

Exploring the Stress Landscape: An In-Depth Analysis of Perceived Stress, Contributing Factors and Its Effect on Sleep among Medical Students in Bangalore – A Cross-Sectional Study

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Abstract:

Background: The escalating concern of mental health issues on university campuses, where students often report heightened psychological distress, necessitates focused exploration for effective interventions. While physical activity and reducing sedentary behavior have shown promise in enhancing overall mental health, understanding specific associations between various factors and perceived stress among university students remains crucial.

Methods: This cross-sectional study, involving all the 454 participants, employed the Cohen Stress Scale and the Epworth Sleepiness Scale to assess stress levels and its impact on sleep, revealing that 13.65% reported low stress, 70.26% experienced moderate stress, and 16.08% faced high stress. Significantly, gender, smoking status, parent's profession, location of stay, and transportation mode were associated with varying stress levels ($p < 0.05$), and 49.77% reported satisfactory sleep, while 1.76% experienced insomnia, demonstrating a significant correlation between sleep quality and stress levels ($p < 0.05$).

Conclusion: These findings emphasize the need for targeted interventions tailored to specific stressors identified among university students, shedding light on factors influencing stress and sleep quality.

Keywords: Cohen Stress Scale, Epworth Sleepiness scale, Perceived stress, Psychosocial factors, University students.

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Introduction

Stress is characterized as a condition of concern or mental tension arising from challenging circumstances. It is a natural human response designed to prompt us to address difficulties and threats in our lives. Stress is a universal experience, varying in degree for each individual. However, the manner in which we handle stress significantly influences our overall well-being. [1]

Stress and sleep are two important determinants of health and well-being, both linked with health outcomes including cardiovascular diseases, diabetes, depression, and anxiety. [2–5] As per the Centers for Disease Control and Prevention (CDC), 35.2 percent of adults in the United States are reported to be sleeping less than 7 hours per night, potentially leading to a sleep deficit with enduring implications for both physical and mental health. [6]

Teens frequently report a bidirectional relationship between stress and sleep, with many sleeping less

than the recommended 8.5 to 9.25 hours per night. A substantial percentage experience fair or poor sleep quality, and stress often interferes with their ability to fall asleep.

Teens with inadequate sleep report heightened stress levels, and a correlation is observed between increased stress and reduced sleep quality. Those with lower stress levels tend to sleep longer, report better sleep quality, and experience fewer adverse effects of insufficient sleep compared to their highly stressed counterparts. Teens who sleep less than eight hours on school nights generally exhibit higher stress levels and are more likely to report symptoms of stress, such as irritability, anxiety, depression, and feeling overwhelmed, than those who get sufficient sleep. [7]

Sleep researchers have primarily concentrated on diagnosing primary sleep disorders like sleep apnea, narcolepsy, or periodic limb movement disorder. However, it is widely acknowledged that

the challenges of everyday life can disturb even the sleep of individuals without diagnosed disorders. As described by Mason in 1968, [8] psychological stressors serve as potent triggers for physiological stress responses. Thus, the present study has been undertaken with the objectives to assess the perceived stress among medical undergraduate students, to identify the various factors associated with perceived stress among medical students and assess the relationship between stress and sleeping pattern.

Materials and Methods

This cross-sectional study was conducted at the Vydehi Institute of Medical Sciences and Research Centre in Bengaluru, spanning a comprehensive three-month period.

The research employed a complete enumeration method, involving the participation of all undergraduate medical students who willingly provided their consent. The inclusion criteria encompassed the entire population of undergraduate medical students, while those who were absent during the data collection period or did not provide consent were excluded from the study.

The participants were ensured of their rights and privacy through the acquisition of written informed consent before engaging in the study activities. A meticulously designed self-administered questionnaire was utilized, incorporating well-established measurement tools such as the Cohen Stress Scale (CSS) and the Epworth Sleepiness Scale (ESS). Furthermore, an open-ended question was included to solicit qualitative insights, allowing participants to express potential stress factors in their own words.

Data analysis was carried out using Epi Info Version 7.2.1, a widely recognized epidemiological software tool. The statistical analysis employed the Chi-Square test to explore associations between various variables.

A significance level of p-value <0.05 was set, providing a rigorous threshold for determining statistical significance. This comprehensive approach ensures the robustness and reliability of the study's findings, contributing valuable insights into the stress and sleep patterns of undergraduate medical students.

