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Original Research Article

COMPARISON OF QUALITY OF SLEEP AND MENTAL HEALTH OF MEDICAL STUDENTS ACROSS VARIOUS PHASES: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: There is a bidirectional correlation between poor quality of Sleep and mental health disorders. Most of the medical students have poor quality of sleep that might have a profound impact on their mental well-being. **Aims and objective:** To study and compare the sleep quality and mental health of medical students across various phases. **Materials and Methods:** A cross- sectional study was conducted among undergraduate medical students from Phase I to Phase IV in a tertiary care hospital in Puducherry. Sleep quality and mental health were assessed using Pittsburgh Sleep Quality Index (PSQI) and Depression Anxiety Stress Scale (DASS-21) respectively. **Results:** Among 876 medical students, depression, anxiety, and stress rates were found to be 40.1%, 46.0%, and 23.7%, respectively. 36.6% had poor sleep quality. Undergraduate students of academic Phase I and students aged 17 to 19 years showed significantly higher rates of depression and anxiety in addition to poor quality of sleep than those students aged ≥20 years or in later academic phases (depression p value <0.05; anxiety p value <0.05; quality of sleep p value <0.05). Depression, anxiety and stress scores had a significant positive correlation with the global PSQI score (r= 0.644, p value<0.05). **Conclusion:** Medical institutes must implement sleep hygiene education and to enhance students' sleep quality and mental health programs for overall mental health and well-being.

INTRODUCTION

Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. Good quality sleep is a well-recognized predictor of physical and mental health wellness and overall vitality.[1]

Medical students are especially prone to sleep disturbances because demanding academic schedules, prolonged study hours, examination stress, and clinical responsibilities create significant pressure that disrupts sleep patterns, alters lifestyle habits, and negatively impacts mental health.

There is growing experimental evidence that the relationship between mental health and quality of sleep is complex and includes bi-directional causation.[2] Chronic sleep deprivation has been found to disrupt the Hypothalamic-pituitary-Adrenal (HPA) axis, increasing vulnerability to anxiety and depression. Additionally, poor sleep quality alters brain regions such as the prefrontal cortex and amygdala, impairing emotional regulation and decision-making. Therfore understanding sleep patterns and psychological well being among medical stidents is important for promoting healtier learning environment thus preventing long term mental health problems.

Literature shows that the various stages of medical education can significantly influence students' sleep and mental health states. During the pre-clinical years, the students struggle to transition to an intensive academic environment often leading to

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anxiety, difficulty falling asleep, and irregular sleep patterns.[3] As students move into the clinical phase, stressors shift toward long hospital hours, night duties, and unpredictable schedules, which disrupt circadian rhythms and increase the risk of depressive symptoms.[4,5] Overall, poor sleep reflects and contributes to worsening psychological distress, including anxiety and depression, among medical students in Indian and international settings.[6,7]

Regional differences influence stress patterns and sleep disturbances among medical students in India. Studies examining diversity in medical education highlight variations in language dynamics, clinical autonomy, social habitus, and standardization. Institutions in Southern and Western regions commonly report challenges related to clinical autonomy and language barriers, whereas Northern and Eastern colleges experience greater difficulty with social adjustment and academic standardization.[8,9]

Recent findings also describe a "Northern Indian paradox," where high patient loads coexist with difficulties in implementing competency-based medical education (CBME) due to manpower shortages and inadequate teaching resources.[10]

Region-specific evidence indicates that anxiety prevalence in Northern states is approximately 34.5%, with stress varying across stages of training.[11] Eastern studies report moderate levels of depression, anxiety, and stress.[12,13] In Western regions, higher stress among female students is linked to academic workload and institutional factors.[14]

Although previous studies done in South India have reported higher prevalence rates of poor quality of sleep and psychological distress among medical students,[15,16] comparative data across different phases of medical education remains sparse. Identifying variations in sleep quality and psychological well-being among medical students at different stages of training may help in recognising vulnerable groups for early intervention and support. Based on this, the present study, through a cross sectional survey, focused on addressing the following questions: Are there significant differences in sleep quality and mental health in undergraduate medical students? How does it vary among various academic phases of undergraduate medical students? Is there any significant association between poor sleep quality and poor mental health among medical students.

Rationale of our study: There is a variability in nationwide implementation of the CBME curriculum across medical institutions and phases of training. These differences may influence psychological well-being and sleep quality among medical students. Additionally, there are limited data from Southern India compared to other regions of the country pertaining to quality of sleep and mental health of medical students. Therefore, this study aims to assess psychological distress and sleep quality among medical students across various academic phases, addressing an important gap and generating evidence to inform strategies for improving student well-being. Taking this as a whole perspective, our study suits "the need of the hour" propaganda.

MATERIALS AND METHODS

Study design and study setting: A cross-sectional study was conducted between July and August 2025 among undergraduate medical students from Phase I to Phase III part 2 at a tertiary care teaching hospital in Puducherry**.** The annual intake of this institute was 250 MBBS students with approximately 1000 MBBS students across all academic phases during the study period.

Study participants: According to the current Competency Based Medical Education (CBME) undergraduate medical students are divided into various academic phases which are as follows Phase I (first year), Phase II (second year), Phase III Part 1 (third year) and Phase III Part 2 (final year).

Inclusion criteria and exclusion criteria: All the students who consented to participate in our study were included. Those consuming any medications for psychiatric illness and those who could not be contacted after 2 attempts were excluded.

