

Sleep Quality and Self-Perceived Stress among Medical Students of Tertiary Care Hospital of District Shahdol (MP), India: A Cross Sectional Survey

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Abstract

Introduction: The academic performance of medical students is negatively impacted by poor sleep quality and high levels of daily stress, which can result in anxiety, depression, suicidal thoughts, alcohol and substance misuse, and interpersonal problems.

Objective: To determine the prevalence of poor sleep and its association with self-perceived stress among medical students of tertiary care hospital of district Shahdol (MP).

Methods: The study provides the evidence of high prevalence of poor quality of sleep (44.6%) among the medical students & also the level of perceived stress which is alarmingly high with 67.4% has moderate stress and around 14.2% has high stress level.

Results: Out of 348 students about 332 completed and returned the online proforma. The mean age of participants was 21.35 years. The study provides the evidence of high prevalence of poor quality of sleep (44.6%) among the medical students & also the level of perceived stress which is alarmingly high with 67.4% has moderate stress and around 14.2% has high stress level.

Conclusions: Despite the medical students' generally poor sleep quality and significant levels of reported stress. Students should get instruction in relaxation techniques, behavioural modifications, and sleep information as part of their curriculum.

Keywords: *Sleep, Students, Stress, Quality, and Medical.*

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Introduction

Humans need sleep in order for their bodies and brains to function correctly. We sleep for nearly one-third of our lives [1]. For older adults (46–60 years), the recommended standard for sleep duration is 7 hours or more per night on a regular basis; however, for younger persons (18–45 years), even greater durations (>9) are seen reasonable [2]. The amount of sleep a student gets has an impact on their mental health. In addition to the pressure of meeting academic standards in college, other factors that might negatively impact a student's mental health include paying for college or securing a postgraduate spot of their choosing.

Numerous studies conducted in many nations, including Pakistan (60%), Thailand (61%), Malaysia (42%), and the United States (57%), have found that medical students experience high levels of stress [3–6]. In India, the percentage of stressed-out pupils is approximately 46.8% [7]. The academic performance of medical students is negatively impacted by poor sleep quality and high levels of daily stress, which can result in anxiety, depression, suicidal thoughts, alcohol and substance misuse, and interpersonal problems. It is common knowledge that getting enough sleep is crucial for medical students to improve their memory and learning. With Keeping in view the above rationale, the study conducted with an aim to determine prevalence of poor sleep quality and its association with self-perceived stress among medical students of tertiary care hospital of district Shahdol (MP).

Methodology

Study Setting and study design

The cross-sectional study was done from May to September 2023 at Birsa Munda Government medical college Shahdol (MP) among the undergraduate medical students (MBBS).

Study population & Sample Size

The sample size needed, was determined by taking $P=30\%$ from a prior study, using a 95% confidence interval (CI) and a 5% margin of error [8]. 87 students were chosen from each of the four MBBS admission batches (2019, 2020, 2021, and 2022) after

line listing the medical students in each batch. The sample was then drawn through stratified random sampling using Microsoft Excel 2007. After adding 10% non-respondent rate, calculated as 348 students, to obtain an unbiased sample size that represents the whole population. The study excluded students who did not provide consent or who returned their questionnaires incomplete.

Study Tools

The self-administered semi-structured pro forma (through online survey link) was used to collect the data from the medical students consisted of three basic sections,

- a) The first section includes sociodemographic data, such as the student's age, sex, weight, height, education, occupation, and the family's economic standing.
- b) The Pittsburgh Sleep Quality Index (PSQI), a modified version of which was validated on an Indian population in a study conducted by Md. Dilshad Manzar et al., was used in the second section to gather data on the quality of sleep [9]. It is composed of 17 distinct things, resulting in five components that add up to a score.
- c) The third section uses a modified version of the Perceived Stress Scale^[10] which was taken from a study conducted on an Indian population by Ruchira Pangtey et al. [11–12] to collect data on the students' stress levels.

