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Comparison of sleep quality, depression, anxiety, and stress patterns among medical students across different academic years: A cross-sectional study

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Background and objective: The medical curriculum is widely regarded as one of the most demanding academic programs, requiring exceptional dedication, consistent effort, perseverance, and passion from its students. However, the inability to effectively manage academic and emotional stressors during the course can adversely impact mental well-being, often manifesting as depression, anxiety, and stress.

Method: This observational study was carried out under the "EviGenCHiP program" at a medical college and hospital. The assessment tools employed included the Depression, Anxiety, and Stress Scale (DASS-21) to evaluate psychological distress and the Pittsburgh Sleep Quality Index (PSQI) to assess subjective sleep quality.

Result: Overall, 8% of the students exhibited moderate to extremely severe levels of depression, 10% experienced moderate to extremely severe anxiety, and 12% reported moderate to extremely severe stress. Poor sleep quality was observed to be more prevalent among female students compared to male.

Conclusion: Although the prevalence was lower than that reported in other studies, depression, anxiety, stress, and poor sleep quality among medical students remain emerging public health concerns. Implementing measures such as mentorship initiatives, student support programs, encouragement of extracurricular participation for mental rejuvenation, and adoption of student-friendly teaching and assessment approaches may help alleviate psychological distress and enhance overall well-being.

Keyword: Sleep quality, stress, anxiety

Introduction

Feelings of sadness, loss of interest in daily activities, and persistent nervousness are emotions most people experience at some point in life. However, when these symptoms persist and begin to interfere with normal functioning, they may indicate depression, a condition that, along with anxiety and stress, constitutes one of the leading causes of morbidity and disability worldwide. According to the World Health Organization (WHO), more than 22% of the global population is affected by depression. Among these, medical students represent a particularly vulnerable group, irrespective of gender, owing to the intense academic and emotional demands of medical education [1, 2].

Medical training is universally recognized as one of the most challenging academic pursuits. It requires sustained concentration, long study hours, extensive syllabi, and continuous assessments, all of which demand high levels of mental endurance and resilience. The rigorous curriculum, coupled with the pressure of examinations and clinical responsibilities, can often lead to psychological distress. Consequently, many medical students experience sleep disturbances, heightened anxiety, and symptoms of depression when unable to effectively manage these pressures.

Manifestations may include emotional withdrawal, irritability, absenteeism from classes, and social isolation factors that can further contribute to deteriorating academic performance and reduced quality of life [2, 3].

Previous studies conducted across different regions have consistently reported an increasing prevalence of depression, anxiety, and stress among university students, particularly those pursuing medicine. These conditions not only compromise students' emotional well-being but also hinder their professional development and long-term mental health. Sleep quality, an essential determinant of cognitive function and psychological stability, is frequently impaired in this population, exacerbating mental health challenges [3, 4].

Understanding the magnitude of these mental health issues and identifying the factors associated with poor sleep quality are crucial for developing effective preventive and interventional strategies. Despite the growing global awareness, research on the prevalence and determinants of depression, anxiety, stress, and sleep disturbances among medical students remains limited in low- and middle-income countries, including India [4, 5].

Therefore, the present study aims to assess the prevalence of depression, anxiety, and stress among medical students and to explore the contributing factors associated with impaired sleep quality. Findings from this study are expected to aid in designing targeted mental health interventions, promote wellness-oriented educational policies, and foster a supportive academic environment conducive to both learning and psychological well-being [5].

Materials and Methods

This was a Cross-sectional that was conducted from August 2012 to July 2013 at Saveetha Medical College, Chennai, Tamil Nadu, India on medical college student by a self-administered questionnaire, requiring approximately 30 minutes to complete, used to collect data on socio-demographic details (gender, age, ethnicity, and living place) and to assess depression, anxiety, and stress using the validated DASS-21 scale, along with subjective sleep quality evaluated through the Pittsburgh Sleep Quality Index (PSQI).

Inclusion Criteria

- Undergraduate medical students who provided written informed consent to participate in the study.
- Students who had successfully completed their first-year examinations and had been engaged in medical education for a minimum duration of one year.

Exclusion Criteria

- Participants who were unwilling or unable to provide the required information, including those with mental impairments.
- Medical students who could not be reached even after two attempts to complete the questionnaire.
- Participants who submitted incomplete questionnaires, as this study utilized validated tools with a scoring-based assessment system.

Results

Of the total 440 students enrolled in the second to third year of the medical program, 69.63% (n = 307) completed the questionnaire. This included 106 (34.52%) second-year students, 97 (31.60%) third-year part 1 students, and 104 (33.88%) third-year part 2 students.

From the socio-demographic profile, all participants were aged between 18 and 25 years, with the majority falling in the 20-21-year age group (44.29%, n = 136). Female students were slightly higher in number than males (52.43% vs 47.57%, n = 161 vs 146). Of the total 307 students, most (81.31%, n = 250) were residing in the hostel. Among the 307 medical students, 81 (26.30%) reported poor sleep quality.