Sample size and sampling: Convenient sampling technique was used in our study. We planned a target sample of n=1000 medical students using the standard single-proportion approach for cross-sectional surveys as elaborated by a previous study. (17) The primary parameter was poor sleep quality (PSQI > 5), with an anticipated prevalence of 78.5% in medical students as seen in a previous study. (18) Using 95% confidence (two-sided $\alpha = 0.05$) and an absolute precision of 2.8 %, the minimum requirement was then accounted for non-response rates yielding a final target of 876.

Study tools: A pre- tested structured questionnaire was used consisting of three sections: background characteristics, assessment of sleep quality by Pittsburgh Sleep Quality Index (PSQI) and mental health by Depression Anxiety Stress Scale 21 (DASS- 21) were used without any modifications.

PSQI is a self- rated questionnaire with an internal reliability of 0.83 that helps assess sleep quality for the past month. (19) Permission regarding the usage of PSQI was obtained from the author. English version of the questionnaire was used for our study. It has 19 self- rated questions and five other questions to be answered by the partner (bed or room). However, the scale's last five questions (rated by a bed partner or roommate) do not contribute to the PSQI scoring, so these were not included in the global score. The 19 questions assess various factors related to sleep quality. The questions are again grouped into seven component scores and all are reflected equally on a 0 – 3 scale. These components are sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction.

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Questions 1–4 were based on estimations for the past, and they included: bedtime, number of minutes to fall asleep, getting up time, and hours of sleep per night. Questions 5 to 10 were based on a score ranging from 0 to 3 points (0 - Not during the past month, 1 - Less than once a week, 2 - Once or twice a week, 3 - Three or more times a week). The seven component scores were added to yield a global PSQI score ranging from 0 to 21. A global score of more than or equal to 5 indicates poor sleep quality in the person for the last 1 month.

DASS- 21 is a self- reporting inventory with an internal reliability of 0.88 for depression, 0.82 for anxiety, and 0.90 for stress. (20) It consists of 21 items to assess the individual's emotional state over one week. It has three subscales of anxiety, depression, and stress, with each subscale having seven items. The cut- off scores for the subscales are below 10 for depression, below 8 for anxiety, and below 15 for stress. The severity of the subscales is further qualified as being mild (depression: 10–13, anxiety: 8–9, stress: 15–18) and moderate (depression: 14–20, anxiety: 10–14, stress: 19–25), severe (depression: 21–27, anxiety: 15–19, stress: 26–33) and extreme (depression: ≥28, anxiety: ≥20, stress: ≥34).

Data collection: Data were collected using Google docs software of a self- administered questionnaire after briefing the purpose of the study. A semi-structured proforma was developed using Google Forms and distributed online through the four phase coordinators of the institution. The proforma collected information on socio-demographic characteristics**,** academic phase of the medical student**,** history of known medical illness**,** history of psychiatric illness including duration and treatment**,** family history of psychiatric illness and willingness and consent to participate in the study**.** Time given to fill the questionnaires was twenty minutes. In addition, it included standardized assessment tools such as the PSQI and the DASS-21**.**

Statistical analysis: After checking for completeness and consistency, data were analysed using IBM SPSS 23. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize data. Univariate analysis was carried out using the Chi- square test. Correlation between sleep quality and mental health was conducted using the Pearson correlation test. $P < 0.05$ was considered to be statistically significant**.**

Ethical issues: Ethical approval (IEC/C-P/69/2025) was obtained from the Institutional research ethics board, SLIMS, Puducherry. Ethical Informed verbal consent and assent were obtained from the study participants, and the participation was completely voluntary. Confidentiality is maintained.

RESULTS

A total of 876 MBBS students were included and the background characteristics of the study population were shown in table 1. The largest age group is 20 to 22 years (583 of 876; 66.6 percent), followed by 23 to 25 years (183; 20.9 percent), 17 to 19 years (104; 11.9 percent), and older than 25 years (6; 0.7 percent). Females are 439 of 876 (50.1 percent) and males are 437 of 876 (49.9 percent). The academic phase distribution is Phase I 226 (25.8 percent), Phase II 186 (21.2 percent), Phase III 229 (26.1 percent), and Phase IV 235 (26.8 percent). Nearly all participants are unmarried (868; 99.1 percent). Parents' occupation is predominantly professional (727; 83.0 percent), with clerical or shop keeper or farmer 100 (11.4 percent), skilled labourer 34 (3.9 percent), and unemployed 15 (1.7 percent). Very small groups such as those older than 25 years and those who are married limit stable comparisons for those categories.

Table 2 shows the distribution of the 21-item Depression, Anxiety and Stress Scales severity categories shows that most students fall in the normal range for each domain, with notable tails toward higher severity. For depression, the proportions are normal 59.9 percent (n=525), mild 9.6 percent (n=84), moderate 15.9 percent (n=139), severe 7.6 percent (n=67), and extremely severe 7.0 percent (n=61). For anxiety, the proportions are normal 54.0 percent (n=473), mild 5.9 percent (n=52), moderate 16.4 percent (n=144), severe 7.7 percent (n=67), and extremely severe 16.0 percent (n=140), indicating a comparatively heavier extremely severe tail for anxiety. For stress, the proportions are normal 76.3 percent (n=668), mild 6.5 percent (n=57), moderate 8.6 percent (n=75), severe 6.3 percent (n=55), and extremely severe 2.4 percent (n=21).