Ethical Consideration

The ethical approval with order no-IEC/2023/122 obtained from Institutional Ethics Committee of Birsa Munda Government medical college Shahdol (MP). Informed consent from the participants was taken. Anonymity and confidentiality of data was assured to the participants.

Data Collection

Every student received a combined pro forma via WhatsApp in the form of survey links, along with a brief explaining the purpose of the study and basic instructions on how to fill it out. Before any student could participate, their informed consent was sought. After two reminders, the students had a week to

voluntarily turn in the online proforma. Those who did not answer on time were deemed non-responders and were excluded from the data analysis.

Data Analysis

Data analysis was done using IBM SPSS Statistics version 22 (SPSS IBM Corp., Armonk, NY, USA). The median and interquartile range are used to display descriptive statistics for asymmetrically distributed data, while the mean and standard deviation are used to convey symmetrically distributed data. Pearson’s Chi-square test and logistic regression was used to find association between variables.

Results

a) Base-Line Characteristics

Out of 348 students about 332 completed and returned the online proforma, about N=99 (29.81%) were from 2022 admission batch followed by 23%, 25% & 23% from 2019, 2020 and 2021 batches respectively. The mean age of participants was 21.35 years. Of all participants about 57.6% were girls & 44.9% were from general category followed by 27.11%, 14.4% & 14% from OBC, SC & ST category. Maximum students belong to urban area 78.8%. The educational status of the head of the family 42.37% were graduates, 33% were post-graduates and 12.7% & 12% were high-school and higher secondary pass out respectively. About 40% of the participants belongs to class 2 SES followed by 26%, 23%, 11% belongs to class 3, class 1 & class 4 respectively. Majority of the participants 78% has English medium of schooling, about 31.3% scored $\geq 90\%$ marks in 12th standard & 96% of them has gone for coaching. Table 1

Table 1: Socio-Demographic Characteristics of The Participants

| Characteristic | Category | N | % |
|----------------|----------|-----|------|
| Gender | M | 140 | 42.3 |
| | F | 191 | 57.7 |
| Admission Year | 2022 | 98 | 29.6 |
| | 2021 | 78 | 23.5 |
| | 2020 | 85 | 25.6 |
| | 2019 | 78 | 23.5 |

Continue.....

| | | | |
|-------------------------------------|------------------|-----|------|
| Caste | UR | 149 | 45.1 |
| | OBC | 90 | 27.1 |
| | SC | 47 | 14.2 |
| | ST | 45 | 13.6 |
| Place of Residence | Urban | 263 | 80.9 |
| | Rural | 68 | 21.7 |
| Education of the Head of the Family | High School | 41 | 13 |
| | Higher Secondary | 39 | 12.3 |
| | Graduate | 142 | 42.5 |
| | Post-Graduate | 109 | 33.5 |
| Socioeconomic Status | Class 1 | 76 | 23.2 |
| | Class 2 | 133 | 39.8 |
| | Class 3 | 86 | 25.5 |
| | Class 4 | 36 | 11.5 |
| Medium of School | English | 260 | 77.8 |
| | Hindi | 71 | 22.2 |
| Marks in 12 th Std. | $\geq 90\%$ | 102 | 31.3 |
| | $< 90\%$ | 229 | 68.7 |
| Coaching | Y | 321 | 96 |
| | N | 10 | 4 |

b) *Sleep Quality*-The prevalence of poor quality of sleep (PQSI Score ≥ 6) among the MBBS students was 44.6%(N=151) and the mean PQSI score is 5.51. The mean duration of actual sleep was about 6.6 hours, almost half (N=172) of the students has sleep duration of >7 hours. Table 2 shows that the average time on the clock at which the students goes to bed is around 12.15 AM while for waking up it is 7.30 AM. Majority of them i.e. 72.8% (N=246) goes to bed past 12.00 AM. Most of the students 68.8%(N=233) took less than 30 mins to fell asleep while the average is 24 mins.



Fig.1. Proportion of Quality of Sleep among Students

c) *Perceived stress*-The mean perceived stress scale score of the participant was around 18.58 ±6.3 with maximum score of 38 with

18.2% have low stress while 67.4% has moderate stress and around 14.2% has high stress level.