Table 1: Baseline socio-demographic profile of the study population

Variable	Frequency (n)	%
Age group (in years)		
18 to 19	88	20.07
20 to 21	195	44.29
22 to 23	144	32.73
24 to 25	12	2.73
Year of study		
Second year of MBBS	152	34.72
Third Year - part 1 of MBBS	140	31.94
Third Year - part 2 of MBBS	148	33.68
Gender		
Male	211	47.92
Female	229	52.08
Living		
Hostel	358	81.36
Rent	15	3.41
With Family	67	15.23
Nature of Sleep		
Good	323	73.70
Poor	117	26.30

Table 2: Relation between socio-demographic variables and the quality of sleep

Variable	Poor	%	Good	%	Total	%	Biostatistics test	
							Chi-square	P value
Gender								
Male	79	23.91	251	76.09	330	100	Chi-square = 0.774	> 0.05
Female	86	28.48	216	71.52	302	100		
Year of study								
Second year of MBBS	54	34.72	100	65	154	100	Chi-square = 14.9	< 0.05
Third First	43	31.94	93	68.48	136	100		
Third Final	28	33.68	198	87.63	226	100		
Living at								
Hostel	119	81.36	347	74.47	466	100	Chi-square = 0.383	> 0.05
Rent	13	3.41	31	70.00	44	100		
With Family	13	15.23	31	70.45	44	100		
Usual Time to fall asleep								
Within 30 min	95	21.81	341	78.19	436	100	Chi-square = 15.85	< 0.05
> 30 min	48	50	48	50	96	100		
Usual time to get in bed								
10 PM to 11 PM	8	22.22	28	77.78	36	100	Chi-square = 16.81	< 0.05
11 PM to 12 PM	31	17.86	143	82.14	174	100		
12 PM to 01 AM	62	29.17	151	70.83	213	100		
01 AM to 02 AM	37	40.54	54	59.46	91	100		
After 02 AM	23	52.38	21	47.62	44	100		
Sleep Hours in Bed								
4-6 hours	74	52.78	66	47.22	140	100	Chi-square = 34.99	< 0.05
7-8 hours	92	35.48	167	64.52	259	100		
9-10 hours	32	47.83	35	52.17	67	100		

The non-parametric Chi-square test indicated that female students exhibited a higher prevalence of poor sleep quality (28.48%) compared to their male counterparts; however, this difference was not statistically significant ($p > 0.05$). In contrast, several other factors demonstrated a significant association with poor sleep quality ($p < 0.05$). These included being in the second year of MBBS (35.00%), residing in rental accommodation (30.00%), requiring more than 30 minutes to initiate sleep (50.00%), going to bed after 2:00 a.m. (52.38%), and spending fewer hours in bed (52.78%).

Discussion

Adequate sleep plays a vital role in enhancing cognitive abilities, particularly in memory consolidation. In contrast, poor nighttime sleep quality and resulting daytime sleepiness can negatively impact both physical and cognitive functioning, thereby affecting academic performance among medical students. In the present study, 26.3% (116/440) of participants recorded a PSQI score of ≥5, indicating that approximately one in four medical students experienced poor sleep quality [6, 7]. Based on the validated DASS-21 questionnaire, the findings further revealed that approximately one in thirteen, one in ten, and one in eight medical students exhibited moderate to extremely severe levels of depression, anxiety, and stress, respectively [8, 9].

The prevalence of depression among medical students in this study was 21% (92/440), which is lower than that reported in Ethiopia (51%) and other regions of India (49-51%). However, the results are comparable to a study conducted at Addis Ababa University, Ethiopia, which reported a prevalence of 27.7%. The prevalence of anxiety in the present study was 38% (167/440), aligning closely with findings from Ethiopia (30.1%) and Brazil (33.7%), but higher than those reported in India (9.8%) and Nepal (5%). The prevalence of stress was also 38% (167/440), which, although notable, remains lower than that observed in some previous studies reporting stress levels of 74% and 90% among medical students [10, 11].

The relatively lower prevalence of mental health issues observed in this study reflects the positive impact of institutional initiatives such as mentorship programs, student support systems, and encouragement of extracurricular engagement, all of which contribute to promoting mental well-being [12].

With respect to sleep quality, 26% (114/440) of participants reported disturbances, a finding consistent with results from a study conducted at Saifai, Etawah (27%) and supported by other similar investigations. In this study, sleep quality was found to be comparable between male and female students, which contrasts with findings from a study conducted in Loni, Maharashtra, where females demonstrated better sleep quality [12, 13].

Furthermore, 24.91% (110/440) of participants reported a sleep duration of less than seven hours, a lower proportion compared to the 60% reported in the Saifai, Etawah study. Approximately 15.91% (70/440) of students indicated taking more than 30 minutes to fall asleep, which is significantly lower than the 51.5% observed in a study conducted in Saudi Arabia [14].

In the present study, factors associated with poor sleep quality included female gender (28.48%, 125/440), being in the second year of MBBS (35.00%, 154/440), residing in rental accommodations (30.00%, 132/440), taking more than 30 minutes to fall asleep (50.00%, 220/440), going to bed after 2:00 a.m. (52.38%, 230/440), and sleeping less than seven hours per night (52.78%, 232/440). Comparable data for these parameters were not available in previous literature, making the present findings potentially valuable as a reference point for future research [14, 15].

Conclusion

Though the less compared to other study but, depression, anxiety, stress and poor sleep quality among medical students is the emerging public health problem. The common anticipated reasons

for this situation are family's expectation, exam pressure, extensive long course, fear of pacing into the real world of medicine, and dissatisfaction with the administration etc. This profession is highly demanding and requires utmost focus and expertise. There is a desperate requirement to take measures to enhance the mental health of medical students who will be the future rescuers of health. Appropriate actions to reduce depress, anxiety and stress and improve sleep quality, include mentorship program, students support program, students engage in extracurricular activities to revitalize them and to include students friendly education and evaluation process.

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Conflict of Interest
None.

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