Innovations

Effect of Sleep Quality on Academic Performance in Undergraduate Medical Students: A Cross- Sectional Study

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Abstract

Background: *Sleep plays a critical role in cognitive function, memory consolidation, and overall well-being. Undergraduate medical students, due to their rigorous academic schedules, often experience sleep disturbances that may impact their academic performance. While prior studies have explored this relationship globally, limited research has been conducted in Andhra Pradesh, India. This study aims to assess the impact of sleep quality on academic performance among medical students in this region.* ***Methods:*** *A cross-sectional study was conducted at Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram. A sample of 223 undergraduate medical students was selected using simple random sampling. Data were collected using a structured questionnaire assessing sleep latency, duration, and quality alongside academic performance in the previous year. Statistical analysis was performed using IBM SPSS Version 24, with correlation tests applied to determine relationships between sleep quality and academic outcomes.* ***Results:*** *The mean age of participants was 20.58 ± 1.46 years, with 64.6% females and 35.4% males. Findings indicated that students frequently experienced delayed sleep due to academic concerns, with a mean response score of 2.91 to 3.91 for sleep latency-related items. Students recognized that adequate sleep improved participation and concentration (mean scores: 3.46–4.16). A weak negative correlation (-0.27) was observed between sleep quality and academic performance, suggesting that poor sleep was associated with slightly lower academic outcomes.* ***Conclusion:*** *While the correlation between sleep quality and academic performance is modest, the findings support the broader evidence that poor sleep negatively impacts cognitive function. Addressing sleep hygiene and academic stress through institutional reforms could enhance medical students' well-being and academic success. Future research should explore interventions to improve sleep habits among medical students.*

Keywords*: Sleep quality, undergraduate medical students, academic performance, sleep hygiene*

Introduction

Sleep is essential for memory consolidation, cognitive processes, and general health. Because of their rigorous academic program, which includes extensive study sessions, clinical rotations, and frequent evaluations, undergraduate medical students need to get enough sleep. Across a range of student populations, poor sleep quality has been linked to cognitive impairment, a shorter attention span, and worse academic performance (1)Nevertheless, there is little research explicitly addressing how sleep quality affects medical students' academic performance in Andhra Pradesh, India, despite the well-established effects of sleep on cognitive processes. By assessing the relationship between academic achievement and sleep quality among medical students in this area, this study seeks to close this knowledge gap and offer important new information about a population that has received little attention.

Numerous studies have previously examined the connection between university students' academic achievement and sleep quality. According to Hershner and Chervin's (2014) research, learning capacity, academic achievement, and cognitive processing are all adversely impacted by sleep deprivation and irregular sleep schedules (2)Accordingly, a study by Abdulghani et al. carried out in Malaysia. (2012) discovered that medical students who had trouble sleeping performed noticeably worse academically than their counterparts who got enough sleep (3)According to these results, medical students' academic difficulties may be exacerbated by sleep disturbances. An investigation by Almojali and associates. A study carried out in Saudi Arabia in 2017 revealed that medical students frequently had poor sleep quality, as measured by the Pittsburgh Sleep Quality Index (PSQI), and that this was substantially connected with lower Grade Point Averages (GPAs) (4). Furthermore, American studies have shown that students who lack sleep are more likely to have executive function impairments, which can cause problems with focus and problem-solving (5). .

In the Indian context, research by Giri et al. (2019) in a medical college in Maharashtra found that a significant proportion of students had poor sleep hygiene, which was associated with increased stress levels and poor academic performance (6). Despite these insights, there is a lack of region-specific studies in Andhra Pradesh that systematically assess the direct impact of sleep quality on medical students' academic outcomes. Given the regional variations in lifestyle, academic pressure, and sociocultural factors, it is necessary to investigate how these variables influence the sleep-academic performance relationship in Andhra Pradesh.

Since medical students will eventually work in the healthcare industry and their performance and cognitive abilities will directly affect patient care, it is imperative that they comprehend this relationship. This research may offer strong support for institutional reforms like improved academic scheduling, sleep hygiene

education, and mental health treatments if it turns out that inadequate sleep has a major negative impact on academic achievement. This study has the potential to influence policy changes targeted at enhancing medical education and student well-being in Andhra Pradesh by highlighting important relationships between academic achievement and sleep quality. With a focus on an underrepresented group—undergraduate medical students in Andhra Pradesh—this study seeks to add to the expanding corpus of research on sleep and academic performance. The goal of this study is to systematically examine how sleep quality affects academic performance.

