

Prevalence of Stress, Anxiety and its association with Sleep Quality among Undergraduate Medical Students in a Medical College in Eastern India: A Cross-Sectional Study

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Abstract:

Background : Recent evidence indicates that stress is a widespread and well-recognised problem among medical students globally, with reported prevalence varying from 21% to 94%. Sleep problems are similarly widespread and closely linked to emotional distress. However, data from medical colleges in Eastern India remain limited. **Objectives:** This study aimed to assess stress and anxiety, and their association with sleep quality among undergraduate medical students. **Material & Methods:** A cross-sectional study was conducted among MBBS students aged 18-25 years in a medical college affiliated with a deemed-to-be university in Eastern India. Students with chronic physical or psychiatric illness were excluded. Data were collected using a pretested, anonymous questionnaire that incorporated validated instruments: the Perceived Stress Scale-10 (PSS-10), Generalised Anxiety Disorder-7 (GAD-7), and Pittsburgh Sleep Quality Index (PSQI). Statistical analysis was performed using SPSS v. 20. Associations were assessed using chi-square tests, t-tests and multivariable logistic regression. A p-value <0.05 was considered significant. **Results:** Of the 278 participants, the mean age was 21.18 ± 1.75 years, and 65.8% were females. Most students had never smoked (88.9%) or consumed alcohol (84.7%), while caffeine use was common. Moderate stress was reported by 63.4% and severe stress by 23.7%. Mild, moderate, and severe anxiety were present in 35.9%, 25.1%, and 12.2% of students, respectively. Poor sleep quality (PSQI ≥ 5) was observed in 81.5% of participants. Poor sleep was significantly associated with higher stress and anxiety and was more common among females and younger students. In adjusted analyses, moderate stress, moderate anxiety, and severe anxiety remained independent predictors of poor sleep. **Conclusion:** Stress, anxiety, and poor sleep quality are highly prevalent among undergraduate medical students in Eastern India. Targeted mental health interventions and sleep-focused support are urgently needed within medical institutions.

Keywords: Stress, Psychological; Anxiety Disorders; Sleep Wake Disorders; Students, Medical; Sleep Hygiene

Introduction

Recent evidence indicates that stress is a widespread and well-recognised problem among medical students globally [1], with reported prevalence ranging from 21% to 94% across countries and instruments, depending on the population studied, the methodology used, and other covariates [2]. Individual college-based studies reinforce these findings; for example, nearly seven in ten MBBS students in one survey demonstrated clinically relevant anxiety (66.9%), and close to half reported significant stress (53%) and depression (51.3%), underscoring the persistent mental health burden in this

population [3]. Sleep-related disturbances appear similarly pervasive. A recent Indian study, using the Pittsburgh Sleep Quality Index (PSQI), found that more than half of participants (55.5%) experienced poor sleep. The study also noted that there was a significant positive correlation between depression, anxiety and stress with global PSQI scores [4]. Consistent with these findings, a recent analysis reported a strong overlap between poor sleep quality and psychological symptoms, demonstrating that prolonged sleep latency and poorer subjective sleep ratings were closely associated with elevated markers of emotional distress [5]. Poor sleep quality

reinforces existing stress and anxiety, creating a cyclical deterioration that negatively affects cognitive performance. Studies from Saudi Arabia also report that elevated stress and anxiety levels among medical students are linked to significantly poorer sleep quality [6].

Despite this growing body of research, the literature remains methodologically diverse. Variations in diagnostic tools, thresholds for psychological symptoms, and sampling techniques contribute to wide differences in prevalence estimates across studies [7].

The demanding nature of medical education, characterised by extensive academic workload, frequent assessments, clinical responsibilities, and concerns regarding future career prospects, places students at increased risk of mental health problems [8]. Poor sleep quality may further exacerbate stress and anxiety, resulting in impaired academic performance, reduced concentration, emotional dysregulation, and diminished quality of life [9].

Furthermore, representation from certain regions, including parts of eastern India, remains limited. Consequently, there is a clear need for context-specific, well-structured studies from underrepresented medical colleges that utilise validated instruments to better understand the local burden of stress, anxiety, and sleep impairment among undergraduate medical students - an evidence gap that the present study addresses. Hence, this study aimed to assess the levels of stress and anxiety, and their association with sleep quality among undergraduate medical students.

