

Prevalence and Assessment of Consequences of Sleep Deprivation on Body in Medical Undergraduate Students

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Abstract:

Background: Sleep deprivation is a condition in which a person don't get enough sleep. He can become sleep deprived due to medical conditions, environmental conditions (stress, long work hours, excess caffeine intake, etc.), or a combination of both. Without regular and sufficient sleep, the wear and tear on our physiology accumulates. This can result in short-term consequences as well as longer term health risks. Sleep quality is critical for optimal health, mental acuity, and performance. By studying quality of sleep and its effects, researchers can examine ways to ensure university students and healthcare professionals get adequate sleep each Night.

Methodology: An observational, cross-sectional study, (an Epidemiological study) Conducted in the Department of Physiology and Medical colleges around the health university, Vijayawada. The study was conducted for duration of 2 months November 2025 to December 2025 by using A semi structured questionnaire which includes SATED questionnaire & Functional Outcomes of Sleep. The subjects are included by Convenience sampling method those were willing to participate in the study will be included with Sample size: 100. After obtaining Institutional Ethics Committee approval, eligible students were recruited. M.B.B.S students within the age group of 19–24-years. The purpose of the study was explained and written informed consent was obtained. Participants were administered a semi-structured questionnaire consisting of demographic details, general health history, and sleep-related questionnaires. Sleep quality was assessed using the SATED questionnaire, and the functional impact of sleep deprivation was evaluated using the Functional Outcomes of Sleep Questionnaire-10 (FOSQ-10). Data were entered in Microsoft Excel and analyzed using appropriate statistical software. Results were expressed as percentages and proportions. Associations between variables were analyzed using Chi-square test where applicable.

Results: Among The Study Population, 82% Does not Have Any Severe Symptoms of Sleep Deprivation, Where As Few Have Impulsive Behaviour(5%), Micro sleeps (5%), Drooling Eyelids (3%), Hallucinations (2%), Trouble Speaking Clearly (2%), Impaired Judgement (1%) Respectively. Almost (78%) of the studied subjects are found to be having mild to moderate sleep, whereas (17%) have good sleep and very few (5%) have poor sleep.

Assessment of impact of Sleep Deprivations among Medial graduates: It is done using FOSQ- 10 (Functional outcomes of sleep deprivation). Out of the 100 studied subjects, only 2 (2%) expressed as having sleep related functional impairment. It is on par with the results of FOSQ-10.

Strengths: Medical students were chosen as the focus of the study because they represent an at-risk population. Validated assessment tools, including the SATED scale and the FOSQ-10 questionnaire, were used to ensure reliable measurement.

Limitations: The cross-sectional study design limits the ability to establish causal relationships. Reliance on self-reported questionnaires may lead to underestimation of the true level of impairment. The absence of objective assessments, such as actigraphy or sleep logs, is another limitation. Additionally, the study included a limited evaluation of modifiable factors, such as screen time and caffeine intake.

Implications: The findings highlight the urgent need for: Sleep-hygiene education in medical colleges, Screening for sleep disorders in students, Structuring academic schedules to reduce chronic sleep debt, Stress-management and mental wellness programs.

Conclusions: In this study on sleep deprivation prevalence and assessment of consequences of sleep deprivation, it is found that A total of 100 participants were included in the study. Sleep quality assessment showed that 5% of participants had poor sleep, 78% had mild to moderate sleep impairment, and 17% reported good sleep quality. Thus, 83% of the study population exhibited some degree of sleep disturbance. Functional

outcomes were assessed using the FOSQ-10 scale. Only 2% of the participants demonstrated sleep-related functional impairment, while 98% reported no functional impairment. The findings indicate that although sleep quality was sub optimal for a large proportion of participants, functional impact on daily activities remained minimal. The study reveals a high prevalence of mild to moderate sleep impairment among participants but minimal functional consequences as measured by FOSQ-10. These findings emphasize the need for early screening and preventive strategies to address sleep disturbances before they lead to significant cognitive or functional deficits.

Keywords: Sleep, Functional outcomes of sleep deprivation (FOSQ-10), SATED scale.