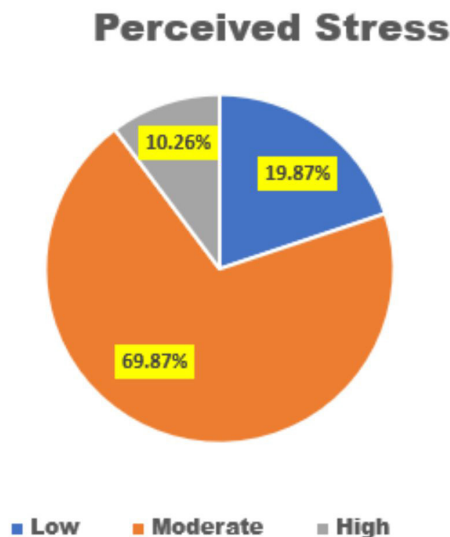


Fig. 2. Distribution of States of Perceived Stress

d) *Association between sleep quality and stress* - There is a statistically significant association between sleep quality and level of perceived stress ($p < 0.001$). The association are shown in table 2. It shows that there is a statistically

significant association between quality of sleep and medium of schooling. Additionally, socio-economic status is also statistically found to be associated with quality of sleep.

Table 2: The association between sleep quality and study variables

| S. No. | Variable | Categories | Good Sleepers (N=181) | | Poor Sleepers (N=151) | | P-Value |
|--------|-----------------------|------------|-----------------------|-------|-----------------------|-------|----------|
| | | | N | % | N | % | |
| 1. | Gender | M | 82 | 59.85 | 55 | 40.15 | .101 |
| | | F | 99 | 50.76 | 96 | 49.24 | |
| 2. | Admission Year | 2022 | 50 | 47.16 | 56 | 52.84 | .278 |
| | | 2021 | 40 | 57.97 | 29 | 42.03 | |
| | | 2020 | 45 | 60.8 | 29 | 39.2 | |
| | | 2019 | 46 | 55.42 | 37 | 44.58 | |
| 3. | Place Of Residence | Urban | 138 | 52.47 | 125 | 47.30 | .143 |
| | | Rural | 43 | 62.31 | 26 | 37.69 | |
| 4. | Socio-Economic Status | Class 1 | 48 | 48.97 | 50 | 51.03 | .000019* |
| | | Class 2 | 68 | 66 | 35 | 34 | |
| | | Class 3 | 51 | 63.75 | 29 | 36.25 | |
| | | Class 4 | 14 | 27.45 | 37 | 72.55 | |
| 5. | Medium of Schooling | English | 133 | 50.95 | 128 | 49.05 | .012* |
| | | Hindi | 48 | 67.6 | 23 | 32.4 | |
| 6. | Perceived Stress | Low | 45 | 68.18 | 21 | 31.82 | .003* |
| | | Moderate | 127 | 54.74 | 105 | 45.26 | |
| | | High | 09 | 26.47 | 25 | 73.53 | |

P values were calculated using the Pearson’s chi-square test.* Significant p value (<0.05).

e) **Predictors of quality of sleep:** Furthermore binary logistic regression analysis was done to determine the predictors of quality of sleep (dependent variable) as shown in table 3. It shows that students suffering from severe level of perceived stress are more likely to have poor quality of sleep (OR = 1.67, 95% CI 0.357-7.894). Similarly students who have

done their schooling in English medium also have a higher odds of having poor quality of sleep (OR = 2.26, 95% CI 0.858-5.947). Also the risk of poor quality of sleep is slightly higher in students belonging to class 3 socio-economic status (OR = 1.13, 95% CI 0.445-3.899).