Methodology:

Study population: Undergraduate medical students

Study settings: Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram

Study design: cross sectional study

Sample size: $n = 4pq/l^2$ (Rasekhi et al)

$p = 36.6$ % according to Rasekhi et al (7)

$q = 1 - p = 63.4$

$l = 5$

$= 4 \times 36.6 \times 63.4$

$\frac{4 \times 36.6 \times 63.4}{6 \times 6} = 258$

Sampling technique: Simple random sampling

Inclusion criteria:

- Students who gave the consent

Exclusion criteria:

- Sleep abnormalities
- Any psychiatric disorder
- On treatment with sedatives, hypnotics, anti depressants, anti psychotics, anti epilepticsetc

Data collection: A pre designed, structured questionnaire with 15 questions related to sleep efficiency, latency and duration along with age, sex, phase of the MBBS course and their academic performance in the last academic year

The questionnaire was administered to the participants in face to face interview method.

 Sleep Latency and Academic Tasks (Q1–Q5):

- Q1: It took me more than 20 minutes to fall asleep due to academic tasks.
- Q2: Delay of sleep makes me groggy in class.
- Q3: Falling asleep immediately makes my mind eager to learn.

- Q4: Unfinished tasks worry me, making sleep harder.
- Q5: Overthinking tomorrow's classes delays sleep by 30+ minutes.

 Sleep Duration and Academic Performance (Q6–Q10):

- Q6: 8 hours of sleep improves class participation.
- Q7: Regular sleep keeps my mind stable in class.
- Q8: Lack of sleep hinders concentration.
- Q9: Sleep hours affect school performance.
- Q10: Excess sleep equals normal sleep performance.

 Sleep Quality and Academic Outcomes (Q11–Q15):

- Q11: Insufficient sleep negatively affects scores.
- Q12: Enough sleep enhances class participation.
- Q13: Even with enough sleep, I feel tired.
- Q14: I can score high without enough sleep.
- Q15: Lack of sleep leads to sleeping in free time.

The collected data was populated into MS Excel and analysed using the IMB SPSS version 24 software. Appropriate statistical tests were applied and tabulated.
Institutional ethics committee approval was taken before the start of the study.Informed consent was taken from the participants before data collection.

Results:
Mean age of the participants is 20.58 ± 1.46
The gender distribution of a sample, with 144 females (64.6%) and 79 males (35.4%), totaling 223 individuals.

 Themajority of the sample (64.6%) consists of females (144 individuals).
 Males account for 35.4% of the sample, totaling 79 individuals.

1. It took me more than 20 minutes to fall asleep after turning the lights off because I was thinking of my academic tasks.	2.91	1.355
2. Delay of sleep makes me groggy in class.	3.91	1.252
3. If I fall asleep immediately at night, I feel like my mind is eager and ready to learn in the morning.	3.43	1.357
4. My unfinished tasks worries me and it makes me harder to fall asleep.	3.56	1.327
5. My mind overthinks about tomorrows' class activities and it took me a long time (30 minutes above) to fall asleep.	2.94	1.411

The table presents students' self-reported experiences on how academic tasks affect their sleep, with mean scores ranging from 2.91 to 3.91 and standard deviations around 1.3–1.4, indicating moderate agreement and some variability in responses.

1.If I get 8 hours of sleep, I can participate well	4.	1.1
2. Maintaining my regular hours of sleep keeps	4.	1.1
3. Lack of sleep makes it harder for me to	4.	1.1
4. My number hours of sleep affects my	3.	1.0
5. If I get more than enough hours of sleep, I	3.	1.3

The table presents students' perceptions of how sleep duration affects their academic performance, with mean scores ranging from 3.46 to 4.16 and standard deviations around 1.1–1.3, indicating general agreement that adequate sleep enhances classroom participation, concentration, and performance.

1. When I do not get enough sleep, it negatively affects my scores.	223	3.56	1.203
2. When I get enough sleep, I can participate well in our class.	223	3.94	1.132
3. Even after getting enough sleep,I still can feel tired and empty.	223	3.09	1.293
4. I can still get high scores in my quizzes even if I do not have enough sleep.	223	2.87	1.179
5. When I don't get enough sleep,I can often sleep during freetime.	223	3.61	1.217

The table presents students' perceptions of how sleep affects their academic performance and fatigue, with mean scores ranging from 2.87 to 3.94 and standard deviations around 1.1–1.3, indicating that most students recognize the negative impact of insufficient sleep on scores and participation, though some still feel tired despite adequate rest.

The correlation between the sleep quality score and academic performance in the provided dataset is approximately -0.27. This indicates a weak negative relationship, suggesting that poorer sleep quality (higher sleep quality scores) is associated with slightly lower academic performance percentages among these MBBS students.