Table 3 shows the overall sleep quality by the Pittsburgh Sleep Quality Index classifies 321 of 876 students (36.6 percent) as having poor sleep and 555 of 876 students (63.4 percent) as having good sleep, with a mean global PSQI score of 4.82 and a standard deviation of 3.45. Poor sleep varies meaningfully across background factors: by age, poor sleep is most frequent at 17 to 19 years (52.9 percent) and least frequent above 25 years (16.7 percent), with a statistically significant difference by age group (chi square p value equals 0.002). By academic phase, poor sleep is higher in earlier phases—Phase I 46.9 percent and Phase II 44.6 percent—compared with Phase III 27.9 percent and Phase IV 28.9 percent, with a statistically significant difference (chi square p value less than 0.001). By sex, poor sleep is 38.0 percent among females and 35.2 percent among males, which is not statistically significant (p value equals 0.390). By marital status, poor sleep is 50.0 percent among married students and 36.5 percent among unmarried students, which is not statistically significant (p value equals 0.431) and should be interpreted cautiously because only eight participants are married. By parents' occupation, differences are not statistically significant (p value equals 0.354).

Table 4 shows that younger students especially those aged 17 to 19 years show the highest proportions of depression and anxiety, and these age differences are

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statistically significant (depression p value less than 0.001; anxiety p value equals 0.002), while stress is somewhat higher in this youngest group but does not reach statistical significance (p value equals 0.065). Across academic progression, students in earlier phases of the Bachelor of Medicine and Bachelor of Surgery program display more depression and anxiety (both p values less than 0.001) and modestly higher stress (p value equals 0.030) than those in later phases. By sex, anxiety is higher among females than males (p value equals 0.010), whereas depression and stress do not differ significantly by sex. Marital status shows an apparent association with depression (p value equals 0.043), but because only eight participants are married, this finding should be interpreted with caution; anxiety and stress do not differ significantly by marital status. Parents' occupation is not significantly associated with depression, anxiety, or stress.

Table 5 shows the global score of the Pittsburgh Sleep Quality Index shows positive correlations with all psychological symptom scales (DASS). The correlation coefficient with depression equals 0.628 with p value less than 0.001, with anxiety equals 0.602 with p value less than 0.001, and with stress equals 0.612 with p value less than 0.001. The global sleep score also correlates with the total score on the 21-item DASS scale instrument (correlation coefficient equals 0.644, p value less than 0.001). Together, these results indicate that poorer sleep quality is meaningfully aligned with higher levels of depression, anxiety, and stress in this sample.

In the present study, sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). As illustrated in Figure 1, a total of 555 (63.4%) study participants reported good sleep quality, whereas 321 (36.6%) students were categorized as having poor sleep quality.

Across DASS-21, the largest share fell in the normal band (Depression 59.9%, Anxiety 54.0%, Stress 76.3%). Anxiety showed a heavier 'Extremely Severe' tail relative to depression and stress as mentioned in figure 2.

Table 1: Background characteristics of the study participants (n = 876)

Background characteristics	n (%)
Age	
20-22	583 (66.6%)
23-25	183 (20.9%)
17-19	104 (11.9%)
>25	6 (0.7%)
Sex	
Female	439 (50.1%)
Male	437 (49.9%)
MBBS batch (Phase)	
PHASE I	226 (25.8%)
PHASE II	186 (21.2%)
PHASE III	229 (26.1%)
PHASE IV	235 (26.8%)
Marital status	
Unmarried	868 (99.1%)
Married	8 (0.9%)
Parents' occupation	
Professional	727 (83.0%)
Clerical/Shop keeper keeper/Farmer	100 (11.4%)
Skilled Labourer	34 (3.9%)
Unemployed	15 (1.7%)
Family history of Psychiatric illness	
Present	6 (0.7%)
Absent	870 (99.3%)

Table 2: DASS-21 severity distribution (%) (n=876)

Severity	Anxiety, n (%)	Depression, n (%)	Stress, n (%)
Normal	473 (54.0%)	525 (59.9%)	668 (76.3%)
Mild	52 (5.9%)	84 (9.6%)	57 (6.5%)
Moderate	144 (16.4%)	139 (15.9%)	75 (8.6%)
Severe	67 (7.6%)	67 (7.6%)	55 (6.3%)
Extremely Severe	140 (16.0%)	61 (7.0%)	21 (2.4%)

DASS-21: Depression, Anxiety and Stress Scales

Table 3: Background characteristics vs Sleep Quality (Good/Poor) (n=876)

Category	Good, n (%)	Poor, n (%)	p value
Age			
17-19	49 (47.1%)	55 (52.9%)	0.002*
20-22	385 (66.0%)	198 (34.0%)	
23-25	116 (63.4%)	67 (36.6%)	
>25	5 (83.3%)	1 (16.7%)	
Sex			

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Female	272 (62.0%)	167 (38.0%)	0.390
Male	283 (64.8%)	154 (35.2%)	
MBBS Batch			
PHASE I	120 (53.1%)	106 (46.9%)	<0.001*
PHASE II	103 (55.4%)	83 (44.6%)	
PHASE III	165 (72.1%)	64 (27.9%)	
PHASE IV	167 (71.1%)	68 (28.9%)	
Marital status			
Married	4 (50.0%)	4 (50.0%)	0.431
Unmarried	551 (63.5%)	317 (36.5%)	
Occupation of parents			
Clerical/shop keeper/farmer	67 (67.0%)	33 (33.0%)	0.354
Professional	461 (63.4%)	266 (36.6%)	
Skilled labourer	17 (50.0%)	17 (50.0%)	
Unemployed	10 (66.7%)	5 (33.3%)	

