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## Sleep Quality in Undergraduate Medical Students of Birat Medical College Teaching Hospital

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### ABSTRACT

**Introduction:** Inadequate sleep could lead to poor performance of work or studies. Medical students can have inadequate sleep due to overloaded medical curriculum and can lead to poor performance in academics.

**Objectives:** The objective was to assess the prevalence and patterns of sleep quality among undergraduate medical students of Birat Medical College Teaching Hospital using the Pittsburgh Sleep Quality Index (PSQI).

**Methodology:** A cross sectional study was conducted from October 1, 2020 to December 30, 2020 among 131 medical students of Birat Medical College Teaching Hospital. Ethical clearance was taken from the Institutional Review Committee (IRC) of Birat Medical College Teaching Hospital. Informed consent was taken from individual students. A pretested self-administered questionnaire using Pittsburgh Sleep Quality Index was given to study participants. The collected data was entered in Microsoft Excel 2016 and analyzed by SPSS version 25.

**Results:** The prevalence of poor sleep quality among medical students, as indicated by a Global PSQI score greater than 5, was 81 (61.8%), with 42 (60%) of male students and 39 (63.9%) of female students. The mean sleep duration across all participants was  $6.7 \pm 1.2$  hours, indicating that most students were not meeting the recommended sleep duration.

**Conclusion:** A significant proportion of medical students reported poor sleep quality, with female students and first-year students being more affected. The majority of students experienced sleep deprivation, with most sleeping less than the recommended 8 hours per night, and only a small fraction meeting the ideal sleep duration.

### Introduction

Poor sleep quality is considered as a significant emerging public health concern.<sup>1</sup> Medical students, nurses, and doctors are particularly vulnerable to experiencing poor sleep quality, and they often endure its adverse effects to a significant degree.<sup>2</sup> Medical students are exposed to a significant level of pressure due to academic demands.<sup>3</sup> Their sleep pattern is characterized by insufficient sleep duration, delayed sleep onset, and occurrence of napping episodes during the day.<sup>4</sup> Sleep problems are related to increased health concerns, irritability, and depression, fatigue, and attention and concentration difficulties, along with poor academic performance.<sup>5</sup> A research in Nepal found prevalence of poor sleep quality (44.23%).<sup>6</sup> The lack of prior studies in our set up would strengthen the rationale. Considering this significant problem of sleep quality, this study aimed to assess the prevalence and patterns of sleep quality among undergraduate medical students of Birat Medical College Teaching Hospital using the Pittsburgh Sleep Quality Index (PSQI).

## Methodology

A descriptive cross-sectional study was carried out to assess sleep quality among first- and second-year MBBS students of Birat Medical College Teaching Hospital. The study was conducted over a three-month period, from October 1, 2020, to December 30, 2020. Prior to commencing the study, ethical approval was obtained from the Institutional Review Committee (IRC) of Birat Medical College Teaching Hospital, Morang, Nepal (BMC/IRC-PA082/2077-78) to ensure that the research complied with ethical guidelines and protected the rights and well-being of the participants. The target population included all students currently enrolled in the first and second years of the MBBS program at the institution during the study period. A list of eligible students totals of 198 was obtained from the academic administration department to create a sampling frame. Students were approached and briefed about the study's purpose, significance, and procedures. Only those students who voluntarily provided written informed consent were included in the study. Participants were assured of their anonymity and confidentiality throughout the process, and participation was entirely voluntary, with the right to withdraw at any point without any academic or personal consequences. To determine the appropriate number of participants required for the study, the sample size was calculated using the standard formula for estimating a proportion in a cross-sectional study:

$$n = z^2 \times \frac{p \times q}{e^2}$$

Where:

n = required minimum sample size

z=1.96, the standard normal variate corresponding to a 95% confidence interval p=0.4423, representing the prevalence of poor sleep quality (44.23%) as reported in a previous similar study. q = 1 - p = 0.5577

e=0.085, the margin of error set at 8.5%

Substituting the values into the formula:

$$n = \frac{(1.96)^2 \times (0.4423 \times 0.5577)}{(0.085)^2}$$

=131

Thus, the minimum calculated sample size required for the study was 131 participants. The study employed a simple random sampling technique to select the required number of students from the list of eligible participants using lottery method

Data collection was conducted using a pretested, structured, and self-administered questionnaire.<sup>7</sup> The instrument used for assessing sleep quality was the Pittsburgh Sleep Quality Index (PSQI), which is a widely validated tool commonly used in sleep research.<sup>7</sup> The questionnaire includes components that evaluate various aspects of sleep, such as duration, latency, disturbances, and overall quality over the past one month. The PSQI has been extensively used in academic and clinical settings due to its strong reliability and validity.