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Introduction

Sleep deprivation is a condition in which a person don't get enough sleep. He can become sleep deprived due to medical conditions, environmental conditions (stress, long work hours, excess caffeine intake, etc.), or a combination of both. [1]

One of the fundamental purposes of sleep is to repair or reverse the effects of wakefulness on the body and the brain. Without regular and sufficient sleep, the wear and tear on our physiology accumulates. This can result in short-term consequences as well as longer term health risks. It's a common refrain that modern day life is impinging on our ability to get adequate sleep. [2]

Individuals experiencing sleep deprivation are more likely to suffer from chronic diseases such as obesity, diabetes, hypertension, and depression, as well as cancer, increased mortality, and reduced quality of life and productivity. [3] Poor sleep quality can predict poor health and is associated with mortality risk. Many factors are associated with sleep quality such as gender, health, education, socioeconomic status, and stress. [4]

Sleep deprivation (SD) can be divided in partial and total Sleep Deprivation. Partial Sleep Deprivation refers to a night of reduced or interrupted sleep, and total Sleep Deprivation to no sleep for at least one night during the normal sleep/wake cycle. Studies show that consistently restricting sleep overtime is more harmful in comparison to a single night of total Sleep Deprivation. [5]

The cumulative long-term effects of sleep loss and sleep disorders have been associated with a wide range of deleterious health consequences including an increased risk of hypertension, diabetes, obesity, depression, heart attack, and stroke. [6] The lack of sleep disrupts body circulation and affects the cognitive and emotional abilities of individuals. [7]

Sleep quality is critical for optimal health, mental acuity, and performance. By studying quality of sleep and its effects, researchers can examine ways to ensure university students and healthcare professionals get adequate sleep each Night. [8]

Aims & Objectives:

1. To estimate the prevalence of sleep deprivation among medical undergraduate students.
2. To assess the impact of sleep deprivation among medical undergraduate students.

Methodology:

Type of study: observational, cross-sectional study, (an Epidemiological study)

Place of study: Department of Physiology and Medical colleges around the health university, Vijayawada.

Duration: Two months November 2025 to December2025

Tools: A semi structured questionnaire which includes SATED questionnaire &Functional Outcomes of Sleep.

Inclusion Criteria: All Students willing to participate in the study will be included.

Exclusion Criteria: following categories of women are excluded from the study.

- Not willing to participate.
- Known cases of psychiatric illness.

Sampling: Convenient sampling is adopted in this study. All subjects satisfying inclusion criteria, presented to place of study, during study period are included.

Sample size: In a current meta-analysis done worldwide [9], prevalence of sleep deprivation in young adults in medical colleges is around 55%. Sample size calculated at 95% confidence level with a precision or confidence interval of 10.

$$\Rightarrow p=0.55,$$

$$\Rightarrow q=1-p=1-0.55=0.45$$

Precision (confidence interval) is 10 on either side
 $\Rightarrow d$ is 0.1

Confidence level 95%.($z=1.96$)

$$N = z^2 p (1-p) / d^2$$

$$= (1.96)^2 (0.55 \times 0.45) / (0.1)^2$$

$$= 3.8416 \times 0.2475 / 0.01 = 95 + 5\% = 100\%$$

Hence our sample size is 100. However, recruitment will be continued till the end of two months period for better precision.

*100 % $\approx$ 50 males and 50 Females to exclude Gender Variation.

Study Procedure: After obtaining Institutional Ethics Committee approval, eligible students were recruited. The purpose of the study was explained and written informed consent was obtained. Participants were administered a semi-structured questionnaire consisting of demographic details, general health history, and sleep-related questionnaires. Sleep quality was assessed using the SATED questionnaire, and the functional impact of sleep deprivation was evaluated using the Functional Outcomes of Sleep Questionnaire-10 (FOSQ-10). All responses were self-reported and collected in a confidential manner. No invasive procedures were involved.

Study Tools and Scoring:

1. SATED Questionnaire: (Assesses five dimensions of sleep health: Satisfaction, Alertness, Timing, Efficiency, and Duration.)