*P value < 0.05

Table 4: Background vs Depression, Anxiety, Stress (Present/Absent) (n=876)

Category	Depression Absent n (%)	Depression Present n (%)	P value	Anxiety Absent n (%)	Anxiety Present n (%)	P value	Stress Absent n (%)	Stress Present n (%)	P value
Age									
17–19	44 (42.3)	60 (57.7)	<0.001*	40 (38.5)	64 (61.5)	0.002*	71 (68.3)	33 (31.7)	0.065
20–22	357 (61.2)	226 (38.8)		318 (54.5)	265 (45.5)		444 (76.2)	139 (23.8)	
23–25	121 (66.1)	62 (33.9)		110 (60.1)	73 (39.9)		147 (80.3)	36 (19.7)	
>25	3 (50.0)	3 (50.0)		5 (83.3)	1 (16.7)		6 (100.0)	0 (0.0)	
Sex									
Female	251 (57.2)	188 (42.8)	0.095	218 (49.7)	221 (50.3)	0.01*	335 (76.3)	104 (23.7)	0.97
Male	274 (62.7)	163 (37.3)		255 (58.4)	182 (41.6)		333 (76.2)	104 (23.8)	
MBBS Batch									
Phase I	110 (48.7)	116 (51.3)	<0.001*	88 (38.9)	138 (61.1)	<0.001*	160 (70.8)	66 (29.2)	0.03*
Phase II	110 (59.1)	76 (40.9)		100 (53.8)	86 (46.2)		136 (73.1)	50 (26.9)	
Phase III	151 (65.9)	78 (34.1)		144 (62.9)	85 (37.1)		186 (81.2)	43 (18.8)	
Phase IV	154 (65.5)	81 (34.5)		141 (60.0)	94 (40.0)		186 (79.1)	49 (20.9)	
Marital Status									
Married	2 (25.0)	6 (75.0)	0.043*	2 (25.0)	6 (75.0)	0.098	5 (62.5)	3 (37.5)	0.358
Unmarried	523 (60.3)	345 (39.7)		471 (54.3)	397 (45.7)		663 (76.4)	205 (23.6)	
Parents' Occupation									
Clerical / Shop keeper / Farmer	55 (55.0)	45 (45.0)	0.701	53 (53.0)	47 (47.0)	0.299	71 (71.0)	29 (29.0)	0.324
Professional	440 (60.5)	287 (39.5)		399 (54.9)	328 (45.1)		562 (77.3)	165 (22.7)	
Skilled Labourer	20 (58.8)	14 (41.2)		13 (38.2)	21 (61.8)		23 (67.6)	11 (32.4)	
Unemployed	10 (66.7)	5 (33.3)		8 (53.3)	7 (46.7)		12 (80.0)	3 (20.0)	

*P value < 0.05

Table 5: Correlation between Global PSQI and DASS-21 subscales (n=876)

DASS-21 Variables	Global PSQI (Rho[#)]	P value
Depression score	0.628	<0.001*
Anxiety score	0.602	<0.001*
Stress score	0.612	<0.001*

[#] Pearson correlation coefficient.

*P value < 0.05

DASS-21: Depression, Anxiety and Stress Scales

PQSI- Pittsburgh Sleep Quality Index

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DISCUSSION

Comparison of background characteristics among medical students across different phases: In our present study comprising of 876 MBBS students, the majority belonged to the 20–22 years age group (66.6%), followed by 23–25 years (20.9%), 17–19 years (11.9%), and a small proportion belonged to above 25 years (0.7%). The cohort showed near gender parity, with females (50.1%) and males (49.9%), and nearly all participants were unmarried (99.1%). These findings are in accordance with multicentric studies on medical students conducted in recent years, which similarly report younger age groups and balanced gender representation as typical characteristics of study populations.[4,21-23] The distribution across academic phases, Phase I (25.8%), Phase II (21.2%), Phase III- Part 1 (26.1%), and Phase III -Part-2 (26.8%) reflects a relatively even representation of students from all academic phases.

The higher prevalence of poor sleep among younger students aged 17-22 years and those in the early academic phases may be attributed to academic transition stress, increased workload, and limited adaptation to the demands of medical training, as reported in previous literature.[4,21,24] In contrast, senior students often exhibit improved sleep quality as they develop more effective coping strategies, time-management skills, and academic familiarity, consistent with findings from other studies.[25-27]

DASS-21 Variables: In our study we found that 16% of students had extremely severe anxiety followed by 7% with extremely severe depression and only 2.40 % with extreme stress. Overall depression, anxiety, and stress rates in the study population were 40.1%, 46.0%, and 23.7%, respectively. These rates were similar to study done earlier.[28] Our results were consistent with that of a study conducted in a medical college in Northern India where the magnitude of depression, anxiety, and stress assessed similarly through DASS-21 was 32%, 40.1%, and 43.8%, respectively.[29] A systematic review of depression, anxiety, and stress among Indian medical students, estimated the pooled prevalence of depression, anxiety, and stress to be 39.2%, 34.5%, and 51.3%, respectively.[30] Similarly, previous literature done on medical students in south India showed higher prevalence of depression and anxiety.[31,32] A study done in Saudi Arabia had shown similar results with a systematic review done in India having a pooled prevalence of 50% depression.[33,34] The burden of depression among medical students is significantly higher in Asian countries compared to a western study in the United States of America.[35] Reason for this disparity could be because of differences in social factors, academic pressures, resilience skills, coping styles, and access to mental health support among medical students.