Material & Methods :

Study Design and Setting: This cross-sectional study was conducted among undergraduate MBBS students enrolled in various semesters of a medical college affiliated with a deemed-to-be university in Odisha. Data were collected from February to April 2025 in the classroom settings during scheduled academic hours.

Participants: All undergraduate medical students aged 18-25 years who were physically healthy and willing to participate were eligible. Students reporting any chronic physical or psychiatric illness were excluded from the study. Participation was voluntary, and written informed consent was obtained before the survey.

Sample Size and Sampling Strategy: The sample size was estimated using the formula $4pq/L^2$, assuming a stress prevalence of 11% reported in a previous study (10), with an absolute precision (L) of 5% and 95% confidence. The minimum required sample size was 157, which increased to 173 after allowing for a 10% non-response rate. A total of 287 students were ultimately included, exceeding the minimum required sample size. Stratified random sampling ensured representation across semesters. The registration numbers of all eligible students were listed, and random numbers were generated using Microsoft Excel 2019 (Microsoft Corporation, Redmond, WA, USA). Absent students were replaced by the following sequential registration numbers.

Variables and Data Sources: Data were collected using a pre-tested, self-administered, and anonymous questionnaire. Sociodemographic variables included age, gender, and semester of study. Lifestyle variables included smoking, alcohol consumption, and intake of caffeinated beverages (e.g., tea, coffee, energy drinks). They were categorized as never, occasional, or frequent based on self-reported use. Occasional use was defined as less than once per week, whereas frequent use was defined as once or more per week. Using validated assessment tools, stress was assessed using the Perceived Stress Scale-10 (PSS-10) (11), with scores categorised as mild (0-13), moderate (14-26), or severe (27-40). Anxiety was measured using the Generalised Anxiety Disorder-7 (GAD-7) (12), categorised as minimal (0-4), mild (5-9), moderate (10-14), and severe (15-21). Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI) (13), which comprises seven components; a global score of 5 or higher indicated poor sleep quality.

Bias Minimisation: Selection bias was minimised by using stratified random sampling across all semesters. Information bias was reduced by using validated instruments and an anonymous questionnaire to encourage honest responses. Exclusion of students with pre-existing chronic or psychiatric illness reduced confounding related to baseline morbidity.

Study Size: Of the 287 students surveyed, 9 (3.1%) were excluded due to chronic illness; hence, 278 participants were included in the final analysis.

Statistical Methods: Data were analysed using IBM Statistical Package for the Social Sciences (SPSS Statistics for Windows) version 20.0 (IBM Corp., Armonk, NY, USA), licensed to the institute. Continuous variables were presented as mean $\pm$ standard deviation, and categorical variables as frequencies and percentages. The chi-square test was used to assess associations between categorical variables, while t-tests were employed to compare means. Multivariable logistic regression identified independent predictors of poor sleep quality, adjusting for age and gender. A p-value <0.05 was considered statistically significant.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee (IEC/IMS.SH/SOA/2024/796 dated 29th July 2024) before commencement. Participation was voluntary, confidential, and based on written informed consent.

Results

A total of 287 undergraduate medical students participated in the study. Students reporting chronic physical or psychological illness (3.1%) were excluded. The mean age of the 278 eligible respondents was 21.18 ± 1.75 years. Among them, the majority, 183 (65.8%), were females.

Concerning lifestyle habits, the majority of participants had never smoked (88.5%), and 84.5% had never consumed alcohol. Caffeine or caffeinated product use was common, with 52.6% consuming it occasionally and 37.8% consuming it frequently.

In terms of mental health status, moderate stress was reported by 63.4% of students, while 23.7% had severe stress and 12.9% had mild stress. Mild anxiety was observed in 35.9%, moderate anxiety in 25.1%, and severe anxiety in 12.2% of participants, with only 26.8% reporting minimal anxiety. A large majority (81.5%) of respondents had poor sleep quality, while only 18.5% reported good sleep quality.