Scoring:

- <4 $\rightarrow$ Poor sleep
- 4–7 $\rightarrow$ Mild to moderate sleep
- 7 $\rightarrow$ Good sleep

Used to assess prevalence of sleep deprivation.

2. Functional Outcomes of Sleep Questionnaire-10 (FOSQ-10): (Assesses the impact of sleepiness on daily functioning.)

Scoring:

- Yes, extreme – 1
- Yes, moderate – 2
- Yes, a little – 3
- No – 4

Interpretation:

- <18 $\rightarrow$ Sleep-related functional impairment
- ≥ 18 $\rightarrow$ No functional impairment.

Ethical Considerations: The study protocol received approval from the Institutional Ethics Committee before initiation of the study (IECSMCGGH2025/AP/218). Participation was voluntary, and written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study.

Data Analysis: Data were entered in Microsoft Excel and analyzed using appropriate statistical software. Results were expressed as percentages and proportions. Associations between variables were analyzed using Chi-square test where applicable. Data were presented using tables and graphical representations.

Results:

Demographic profile of the study participants:

Table 1: Distribution by age of the study population

Age	Frequency	%
17-18	8	8.00
19-20	57	57.00
21-22	28	28.00
23 & >23	7	7.00
Total	100	100.00

Majority (57%) of the students studied are between the age 19 to 22 yrs. There are 57 students (57%) between 19- 20yrs, 28% between 21-22yrs, 8% are below 19 yrs and 7% are 23 & above respectively.

Table 2: Distribution by gender

Gender	Frequency	%
Female	56	56.00
Male	44	44.00
Total	100	100.00

Majority of the study subjects are Females (56%) and while males are around 44.

Table 3: Distribution by Academic year.

Academic year	Frequency	%
MBBS 1 ST Year	19	19.00
MBBS 2 ND Year	14	14.00
MBBS final year part 1	65	65.00
MBBS Final year part 2	02	02.00
Total	100	100.00

Majority of the participants are studying MBBS final year part 1 (65%), whereas 19% are studying MBBS 1st Year, 14% are MBBS 2nd year and 2% are MBBS final year part 2.

General History

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Table 4: Distribution by Diabetes

Diabetes	Frequency	%
Yes	01	1.00
No	99	99.00
Total	100	100.00

Almost all (99%) of the study participants don't have history of diabetes.

Table 5: Distribution by Hypertension).

Hypertension	Frequency	%
Yes	01	1.00
No	99	99.00
Total	100	100.00

Almost all (99%) are not having any history of hypertension.

Table 6: Distribution by Hypothyroidism.

Hypothyroidism	Frequency	%
Yes	02	02.00
No	98	98.00
Total	100	100.00

Almost all (98%) are not having hypothyroidism.

Table 7: Distribution by Cardiac Illness.

Cardiac Illness	Frequency	%
Yes	00	0.00
No	100	100.00
Total	100	100.00

All Study Participants are not having any cardiac illness.

Table 8: Distribution by Renal Problems.

Renal Problems	Frequency	%
Yes	01	1.00
No	99	99.00
Total	100	100.00

Almost all (99%) of the study population are not having any renal problems.

Table 9: Distribution by Brain Strokes.

Brain Strokes	Frequency	%
Yes	00	0.00
No	100	100.00
Total	100	100.00

All of the study participants do not have any history of brain strokes.

Majority of the study population have Day time sleepiness (26%) and Headache (23%), and trouble thinking, focusing, and remembering (20%),

whereas few have Fatigue (15%), Irritability (16%), and slow reaction time (10%).

Most (51%) of the study participants from study population are not having any symptoms of sleep deprivation.