Comparison of DASS-21 findings among medical students across various academic phases:

A. Pre-clinical Phase (PHASE I): Our findings were consistent with a study done among first year undergraduate medical students which detected a significant association between higher levels of depression, anxiety and stress seen in majority of Phase I students.[16,36] A study done in Tamil Nadu showed that first-year students experience high stress (43%), anxiety (35%) and depression (22%) due to the "tough and rigid" transition from schooling.[16] The studies done outside India showed findings consistent with our study, that the first-year students were highly susceptible for stress,[37,38] compared to subsequent years students with minimized level of stress.[39,40] In general, Phase I students faced challenges such as transitioning to higher education, academic pressure, acclimatizing to university life, which may be due to difficulty in coping with the new environment like staying away from home, escalation in academic volume, adjusting with peers.

B. Clinical Transition (PHASE II & PHASE III Part 1): Our findings were in contrary to the Indian research which showed that second year students carry the highest stress load due to subjects like Pathology and Pharmacology. One study reported severe distress in 25% of students during this phase.[41] Research indicates that as students move from classrooms to wards (third year), anxiety shifts toward clinical competency. A 2023 study found that third year students had significantly higher psychological distress than all other years as they struggled to adapt to the clinical environment.[12] Hereby we found that students belonging to second phase and third phase were adapting to the CBME curriculum. CBME curriculum has allotted only two subjects for Phase III Part 1 and so the reduced academic load reflected on the reduced stress and anxiety levels.

C. Final Year (PHASE III Part 2): Additionally, our study revealed Phase III part 2 students had higher rates of depression, anxiety and stress. Final year students often show the highest rates of depression (up to 55%) and anxiety (73%) as they face exit exams and residency competition.[42] A 2025 six-year longitudinal study followed a cohort from admission to graduation. It found that scores for depression and anxiety were stable initially but showed a statistically significant spike in the later academic phases.[43] The final year phase is the breaking point phase due to its inclusion of vast CBME curriculum which has a whopping six clinical subjects that is in turn a heavy burden on students who are determined to somehow clear the final phase of M.B.B.S. Hence we conclude that final year students have been under stress due to heavy academic load and also the pressure of graduation.

Comparison of sleep quality among undergraduate medical students across different academic phases: Our study revealed that 36.6% of the participants had poor sleep quality, which is comparable to findings from other Indian studies, 37% in Chennai,[44] and 29.53% in Uttar Pradesh.[45] A slightly higher prevalence was noted in Manipur

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(55.5%),[28] and Karnataka (58%),[24] possibly due to comparable socio-cultural and academic factors. Globally, studies have shown a high prevalence of poor sleep quality among students. A sleep quality study done among Croatian medical students in 2018 reported 37.6% prevalence,[46] which increased to 68% in another research done in 2025.[47] Another literature found a 64% pooled prevalence in Southeast Asia.[25] Two major systematic reviews conducted in 2023 estimated global prevalence rates of 55.6% and 57%,[23,48] while another systematic review done in 2020 reported 52.7%,[26] highlighting poor sleep as a widespread issue among students worldwide.

In the current study, poor sleep quality was most prevalent among first-year (46.9%) and second-year (44.6%) students, with a significant decline observed in third-year (27.9%) and final-year (28.9%) students. This pattern suggests that students in the early phases of medical training are more vulnerable to sleep disturbances, likely due to the increased academic pressure, adjustment to a demanding curriculum, and altered routines. Similar findings have been reported in multiple studies.[21,22,24]

These findings emphasize the importance of implementing targeted sleep hygiene education and stress management programs, particularly for medical students in the early phases of their training, as recommended by recent literature.[7,21,49] Early intervention may help students develop healthier coping mechanisms, improve academic performance, and prevent the long-term consequences of chronic sleep deprivation. Institutions should consider integrating sleep health awareness into orientation programs and providing accessible mental health support services.

DASS21 and PSQI association: The global score of the Pittsburgh Sleep Quality Index shows positive correlations with all psychological symptom scales (DASS) which is consistent with studies done earlier.[24,28] An Indian study showed weak to strong positive correlations between PSQI and all three DASS 21 dimensions, though only PSQI and anxiety were statistically significant.[50] High prevalence of psychological distress and its strong association with poor sleep quality amongst medical students were also observed in a previous studies using DASS-21 and PSQI.[6,51,52] A study done in China found moderate positive correlations between PSQI and depression, anxiety, and stress.[53] A statistically significant association was found between poor sleep quality and the presence of anxiety, depression, and stress (all $P< 0.001$) was seen in a study done on medical students outside India which was much similar to our findings.[54] Such correlations underscore the bidirectional relationship between mental health and sleep quality. Individual resilience and coping strategies play a moderating role in determining the impact on sleep and mental health It is mandatory to highlight the importance of interventions for psychological distress and sleep disturbances to promote overall well-being.

The students who scored higher on PSQI and DASS-21 were advised regarding sleep hygiene measures and stress management techniques through group sessions by our institutional student counsellor. Students who showed no improvement with the aforementioned non-pharmacological interventions and those students with severe symptoms were advised to seek further evaluation and follow-up with Psychiatrists for individual sessions.