To ensure the quality and reliability of the responses, the questionnaire was pretested (Cronbach's alpha=0.74) among a small subset of 15 students who were not included in the final study sample. Based on their feedback, necessary modifications were made to improve clarity and comprehensibility. Students were given clear instructions on how to fill out the questionnaire, and they completed it independently under the supervision of the research team to minimize peer influence at classroom setting of academic blocks which took about 35 minutes to complete the questionnaire. Anonymity and confidentiality were maintained to ensure privacy.

Exclusion criteria were strictly followed. Students who had a prior diagnosis of any sleep disorder, those with a known history of recurrent mood disorders (such as depression or bipolar disorder), individuals currently taking sedative or narcotic medications, and those suffering from any severe medical condition that could affect sleep patterns were excluded from participation in order to eliminate potential confounding factors.

Once the questionnaires were completed, the collected data were carefully reviewed for completeness and consistency. Data entry was carried out using Microsoft Excel 2016, and subsequent statistical analysis was performed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize the data in terms of frequency and percentage.

## Results

The mean age of the participants was 20.7 ± 1.5 years. Among the 131, medical students surveyed 70 (53.4%) were male and 61 (46.6%) were female. Of these, 70 (53.4%) students were enrolled in the first year of MBBS program, while the remaining 61 (46.6%) were in the second year. The prevalence of poor sleep quality indicated by a Global PSQI score greater than 5 among medical students was found to be 81 (61.8%), as indicated by a Global PSQI score greater than 5. When comparing the prevalence of poor sleep quality by gender, 42 (60%) of male students reported poor sleep quality, which was slightly lower than the 39 (63.9%) of female students who reported similar issues. With respect to academic year, poor sleep quality was more prevalent among first-year students, with 48 (68.6%) affected, compared to 33 (54.1%) of second-year students (Table 1).

**Table 1:** Distribution of Sleep Quality by Sex and Year of Study Among Medical Students (n=131)

Global PSQI	Mean 5.57, Median 5.0, SD 2.7	
Sex	Good	Poor
Male	28 (40%)	42 (60%)
Female	22 (36.1%)	39 (63.9%)
<b>Year of study</b>		
First year	22 (31.4%)	48 (68.6%)
Second year	28 (45.9%)	33 (54.1%)

The students reported an average sleep duration of 6.7 ± 1.2 hours. A large majority, 103 students (78.6%), indicated that they slept less than 8 hours per night, suggesting a high prevalence of

sleep deprivation in this population. Only 19 students (14.5%) met the recommended minimum of 8 hours of sleep for adults, while a smaller group of 9 students (6.9%) reported sleeping more than 8 hours. (Table 2).

**Table 2:** Distribution of Sleep Duration Among Medical Students (n=131)

Sleep duration	No. of students
8 hours	19 (14.5%)
Less Than 8 hours	103(78.6%)
More Than 8 hours	9 (6.9%)

Table 3 presents the subjective assessment of sleep quality among students. The majority of students, 89 (67.9%), rated their sleep quality as “fairly good,” indicating that most students did not perceive severe disturbances in their sleep. However, a smaller proportion of students, 12 (9.2%), reported their sleep quality as “fairly bad,” and 3 (2.3%) described it as “very bad.” Only 27 (20.6%) students considered their sleep quality as “very good.”

**Table 3:** Distribution of Subjective Sleep Quality Among Medical Students (n=131)

Subjective sleep quality	No. of students
Very good	27 (20.6%)
Fairly good	89(67.9%)
Fairly bad	12 (9.2%)
Very bad	3 (2.3%)

## Discussion

Sleep problems are closely associated with a range of physical and mental health concerns, including irritability, depression, fatigue, attention and concentration difficulties, as well as poor academic performance.<sup>5</sup> In this study, the Global PSQI Mean, Median and SD score were 5.57, 5 and 2.7. We found the prevalence of poor sleep quality among medical students to be 61.8%, which is significantly higher than the 44.23% reported in a previous study conducted among medical students at a medical college, using the same PSQI questionnaire.<sup>6</sup> This finding highlights that sleep disturbances are a major issue for medical students. Furthermore, the prevalence of poor sleep quality among non-medical undergraduate students and higher secondary students has been reported to be lower, at 35.4% and 59.1%, respectively.<sup>8,9</sup> These figures emphasize the unique challenges faced by medical students in maintaining healthy sleep patterns. The prevalence of poor sleep quality among medical students has been consistently reported to be higher than that of non-medical students or the general population.<sup>10</sup> A study among medical students, nurses, and doctors showed these groups to be particularly vulnerable to sleep deprivation.<sup>2</sup> Medical students are often exposed to a significant level of academic pressure, which may disrupt their sleep patterns.<sup>3</sup> Their sleep habits are frequently characterized by insufficient sleep duration, delayed sleep onset, and frequent daytime napping episodes.<sup>4</sup>