SEVERE SYMPTOMS OF SLEEP DEPRIVATION:
100 responses

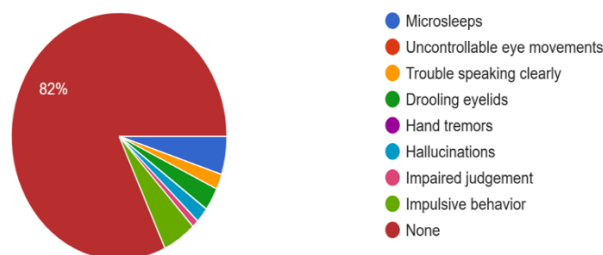


Figure 1: Severe symptoms of sleep deprivation

Where As Few Have Impulsive Behaviour (5%), Microsleeps (5%), Drooling Eyelids (3%), Hallucinations (2%), Trouble Speaking Clearly (2%), Impaired Judgement (1%) Respectively. Among The Study Population, 82% does not Have Any Severe Symptoms of Sleep Deprivation,

Prevalence and assessment of consequences of sleep deprivation: Prevalence and assessment of

consequences of sleep deprivation is studied by using SATED Questionnaire and functional outcomes of sleep questionnaire (FOSQ-10).

Prevalence of Sleep Deprivation among Medical Undergraduate's: Almost (78%) of the studied subjects are found to be having mild to moderate sleep, whereas (17%) have good sleep and very few (5%) have poor sleep.

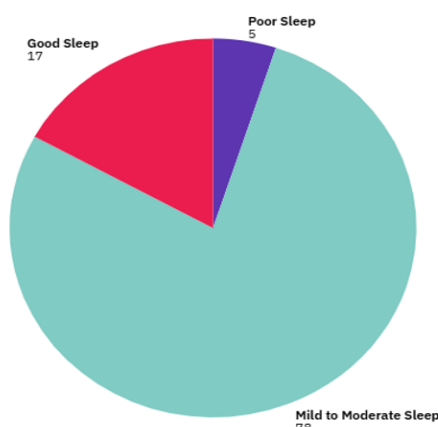


Figure 2: Prevalence of sleep deprivations among undergraduate's using SATED Questionnaire.

Assessment of impact of Sleep Deprivations among Medial graduates: It is done using FOSQ- 10 (Functional outcomes of sleep deprivation). Out of the 100 studied subjects, only 2 (2%) expressed as having sleep related functional impairment. It is on par with the results of FOSQ- 10

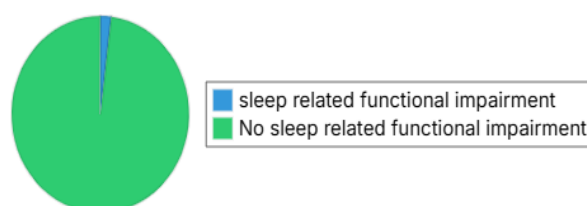


Figure 3: Assessment of impact of sleep deprivation among medical graduate students.

2% of the studied population expressed sleep related functional impairment needing attention like difficulty concentrating, memory issues or trouble with studies or hobbies due to sleepiness. Majority (98%) expressed to have no sleep related functional impairment.

Discussion

Demographic Profile and Its Influence on Sleep Deprivation: In the present study conducted among 100 medical undergraduate students, most participants belonged to the 19–22-year age group (85%), with a slight female predominance (56%). This age distribution is consistent with typical medical college populations and represents a period characterized by high academic load and irregular lifestyles, factors known to adversely affect sleep quality. Similar observations were reported by Hershner and Chervin, who highlighted that late teen and young adult students are at the highest risk for insufficient sleep due to lifestyle pressures and academic demands. [10] A majority of participants were from the final MBBS year (65%), a phase known for heavy clinical duties and examination stress, which may contribute to poor sleep. Studies among final year medical students globally have shown higher prevalence of sleep deprivation due to increased academic workload and clinical responsibilities. [11]

General Health Profile and Relationship with Sleep deprivation: The general health history showed that almost all participants did not suffer from chronic diseases such as diabetes (1%), hypertension (1%), hypothyroidism (2%), renal disease (1%), or cardiac illness (0%). The extremely low prevalence of chronic medical conditions suggests that sleep deprivation seen in this study is unlikely to be secondary to medical co-morbidities, and more likely due to behavioral and lifestyle factors. Previous studies had established that metabolic diseases worsen sleep quality, while young, medically healthy individuals mostly experience behaviour-related sleep loss, especially due to academic stress, screen exposure, and irregular sleep-wake patterns. [12]

Symptoms of Sleep Deprivation: Symptoms reported in this study reflect classical early manifestations of sleep loss. The most commonly reported symptoms were:

- Daytime sleepiness – 26%
- Headache – 23%
- Difficulty concentrating / trouble thinking – 20%
- Irritability – 16%
- Fatigue – 15%
- Slow reaction time – 10%

Interestingly, 51% had no major symptoms, despite having varying degrees of sleep impairment. This

aligns with research showing that young adults often under-recognize the functional impact of poor sleep. [13] In the early stages of sleep restriction, symptoms may be subtle and often normalised by students, leading to underreporting.