Strength of our study: Our study used validated questionnaires, which ensure that the data collected is reliable and accurate. This increases the validity of the study results and enhances confidence that the findings are trustworthy. We also recruited an adequate sample size, which increases the statistical power of the study.

Limitations: Our study had certain limitations. The inherent limitation of a cross-sectional study as it prevents establishing a causal relationship between quality of sleep and mental health issues. The sample is limited to medical students at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry which may limit the generalizability of the findings. Sleep quality was measured using the self-reported PSQI, which is subjected to reporting bias; future research should incorporate more objective tools such as polysomnography or sleep diaries. The DASS-21 questionnaire, which was utilized for assessing symptoms of depression, anxiety and stress, is suitable for initial assessments only but is not adequate for establishing definitive diagnoses of mental disorders. The study did not provide mental health support resources for participants who might experience questionnaire induced emotional distress. Additionally, the study primarily focused on students' mental health as a potential factor associated with quality of their sleep. Implementing a broader set of instruments would provide a more comprehensive understanding of the potential underlying causes of the high prevalence of poor sleep quality among students.

CONCLUSION

Previous literature has consistently reported moderate to severe psychological distress and significantly poorer sleep quality among medical students. In contrast, the present study observed comparatively better outcomes, with only one-third of participants reporting poor sleep quality and less than half exhibiting symptoms of stress, anxiety and depression. These relatively favourable findings may be attributed to recent academic and institutional initiatives, including the implementation of the CBME curriculum, structured mentor–mentee programs, and regular mental health awareness activities. Furthermore, the current cohort of students, often characterized as Generation Z, appears to demonstrate greater awareness regarding mental health issues and the importance of maintaining healthy sleep practices.

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The trends identified in this study warrant further exploration through research focusing on independent determinants of psychological well-being and sleep quality. Future studies should examine factors such as personality traits, coping strategies adopted by the current generation, screen exposure, social media use, dietary habits, substance use, levels of physical activity and engagement in extracurricular interests and hobbies. Expanded multicentric and longitudinal research in these domains would provide deeper insights and help formulate targeted interventions aimed at promoting mental health and healthy sleep patterns among medical students.