A study conducted in Saudi Arabia among medical students found an even higher prevalence of poor sleep quality (76%), further underscoring the widespread nature of sleep disturbances in this group.<sup>11</sup> Similarly, a study from Qatar reported that 70% of university students reported poor sleep quality.<sup>12</sup> In this study, we found that female students experienced a higher prevalence of poor sleep quality, with 63.9% of female students reporting sleep disturbances compared to 60% of male students. This finding is consistent with research conducted in Karachi, Pakistan, where a similar trend was observed, with female students reporting higher levels of poor sleep quality (44%).<sup>13</sup>

A large-scale study across multiple Latin American countries found that 62.2% of medical students experienced poor sleep quality. It identified significant associations between sleep issues and gender, academic level, and lifestyle habits.<sup>14</sup> A study conducted among Egyptian medical students reported widespread poor sleep quality and linked it to poor sleep hygiene practices such as irregular sleep schedules and excessive caffeine consumption. It recommended integrating sleep hygiene education into the curriculum.<sup>15</sup> A meta-analysis of 57 studies and over 25,000 medical students found a global prevalence of poor sleep quality at 52.7%. It highlighted variations by geographic region, with students in Europe and the Americas more affected than those in Asia.<sup>16</sup> A study from Nepal also found that female medical students had a higher prevalence of poor sleep quality (65.8%).<sup>9</sup> A study found a reported 67.9% prevalence of poor sleep quality and showed strong correlations with symptoms of anxiety and depression, emphasizing the importance of mental health support alongside sleep interventions.<sup>17</sup> Post-pandemic, a Chinese study reported an 82.3% prevalence of sleep disorders among medical students. It identified academic stress, physical health status, and economic concerns as major contributors, indicating a need for post-COVID wellbeing strategies.<sup>18</sup> This difference in sleep quality may be attributed to a range of factors, including hormonal fluctuations, social expectations, and perhaps greater psychological stress in female students. Understanding the specific reasons for the higher prevalence of poor sleep quality among female students requires further investigation, as the factors involved may be multifaceted and complex. One possible explanation for the high prevalence of poor sleep quality among medical students could be the intense academic pressures they face. Medical school is notoriously demanding, and students often experience stress related to heavy coursework, exams, clinical rotations, and long study hours. A lack of adequate time for rest and recovery can lead to insufficient sleep and disrupted sleep patterns. Additionally, the irregular sleep schedules and late-night study sessions commonly practiced by medical students can exacerbate the problem. Moreover, a key finding in this study is that the prevalence of poor sleep quality was higher among first-year medical students (68.6%) compared to second-year students (54.1%). This could be due to the transition into medical school, which often brings with it new academic and social challenges. First-year students may experience more stress as they adjust to the rigorous nature of the program and develop new study habits, leading to disrupted sleep patterns. Conversely, second-year students may have adapted to the academic demands

and thus report slightly better sleep quality. This observation suggests first-year medical students are particularly vulnerable to sleep disturbances due to the initial adjustment period. Another important aspect to consider is the self-reported nature of the data in this study. While the PSQI is a validated tool for assessing sleep quality, the reliance on self-reported data means that subjective bias could influence the results. For a more objective assessment of sleep quality, studies employing polysomnography or actigraphy could provide a more accurate representation of sleep patterns. Additionally, it is important to recognize that factors beyond academic stress, such as lifestyle choices, psychological health, and social support, may also contribute to poor sleep quality in medical students. Future research should aim to identify these contributing factors and explore how they interact with academic stress to impact sleep quality. A better understanding of the etiology of sleep disturbances in medical students is crucial for developing effective interventions. Sleep hygiene education, stress management workshops, and mental health support programs could help improve the sleep quality of medical students and, in turn, their overall well-being and academic performance. Interventions aimed at improving sleep could potentially reduce the negative consequences associated with poor sleep, such as impaired cognitive function, increased anxiety, and diminished physical health.

## Conclusion

The study found that a significant proportion of medical students reported poor sleep quality, with female students and first-year students being more affected. The majority of students experienced sleep deprivation, with most sleeping less than the recommended 8 hours per night, and only a small fraction meeting the ideal sleep duration. Despite the high prevalence of poor sleep quality, most students subjectively rated their sleep as "fairly good," indicating a discrepancy between perceived and actual sleep quality.

## Recommendations

Given the high prevalence among first-year students, orientation programs could include modules on time management and sleep practices.

## Limitations of the study

Reliance on self-reported data may have introduced recall or reporting bias. The sample was limited to first- and second-year MBBS students from a single institution, which restricts the generalizability of the findings. Furthermore, potential confounding factors such as stress, screen time, and lifestyle habits were not assessed, and no objective measures of sleep quality were employed.

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## Conflict of Interest

The authors declare that there is no conflict of interest related to this study. There were no competing interests or any personal, financial, or professional relationships that could have influenced the study's design, data collection, analysis, or reporting of findings. The study was conducted with the highest ethical standards and transparency.

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