The neurocognitive symptoms observed—poor focus, irritability, slowed reaction—are well-documented consequences of partial sleep deprivation. Studies by Lim & Dinges demonstrated that even moderate sleep restriction reduces attention, working memory, and reaction time, impairing academic and clinical performance. [14]

Prevalence of Sleep Deprivation in the Study Population: Although the prevalence numbers were provided separately (poor sleep = 5%, mild moderate = 78%, good sleep = 17%), the overall pattern shows that 83% of students have suboptimal sleep. This aligns with global literature indicating that 50–70% of medical students experience inadequate sleep duration or poor sleep quality. [15]

Multiple factors contribute: Late-night studying, Shift duties during clinical postings, High stress and anxiety, Digital media and screen exposure, Irregular meal and sleep schedules

A meta-analysis on sleep among medical students worldwide found mean sleep durations of 5–6 hours, far below the recommended 7–9 hours. [16]

FOSQ-10 Functional Impairment

Although 83% reported mild–moderate sleep problems, only 2% showed functional impairment on FOSQ-10. This discrepancy can be explained by:

1. Young adults show resilience to early functional decline.
2. FOSQ-10 is sensitive for moderate-to-severe functional loss, not early subtle deficits.
3. Students may underestimate performance impairment, especially during stressful academic periods.
4. Symptoms such as fatigue and poor concentration may be mistakenly attributed to academic workload rather than sleep loss.

This pattern matches findings from Chasens et al., who noted that simple subjective sleep complaints precede measurable functional impairment in questionnaires like FOSQ-10. [17]

Strengths and Limitations

Strengths: Medical students were chosen as the focus of the study because they represent an at-risk population. Validated assessment tools, including the SATED scale and the FOSQ-10 questionnaire, were used to ensure reliable measurement. The inclusion of detailed symptom profiling provided valuable insight into the functional impact of the condition being studied. Additionally, the study

achieved a good sample size of 100 participants, which is appropriate for a cross-sectional study conducted in a college setting.

Limitations: The cross-sectional study design limits the ability to establish causal relationships.

Reliance on self-reported questionnaires may lead to underestimation of the true level of impairment. The absence of objective assessments, such as actigraphy or sleep logs, is another limitation. Additionally, the study included a limited evaluation of modifiable factors, such as screen time and caffeine intake.

Implications: The findings highlight the urgent need for: Sleep-hygiene education in medical colleges, Screening for sleep disorders in students, Structuring academic schedules to reduce chronic sleep debt, Stress-management and mental wellness programs, Sleep deprivation not only affects student well-being but may impair clinical judgment, reaction time, and learning capabilities—critical in medical training.

Conclusions

In this study on sleep deprivation prevalence and assessment of consequences of sleep deprivation, it is found that A total of 100 participants were included in the study. Sleep quality assessment showed that 5% of participants had poor sleep, 78% had mild to moderate sleep impairment, and 17% reported good sleep quality. Thus, 83% of the study population exhibited some degree of sleep disturbance.

Functional outcomes were assessed using the FOSQ-10 scale. Only 2% of the participants demonstrated sleep-related functional impairment, while 98% reported no functional impairment. The findings indicate that although sleep quality was sub optimal for a large proportion of participants, functional impact on daily activities remained minimal.

The study reveals a high prevalence of mild to moderate sleep impairment among participants but minimal functional consequences as measured by FOSQ-10. These findings emphasize the need for early screening and preventive strategies to address sleep disturbances before they lead to significant cognitive or functional deficits.

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