REFERENCES

1. Nelson KL, Davis JE, Corbett CF. Sleep quality: An evolutionary concept analysis. Nurs Forum (Auckl). 2022 Jan;57(1):144–51. doi:10.1111/nuf.12659
2. Krystal AD. Psychiatric Disorders and Sleep. Neurol Clin. 2012 Nov;30(4):1389–413. doi:10.1016/j.ncl.2012.08.018
3. Tian-Ci Quek T, Wai-San Tam W, X. Tran B, Zhang M, Zhang Z, Su-Hui Ho C, et al. The Global Prevalence of Anxiety Among Medical Students: A Meta-Analysis. Int J Environ Res Public Health. 2019 Jul 31;16(15):2735. doi:10.3390/ijerph16152735
4. Almojali AI, Almalki SA, Alothman AS, Masuadi EM, Alaqeel MK. The prevalence and association of stress with sleep quality among medical students. J Epidemiol Glob Health. 2017;7(3):169. doi:10.1016/j.jegh.2017.04.005
5. Singh S, Agrawal T, Kumar N, Agarwal B, Kumar S. Sleep Quality and Its Correlates Among Medical Students of a Tertiary Care Hospital: A Cross-Sectional Study from Tertiary Health Care Centre in Southern Rajasthan. Natl J Med Res. 2025 Oct 1;15(04):306–11. doi:10.55489/njmr.150420251195
6. Li M, Jin XY, Li H, Chu MD, Su ZF. Sleep quality and its correlates among medical undergraduates in Anhui Province: A cross-sectional study on academic stress, mental health, and lifestyle factors. Sleep Epidemiol. 2025 Dec;5:100109. doi:10.1016/j.sleepe.2025.100109
7. Sun Y, Wang H, Jin T, Qiu F, Wang X. Prevalence of Sleep Problems Among Chinese Medical Students: A Systematic Review and Meta-Analysis. Front Psychiatry. 2022 Mar 9;13:753419. doi:10.3389/fpsyt.2022.753419
8. Agarwal M, Sharma P, Goswami A, Mittal R. A 2023 nationwide study on adjustment disorder among first year MBBS students in India. Bioinformation. 2024;20(2):190–5. doi:10.6026/973206300200190 PubMed PMID: 38497077; PubMed Central PMCID: PMC10941775.
9. Ghosh SK, Biswas S. Diversity in medical education: the Indian Paradox. Med Educ Online. 2014 Jan;19(1):26395. doi:10.3402/meo.v19.26395
10. Virani S, Rewri P, Gupta P, Badyal D. Challenges and Opportunities in the Implementation of Competency-Based Medical Education for Undergraduates in Northern India. Int Med Educ. 2026 Feb 6;5(1):23. doi:10.3390/ime5010023
11. Garg K, Agarwal M, Dalal PK. Stress among medical students: A cross-sectional study from a North Indian Medical University. Indian J Psychiatry. 2017 Oct;59(4):502–4. doi:10.4103/psychiatry.IndianJPsychiatry_239_17
12. Chakraborty A, Jha A, Banerjee A, Banerjee N, Saha D, Das A. Depression, Anxiety, and Stress Levels among Medical Students and Interns in a Medical College of Kolkata: A Cross-Sectional Study. J Compr Health. 2024 Jul 6;12:89–93. doi:10.25259/JCH_18_2024
13. Kant R, Sinha D, Prasad BK. A Cross-Sectional Study Assessing the Relationship between Stress and Academic Performance among First-Year Undergraduate Medical Students.
14. Gagan J. Bhatia, Kazi Mehfuzur Rehman. A Study on Stress Management Among the Medical Students in India. J Inf Syst Eng Manag. 2025 Mar 1;10(21s):373–81. doi:10.52783/jisem.v10i21s.3362
15. Sungoh D, Kattimani S, Balasubramanian I. Stress levels in medical students: A comparative study of first-and final-year MBBS students of government medical college. Calabar J Health Sci. 2024 Nov 26;7:104–6. doi:10.25259/CJHS_10_2024
16. Rajanayagam B. Prevalence of anxiety depression and stress among first year medical students in Tamilnadu. Bioinformation. 2023 May 31;19(5):649–54. doi:10.6026/97320630019649
17. Charan J, Biswas T. How to Calculate Sample Size for Different Study Designs in Medical Research? Indian J Psychol Med. 2013 Apr;35(2):121–6. doi:10.4103/0253-7176.116232
18. Almalki A, Shehata M, Siddiqui K, Albulushi H, Alshehri N, Aldumri A, et al. Sleep Quality Among a Sample of Medical Students and the Association with Academic Performance: An Updated Data. J Epidemiol Glob Health. 2025 Jan 27;15(1):8. doi:10.1007/s44197-025-00345-6
19. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res. 1989 May;28(2):193–213. doi:10.1016/0165-1781(89)90047-4
20. Adu P, Popoola T, Iqbal N, Medvedev ON, Simpson CR. Validating the depression anxiety stress scales (DASS-21) across Germany, Ghana, India, and New Zealand using Rasch methodology. J Affect Disord. 2025 Aug;383:363–73. doi:10.1016/j.jad.2025.04.099
21. Giri P, Baviskar M, Phalke D. Study of Sleep Habits and Sleep Problems Among Medical Students of Pravara Institute of Medical Sciences Loni, Western Maharashtra, India. Ann Med Health Sci Res. 2013;3(1):51. doi:10.4103/2141-9248.109488
22. Azad MC, Fraser K, Rumana N, Abdullah AF, Shahana N, Hanly PJ, et al. Sleep Disturbances among Medical Students: A Global Perspective. J Clin Sleep Med. 2015 Jan 15;11(01):69–74. doi:10.5664/jcsm.4370
23. Binjabr MA, Alalawi IS, Alzahrani RA, Albalawi OS, Hamzah RH, Ibrahim YS, et al. The Worldwide Prevalence of Sleep Problems Among Medical Students by Problem, Country, and COVID-19 Status: a Systematic Review, Meta-analysis, and Meta-regression of 109 Studies Involving 59427 Participants. Curr Sleep Med Rep. 2023 Jun 3;9(3):161–79. doi:10.1007/s40675-023-00258-5
24. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AMA, Alhaqwi AI. Sleep disorder among medical students: Relationship to their academic performance. Med Teach. 2012 Apr;34(sup1):S37–41. doi:10.3109/0142159X.2012.656749
25. Lohitashwa R, Kadli N, Kisan R, A S, Deshpande D. Effect of stress on sleep quality in young adult medical students: a cross sectional study. Int J Res Med Sci. 2015;3519–23. doi:10.18203/2320-6012.ijrms20151391
26. Ferry D S, Sharon L H, Tahereh S I, Winny N W, Mohamad H H. Prevalence of Poor Sleep Quality Based on Pittsburgh Sleep Quality Index (PSQI) among Medical Students in Southeast Asia: A Systematic Review and Meta-Analysis. J Sleep Disord Manag. 2024 Dec 31;9(1). doi:10.23937/2572-4053.1510046
27. Rao WW, Li W, Qi H, Hong L, Chen C, Li CY, et al. Sleep quality in medical students: a comprehensive meta-analysis of observational studies. Sleep Breath. 2020 Sep;24(3):1151–65. doi:10.1007/s11325-020-02020-5
28. 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. 2025 Jan;14(1):276–82. doi:10.4103/jfmpc.jfmpc_1160_24
29. Taneja N, Sachdeva S, Dwivedi N. Assessment of depression, anxiety, and stress among medical students enrolled in a medical college of New Delhi, India. Indian J Soc Psychiatry. 2018;34(2):157. doi:10.4103/ijsp.ijsp_114_17
30. Sarkar S, Gupta R, Menon V. A Systematic Review of Depression, Anxiety, and Stress among Medical Students in India.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