Poor sleep was significantly associated with higher levels of stress ($\chi^2 = 22.44$, $p < 0.001$) and anxiety ($\chi^2 = 33.22$, $p < 0.001$). Females reported poorer sleep quality than males (85.2% vs

73.7%, $p = 0.019$). Younger students had slightly poorer sleep ($p = 0.026$). Lifestyle factors like smoking, alcohol, and caffeine intake were not significantly related to sleep quality ($p > 0.05$).

After adjusting for age and gender, moderate stress (AOR = 2.51, 95% CI 1.07-5.89, $p = 0.034$), and mild anxiety (AOR = 2.68, 95% CI: 1.23-5.86, $p = 0.013$), moderate anxiety (AOR = 12.44, 95% CI 3.25-47.66, $p < 0.001$), and severe anxiety (AOR = 16.38, 95% CI 2.66-100.76, $p = 0.003$) were identified as significant predictors of poor sleep quality. Gender and age were not significant after adjustment (Nagelkerke $R^2 = 0.243$).

Table 1: Univariate Analysis of Factors Associated with Sleep Quality (n=278)

Variable	Category	Good Sleep Quality n (%)	Poor Sleep Quality n (%)	Test Used	p-value
Age(years)	Mean $\pm$ SD	21.65 $\pm$ 1.73	21.06 $\pm$ 1.73	t-test	0.026 *
Gender	Male	25 (26.3)	70 (73.7)	$\chi^2 = 5.50$	0.019 *
	Female	27 (14.8)	156 (85.2)		
Year of study	1st	8(11.4)	62 (88.6)	$\chi^2 = 3.31$	0.346
	2nd	14 (20.3)	55 (79.7)		
	3rd	15 (21.4)	55 (78.6)		
	4th	15 (21.7)	54 (78.3)		
Smoking	Never	48 (19.5)	198 (80.5)	$\chi^2 = 1.14$	0.567
	Occasional/ Frequent	4 (14.8)	28 (85.2)		
Alcohol use	Never	47 (20.0)	188 (80.0)	$\chi^2 = 1.96$	0.375
	Occasional/ Frequent	5 (12.5)	38 (87.5)		
Caffeine consumption	Never	4 (15.4)	22 (84.6)	$\chi^2 = 0.64$	0.727
	Occasional	30 (20.4)	117 (79.6)		
	Frequent	18 (17.1) ₁	87 (82.9)		
Stress category	Mild	17 (47.2)	19 (52.8)	$\chi^2 = 22.44$	<0.001 *
	Moderate	27 (15.3)	149 (84.7)		
	Severe	8 (12.1)	58 (87.9)		
Anxiety category	Minimal	30 (39.5)	46 (60.5)	$\chi^2 = 33.22$	<0.001 *
	Mild	16 (16.2)	83 (83.8)		
	Moderate	4 (5.6)	67 (94.4)		
	Severe	2 (6.3)	30 (93.8)		

*Statistically significant at $p < 0.05$

Table 2: Multivariable Logistic Regression Analysis of Factors Associated with Poor Sleep Quality (n = 278)

Variable	Category	Adjusted Odds Ratio (AOR)	95% Confidence Interval (CI)	p-value
Age (years)	Continuous	0.82	0.68–1.01	0.056
Gender	Female vs Male	1.42	0.70–2.89	0.329
Stress category				
Mild (Ref)	—	—	—	—
Moderate		2.51	1.07–5.89	0.034*
Severe		0.82	0.21–3.13	0.771
Anxiety category				
Minimal (Ref)	—	—	—	—
Mild		2.68	1.23–5.86	0.013*
Moderate		12.44	3.25 –47.66	<0.001*
Severe		16.38	2.66 –100.76	0.003*

*Statistically significant at $p < 0.05$

Model summary:

-2 Log Likelihood = 222.76; Cox & Snell R^2 = 0.150; Nagelkerke R^2 = 0.243; Overall model significance: $\chi^2(7) = 45.19$, $p < 0.001$

Discussion

In this cross-sectional study, we found a high burden of psychological distress and sleep impairment. Moderate-to-severe stress affected 87.1% of participants, while 73.2% reported at least mild anxiety. Notably, 81.5% of students were classified as poor sleepers, a proportion higher than that reported in comparable Indian cohorts, such as the 76.8% prevalence observed in a study from Himachal Pradesh using the PSQI and DASS-21 (5). Similar rates have been documented internationally, with 86.4% of healthcare students in Saudi Arabia exhibiting poor sleep quality, accompanied by strong correlations between PSQI scores and perceived stress, anxiety, and depression (6). These comparisons indicate that sleep disturbance in our setting is substantial and lies at the higher end of reported prevalence.