Table 3: Logistic regression analysis to determine the predictors of quality of sleep in study participants.

| Characteristic | Categories | Poor Quality of Sleep | | |
|----------------------|------------|-----------------------|-------|-------------|
| | | Significance | OR | CI-95% |
| Stress | Mild† | - | - | - |
| | Moderate | 0.99 | 1.08 | 0.277-3.667 |
| | Severe | 0.51 | 1.67 | 0.357-7.894 |
| Medium of Schooling | English | 0.09 | 2.26 | 0.858-5.947 |
| | Hindi† | - | - | - |
| Socio-economic Class | Class 1† | - | - | - |
| | Class 2 | 0.739 | 0.848 | 0.322-2.234 |
| | Class 3 | 0.619 | 1.13 | 0.445-3.899 |
| | Class 4 | 0.515 | 0.636 | 0.163-2.481 |

† Reference Group

Discussion

The study shows that a substantial percentage of people (44.6%) had poor sleep quality. Among medical students, there is also a concerning high degree of perceived stress: 67.4% report moderate stress, and 14.2% report extreme stress. The results are not shocking because earlier studies among medical students at various medical colleges also found a comparable higher prevalence of poor sleep quality and stress levels, which may be related to the demanding nature of the medical curriculum and the pressure to perform well academically.

Rebello et. al. reported 33.8% of Karwar, Karnataka, India's medical students had inadequate sleep quality [13] in accordance to our study, 44% of medical college students in Kathmandu experienced poor sleep quality [4]. Similar results were observed in earlier research by Basu et al., which revealed that MBBS students had a greater percentage of poor sleep quality (63.5%) [14]. Nonetheless, Goyal et al. found that almost 30% of medical students had low sleep quality ratings [15]. A study conducted among medical undergraduate students at Abdulaziz University in Saudi Arabia revealed that 70.4% of them reported having poor sleep quality [16].

Variations in study designs, study sites, sociocultural practices, and academic demands among various demographic cohorts may all have an impact on the variation among studies. Our study's results, however, were consistent with those of prior research that have demonstrated the larger proportion.

According to the current study, female students' sleep was of lower quality than that of their male counterparts. These results align with a number of research investigations [17-18]. It could be because women report experiencing worry and depression at higher rates than men do, and hormone fluctuations associated with menstruation may also contribute to poor sleep. However, the study's cross-sectional methodology restricts the amount of information that can be analysed about gender differences.

The socioeconomic position of a student's family was found to have a strong correlation with sleep deprivation; students from lower socioeconomic backgrounds had lower sleep quality. It is becoming more and more clear that a person's living situation affects both their lifestyle and how they view their health. Low socioeconomic status students are more

likely to have poor sleep quality. Studies conducted in the United States, Brazil, and Africa revealed similar results [19-21].

About 80% of the participants in the current study reported having moderate to high levels of stress. In study at King Abdulaziz University in Saudi Arabia it was found that 65% of them experienced stress [16]. However, other research shows that stress is rather uncommon at King Saud University (53.2%) and Pakistani medical schools (59.7%), respectively [3,22]. It does seem to be lower than previous research, though, which report that over 90% of their students experienced stress [13].

Additionally, the current study shows that poorer sleep quality is correlated with higher stress levels, which is consistent with findings from medical students in Saudi Arabia, Pakistan, and India [3,16,22].

Students suffer greatly from a vicious cycle of sleep deprivation and the release of stress hormones. The "stress hormones," cortisol and adrenaline, are produced in greater amounts during stressful situations [17-18]. While the circadian cycle of cortisol secretion is affected by sleep deprivation. In line with research from King Saud University and a Pakistani medical school, the current study also shows that a high level of stress is a predictor of poor sleep quality, even though the prediction was not significant when tested in our logistic regression model [3,22].

Conclusion

Despite the medical students' generally poor sleep quality and significant levels of reported stress. Our analysis has proven no substantial relationship between the two. However, stress and poor sleep quality are concerning issues in and of themselves. With today's competitive exams and the introduction of a new medical curriculum, students must adapt to the circumstances. Based on these results, curriculum-integrated interventions involving behavioural modifications, sleep education, and relaxation techniques should be taught to students in order to control the kinds of variables that lead to stress and poor sleep quality.

Conflicts of Interests: None

Authors Funding: Self

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