31. Arun P, Ramamurthy P, Thilakan P. Indian Medical Students with Depression, Anxiety, and Suicidal Behavior: Why Do They Not Seek Treatment? Indian J Psychol Med. 2022 Jan;44(1):10–6. doi:10.1177/0253717620982326
32. 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. 2022 Jan;11(1):373. doi:10.4103/jehp.jehp_393_22
33. Al-Khani AM, Sarhandi MI, Zaghloul MS, Ewid M, Saquib N. A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. BMC Res Notes. 2019 Dec;12(1):665. doi:10.1186/s13104-019-4713-2
34. Dutta G, Rajendran N, Kumar T, Varthya SB, Rajendran V. Prevalence of Depression Among Undergraduate Medical Students in India: A Systemic Review and Meta-Analysis. Cureus. 2023 Jan 10. doi:10.7759/cureus.33590
35. Goebert D, Thompson D, Takeshita J, Beach C, Bryson P, Ephgrave K, et al. Depressive Symptoms in Medical Students and Residents: A Multischool Study: Acad Med. 2009 Feb;84(2):236–41. doi:10.1097/ACM.0b013e31819391bb
36. Kumar S, H.S. K, Kulkarni P, Siddalingappa H, Manjunath R. Depression, anxiety and stress levels among medical students in Mysore, Karnataka, India. Int J Community Med Public Health. 2016;359–62. doi:10.18203/2394-6040.ijcmph20151591
37. Saipanish R. Stress among medical students in a Thai medical school. Med Teach. 2003 Jan;25(5):502–6. doi:10.1080/0142159031000136716
38. Guthrie E, Black D, Bagalkote H, Shaw C, Campbell M, Creed F. Psychological stress and burnout in medical students: a five-year prospective longitudinal study. J R Soc Med. 1998 May;91(5):237–43. doi:10.1177/014107689809100502
39. Melaku L, Mossie A, Negash A. Stress among Medical Students and Its Association with Substance Use and Academic Performance. J Biomed Educ. 2015 Dec 2;2015:1–9. doi:10.1155/2015/149509
40. Rosiek A, Rosiek-Kryszewska A, Leksowski Ł, Leksowski K. Chronic Stress and Suicidal Thinking Among Medical Students. Int J Environ Res Public Health. 2016 Feb 15;13(2):212. doi:10.3390/ijerph13020212
41. Venkatarao E, Iqbal S, Gupta S. Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. Indian J Med Res. 2015;141(3):354. doi:10.4103/0971-5916.156571
42. Kumar B, Shah MAA, Kumari R, Kumar A, Kumar J, Tahir A. Depression, Anxiety, and Stress Among Final-year Medical Students. Cureus. 2019 Mar 16. doi:10.7759/cureus.4257
43. Akdemir M, Sonmez Y, Şenol YY, Gurpinar E, Aktekin MR. A Six-Year Longitudinal Study of Psychological Distress, Depression, Anxiety, and Internet Addiction Among Students at One Medical Faculty. Healthcare. 2025 Jul 19;13(14):1750. doi:10.3390/healthcare13141750
44. Kumar RS, Kumar KS. Prevalence of insomnia and sleep pattern among MBBS students of Stanley Medical College, Chennai. Int J Community Med Public Health. 2019 Feb 22;6(3):1057. doi:10.18203/2394-6040.ijcmph20190584
45. Goyal N, Gupta SK. Sleep quality among medical students in Moradabad, Uttar Pradesh, India. Int J Community Med Public Health. 2019 Dec 25;7(1):274. doi:10.18203/2394-6040.ijcmph20195866
46. Štefan L, Sporiš G, Krističević T, Knjaz D. Associations between sleep quality and its domains and insufficient physical activity in a large sample of Croatian young adults: a cross-sectional study. BMJ Open. 2018 Jul;8(7):e021902. doi:10.1136/bmjopen-2018-021902
47. Vidović S, Rakić N, Kraštek S, Pešikan A, Degmečić D, Zibar L, et al. Sleep Quality and Mental Health Among Medical Students: A Cross-Sectional Study. J Clin Med. 2025 Mar 26;14(7):2274. doi:10.3390/jcm14072274
48. Leow MQH, Chiang J, Chua TJX, Wang S, Tan NC. The relationship between smartphone addiction and sleep among medical students: A systematic review and meta-analysis. Kabir H, editor. PLOS ONE. 2023 Sep 15;18(9):e0290724. doi:10.1371/journal.pone.0290724
49. Jahrami H, BaHammam AS, AlGahtani H, Ebrahim A, Faris M, AlEid K, et al. The examination of sleep quality for frontline healthcare workers during the outbreak of COVID-19. Sleep Breath. 2021 Mar;25(1):503–11. doi:10.1007/s11325-020-02135-9
50. 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. 2025 May;17(Suppl 1):S363–5. doi:10.4103/jpbs.jpbs_310_25 PubMed PMID: 40511021; PubMed Central PMCID: PMC12156477.
51. Rezaei M, Khormali M, Akbarpour S, Sadeghniiat-Hagighi K, Shamsipour M. Sleep quality and its association with psychological distress and sleep hygiene: a cross-sectional study among pre-clinical medical students. Sleep Sci. 2018 Aug;11(04):274–80. doi:10.5935/1984-0063.20180043
52. Shamsuddin K, Fadzil F, Ismail WSW, Shah SA, Omar K, Muhammad NA, et al. Correlates of depression, anxiety and stress among Malaysian university students. Asian J Psychiatry. 2013 Aug;6(4):318–23. doi:10.1016/j.ajp.2013.01.014
53. Shen Z, Wang T, Zeng X, Wang J. Discrepant Associations Between Psychological Stress and Sleep Quality Among Medical and Non-Medical Students: A Nationwide Cross-Sectional Study in China.
54. Gosadi I, Shnaimer J. Association Between Depression, Anxiety, and Stress and Sleep Quality Among University Students from Saudi Arabia: A Cross-Sectional Study. Psychol Res Behav Manag. 2025 Nov;Volume 18:2287–98. doi:10.2147/PRBM.S562798.

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