In our analysis, moderate and severe anxiety emerged as powerful independent predictors of poor sleep after adjustment for age and gender, with adjusted odds ratios of 12.44 and 16.38, respectively. These findings align with a Chinese study conducted during the COVID-19 pandemic, in which anxiety (measured using GAD-7) partially mediated the relationship between perceived stress (PSS-10) and sleep quality (PSQI) (14). Mechanisms underlying this association

may include cognitive hyperarousal, emotional dysregulation, nocturnal rumination, and altered cortisol rhythms (15). Neurobiological literature also highlights that sleep disruption sensitises emotional reactivity via amygdala overactivation, potentially worsening stress and burnout (16).

Female students reported poorer sleep than males in the unadjusted analysis, although this association was not sustained after adjustment - likely reflecting higher anxiety levels commonly reported among female learners (17). Younger students exhibited marginally poorer sleep, an observation that has been less explored in the literature, as most studies focus primarily on psychological rather than demographic determinants. This finding suggests that the early stages of medical training may constitute a vulnerable period that warrants further evaluation.

In contrast to some international studies that implicate lifestyle factors, we found no significant association between smoking, alcohol use, or caffeine intake and sleep quality (18). The low prevalence of these behaviours in our sample may have limited statistical power, and psychological variables may exert stronger influences on sleep patterns in this population.

Overall, our findings mirror a growing body of evidence showing that poor sleep is pervasive among medical undergraduates and closely intertwined with psychological distress. The strong predictive role of anxiety, combined with the greater vulnerability noted among younger students, underscores the need for early, targeted mental health interventions within medical institutions. Integrating structured counselling services, stress-management programs, and sleep-hygiene education into the medical curriculum could help mitigate these issues.

This study has some limitations. Its cross-sectional design precludes causal inferences, and the use of self-administered questionnaires may be subject to reporting bias. The findings are based on a single institution, which may limit generalizability. Nonetheless, the use of validated instruments and random sampling across semesters strengthens the internal validity of our results.

Overall, the study underscores an urgent need to address stress, anxiety, and poor sleep quality among medical undergraduates. Early, evidence-based interventions are essential to safeguard students' mental health and academic functioning within the demanding environment of medical education.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the author(s) used ChatGPT to improve the language and vocabulary. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the published article.

References

1. Kaur H, Gupta V, Garg A, Sangeeta, Padhi BK. Prevalence of Depression, Anxiety, Stress and Suicide Ideation Among Undergraduate Medical Students in India: A Systematic Review and Meta-Analysis. *Natl J Community Med* [Internet]. 2024 Oct 1 [cited 2025 Dec 11];15(10):868-83. Available from: <https://www.njcmindia.com/index.php/file/article/view/4529>
2. Satpathy P, Siddiqui N, Parida D, Sutar R. Prevalence of stress, stressors, and coping strategies among medical undergraduate students in a medical college of Mumbai. *J Educ Health Promot* [Internet]. 2021 Aug 1 [cited 2025 Dec 11];10(1):318. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8459850/>
3. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. *Indian J Med Res Suppl* [Internet]. 2015 Mar 1 [cited 2025 Dec 11];141(Mar2015):354-7. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4442334/>
4. Laishram J, Fernandez S, Devi PA, Bhowmick MR, Heigrujam R, Devi HS. Sleep quality and mental health among medical students in Imphal, Manipur: A cross-sectional study. *J Fam Med Prim Care* [Internet]. 2025 Jan [cited 2025 Dec 11];14(1):276-82. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11844959/>
5. Verma P, Jani H, Bhanderi P, Patel B, Parlewar R. Association between Sleep Quality and Mental Health among Medical Students: A College Based Study in Himachal Pradesh, India. *J Pharm Bioallied Sci* [Internet]. 2025 May [cited 2025 Dec 11];17(Suppl 1):S363-5. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC12156477/>
6. Safhi M, Alafif R, Alamoudi N, Alamoudi M, Alghamdi W, Albishri S, et al. The association of stress with sleep quality among medical students at

