factors such as domicile, year of study, sleep duration, screen time, self-reported academic performance, and the presence of health problems. These findings emphasize the multifactorial nature of sleep disturbances in this population and suggest that academic and lifestyle pressures contribute substantially to compromised sleep health.

Given the implications of inadequate sleep on academic performance, mental well-being, and future clinical competency, there is a pressing need for targeted interventions aimed at improving sleep hygiene among medical students. Educational programs promoting awareness, regular sleep schedules, reduced screen time, and stress management strategies should be incorporated into student wellness initiatives. Future research using longitudinal and multi-institutional designs, along with objective sleep assessments and psychological screening, is recommended to build a deeper and more generalizable understanding of this critical issue.

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Author's Contribution: **SS** and **TA** contributed to the conceptualization, methodology, data collection, data analysis, and writing of the original draft, as well as the final review of the manuscript. **NK** was responsible for software development, statistical analysis, and data visualization. **BA** oversaw the project, provided supervision, and secured funding for the research. **SK** contributed to validation of the work, provided resources, and assisted with writing review and editing of the manuscript.

Availability of Data: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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