Discussion:

Using a sample of 223 MBBS students (mean age 20.58 ± 1.46) with a gender distribution of 64.6 percent female and 35.4 percent male, the current study investigated the association between sleep parameters and academic performance.

Students' perceptions of how academic assignments and sleep duration impact their engagement, focus, and general performance were assessed using a variety of self-report measures. Furthermore, a weak correlation of roughly -0.27 was discovered between academic performance and the sleep quality score, suggesting that lower academic performance is linked to poorer sleep quality. There are a number of similarities and differences between these findings and earlier research. Many college students suffer from significant daytime sleepiness and irregular sleep patterns, which have a detrimental effect on academic performance, according to Hershner and Chervin (2014). Students indicate that cognitive preoccupation with academic tasks prolongs sleep latency, which is reflected in the moderate mean scores in our first table (ranging from 2.91 to 3.91 on items addressing delayed sleep onset due to academic concerns). This supports Hershner and Chervin's analysis of how academic pressures can cause sleep delays, which in turn can impair memory consolidation and learning. (2) Abdulghani and associates(2012), which concentrated on medical students specifically, discovered that between one-third and more than one-third of participants had bad sleeping habits, which were strongly associated with worse academic achievement. Despite being modest, the study's correlation of -0.27 lends credence to the idea that, in a high-pressure learning environment, there is even a weakly negative relationship between academic performance and sleep quality. The results show that medical students have sleep problems in both situations. (3)

In a similar vein, Almojali et al. (2017) discovered a correlation between medical students' poorer sleep quality and high academic stress, indicating that stress may act as a mediator in the relationship between academic performance and sleep. The findings, which show that the average scores on measures of academic stress (e.g. A. These findings are supported by the comparatively high mean values for "My unfinished tasks worry me and it makes me harder to fall asleep," which is 3.56. Although students acknowledge that getting too little sleep has a detrimental effect on their learning and participation in class, the effect may be subtle and complex, as evidenced by the moderate agreement across items.(4)

The importance of sleep for memory consolidation and emotional control is highlighted in Walker's (2009) review. According to the study's second table, students generally agree that getting enough sleep improves participation and concentration (with mean scores ranging from 3.46 to 4.16). This is consistent with Walker's findings. The idea that the cognitive advantages of sleep, particularly in areas like attention and memory consolidation, are essential for academic success is thus supported when students believe that getting a full night's sleep (in this case, eight hours) prepares them for learning.(5)

Giri and associates. (2019) looked at the sleep patterns of Indian medical students and found that many of them relied on naps to make up for their lack of

sleep duration and delayed sleep onset. According to the data, only 25 percent of the sample reported sleeping 7–10 hours per day, while a significant portion slept 4–6 hours. This result aligns with the findings of Giri et al.'s findings about inadequate sleeping. Even though compensatory napping behavior was not explicitly evaluated in the study, the general lack of sleep duration adds to the slight inverse relationship between academic performance and sleep quality.(6)

Gomes & Co. (2011) found that the frequency of getting enough sleep and self-reported sleep quality were significant predictors of end-of-semester grades using a multi-measure, multi-predictor approach. Even though the study didn't use regression analysis to separate the independent contributions of different sleep parameters, the correlation coefficient of -0.27 suggests that academic performance is impacted by sleep quality in a minor way. Similar to Gomes et al. (8)According to the research, sleep quality interventions may have a positive impact on academic achievement in addition to the more conventional predictors like prior grades or class attendance. The findings are further contextualized by Gaultney's (2010) research, which shows that 27% of college students are at risk for one or more sleep disorders and that these disorders are associated with worse academic performance (students at risk for sleep disorders typically have GPAs below 2.0). The moderate negative correlation and self-reported sleep quality scores were used to measure the prevalence of sleep disorders in the sample, even though a clinical diagnostic tool did not specifically measure this.(9)

In summary, the current findings of moderate sleep-related impairments—demonstrated by prolonged sleep latency and insufficient sleep duration—are consistent with prior research in college and medical student populations. Although the correlation between sleep quality and academic performance is modest (–0.27), it reinforces the cumulative evidence that poor sleep hygiene, academic stress, and irregular sleep schedules are detrimental to students' cognitive abilities and academic outcomes. Future interventions in this population should target not only sleep duration but also stress reduction and improved sleep hygiene, as suggested by the converging literature.(2,4)

This discussion demonstrates that the findings, while modest in magnitude, are in line with previous research, emphasizing that even weak associations can have important implications in high-stakes educational settings.

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