- King Abdulaziz University. *J Fam Med Prim Care* [Internet]. 2020 [cited 2025 Dec 11];9(3):1662. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC7266176/>
7. Dwivedi N, Sachdeva S, Taneja N. Depression among Medical Students of India: Meta-Analysis of Published Research Studies using Screening Instruments. *Indian J Soc Psychiatry* [Internet]. 2021;37(2). Available from: https://journals.lww.com/ijsp/fulltext/2021/37020/depression_among_medical_students_of_india_10.aspx
8. Jeyapalan T, Zapata-Rios JA, Blair E. The Factors Causing Stress in Medical Students and their Impact on Academic Outcomes: A Narrative Qualitative Systematic Review. *Int J Med Students* [Internet]. 2024 Jul 9 [cited 2026 Jun 5];12(2):195-203. Available from: <https://ijms.pitt.edu/IJMS/article/view/2218/2564>
9. Seoane HA, Moschetto L, Orliacq F, Orliacq J, Serrano E, Cazenave MI, et al. Sleep disruption in medicine students and its relationship with impaired academic performance: A systematic review and meta-analysis. *Sleep Med Rev* [Internet]. 2020 Oct 1 [cited 2026 Jun 5];53:101333. Available from: https://www.sciencedirect.com/science/article/abs/pii/S1087079220300769?utm_source=chatgpt.com
10. Raja S, Balasubramanian G, Jamuna Rani R. Prevalence of depression, anxiety and stress among private medical college students in South India: A cross-sectional study. *J Educ Health Promot* [Internet]. 2022 Jan 1 [cited 2025 Dec 12];11(1):373. Available from: <https://pubmed.ncbi.nlm.nih.gov/36618453/>
11. Roberti JW, Harrington LN, Storch EA. Further Psychometric Support for the 10-Item Version of the Perceived Stress Scale. *J Coll Couns* [Internet]. 2006 Sep 1 [cited 2026 Jun 5];9(2):135-47. Available from: [/doi/pdf/10.1002/j.2161-1882.2006.tb00100.x](https://doi/pdf/10.1002/j.2161-1882.2006.tb00100.x)
12. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* [Internet]. 2006 May 22 [cited 2026 Jun 5];166(10):1092-7. Available from: <https://pubmed.ncbi.nlm.nih.gov/16717171/>
13. Manzar MD, Moiz JA, Zannat W, Spence DW, Pandi-Perumal SR, Bahammam AS, et al. Validity of the Pittsburgh Sleep Quality Index in Indian University Students. *Oman Med J* [Internet]. 2015 [cited 2026 Jun 5];30(3):193-202. Available from: <https://pubmed.ncbi.nlm.nih.gov/26171126/>
14. Huang W, Wen X, Li Y, Luo C. Association of perceived stress and sleep quality among medical students: the mediating role of anxiety and depression symptoms during COVID-19. *Front Psychiatry* [Internet]. 2024 [cited 2025 Dec 11];15:1272486. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10830648/>
15. Hirotsu C, Tufik S, Andersen ML. Interactions between sleep, stress, and metabolism: From physiological to pathological conditions [Internet]. Vol. 8, *Sleep Science. FLASS*; 2015 [cited 2025 Dec 13]. p. 143-52. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4688585/>
16. Goldstein AN, Walker MP. The role of sleep in emotional brain function [Internet]. Vol. 10, *Annual Review of Clinical Psychology*. Annual Reviews Inc.; 2014 [cited 2025 Dec 13]. p. 679-708. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4286245/>
17. Fatima Y, Doi SAR, Najman JM, Al Mamun A. Exploring Gender Difference in Sleep Quality of Young Adults: Findings from a Large Population Study. *Clin Med Res* [Internet]. 2016 Dec 1 [cited 2025 Dec 13];14(3-4):138. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC5302457/>
18. Kaldenbach S, Hysing M, Strand TA, Sivertsen B. Energy drink consumption and sleep parameters in college and university students: a national cross-sectional study. *BMJ Open* [Internet]. 2024 Jan 23 [cited 2025 Dec 13];14(2). Available from: <https://pubmed.ncbi.nlm.nih.gov/38262632/>