Results

Table 1: Distribution of various stress factors and stress levels according to Cohen Stress Scale

		Cohen PSS			Total	P Value
		Low stress	Moderate Stress	High Stress		
Total		62(13.65%)	319(70.26%)	73(16.08%)	454	
Gender	Male	31(17.91%)	124(71.67%)	18(10.4%)	173	0.009
	Female	31(11.03%)	195(69.39%)	55(19.57%)	281	
Smoking status	Smokers	7(16.28%)	23(53.48%)	13(30.23%)	32	0.017
	Non smokers	55(13.38%)	296(72.02%)	60(14.59%)	422	
Paternal Profession	Doctor	6(6.38%)	69(73.40%)	19(20.21%)	94	0.049
	Other	56(15.55%)	250(69.44%)	54(15%)	360	
Location of stay	Day scholar	32(13.5%)	164(69.19%)	41(17.3%)	237	0.007
	Hostelite	39(17.97%)	161(74.19%)	17(7.83%)	217	
Staying with	Family	38(11.04%)	190(55.23%)	116(33.72%)	344	0.006
	Friends+PG	12(10.9%)	78(70.9%)	20(18.18%)	110	
Self-arranged transport	Car	20(23.25%)	35(40.69%)	31(36.04%)	92	0.048
	Bicycle	1(14.28%)	6(85.71%)	0(0%)	7	
	Bike	10(12.19%)	58(70.73%)	14(17.07%)	82	
	Total	31(17.71%)	99(56.57%)	45(25.71%)	181	
Public transport	Train	0(0%)	1(100%)	0(0%)	1	
	Bus	33(17.09%)	144(59.06%)	46(23.83%)	224	
	cab	3(5.55%)	44(81.48%)	7(12.96%)	48	
	Total	36(12.94%)	189(6.98%)	53(19.06%)	273	

Table 2: Distribution of Stress level among participants as compared with various Self-reported Stress factors (N=454)

Academics associated stress factors		
High stress	Fear of upcoming exam	324(71.37%)
	Vastness of academic curriculum	216(47.58%)
	Fear of Failure	210(46.26%)
	Stressed due to lack of recreation	185(40.75%)
	Exhaustion not letting you study	178(39.21%)
	Worried not to master the pool of knowledge	151(33.26%)
Moderate	Too many Exams	137(30.18%)

stress	Pace of studies too high	116(25.55%)
	Non-supportive learning environment/ Lack of support	104(22.91%)
	Peer competition	96(21.15%)
	Lack of encouragement from teachers	79(17.40%)
	Lack of respectful treatment from teachers	71(15.64%)
Low Stress	Not satisfied with choice of career	51(11.23%)
	Literature of study too difficult	31(6.83%)
	No holidays	12(2.64%)
	Attendance problem	4(0.88%)
	Too much hostel rules	1(0.22%)
Psychosocial and Environmental Stress factors		
High stress	Prolonged travel to college	140(30.84%)
	Poor/Insufficient sleep schedule	124(27.31%)
	High Parental Expectation	121(26.65%)
	Accommodation far from home/ Homesickness	117(25.77%)
	Loneliness/ Lack of Friends	77(16.96%)
	Poor living conditions in hostel	76(16.74%)
	Working Part time or Night shifts	12(2.64%)
	Family Problem/Fights	73(16.08%)
Moderate stress	Relationship Problems	70(15.42%)
	Stress due to unsatisfactory food in hostel	69(15.20%)
	Financial Problem/ Worries over financing during education	60(13.22%)
	Noise in living places	59(13.00%)
	Stress due to language problem	48(10.57%)
Low stress	Maladjustment with roommates/ Neighbors'	38(8.37%)
	Anonymity/ Unpopular among students	37(8.15%)
	Too much homework	22(4.85%)
	Being less well treated because of gender	21(4.63%)
	Working Part time or Night shifts	12(2.64%)

Table 3: Association of stress with quality of sleep according to Epworth Sleepiness Scale(ESS).

		Quality of Sleep						p Value
		Perfect	Satisfactory	Fairly Good	Bad	Insomnia	Total	
Stress level	Low Stress	25(40.32%)	25(40.32%)	10(16.12%)	2(3.22%)	0(0%)	62	<0.001
	Moderate Stress	37(11.59%)	169(52.97%)	98(30.72%)	9(2.82%)	6(1.88%)	319	
	High Stress	8(10.95%)	32(43.83%)	25(34.24%)	6(8.22%)	2(2.74%)	73	

Out of the 454 students who willingly took part in the study, their stress levels were assessed using the Cohen Stress Scale. The results revealed that 62 (13.65%) reported low stress, 319 (70.26%) experienced moderate stress, and 73 (16.08%) faced high stress.

Within the present investigation, demographic factors such as age, marital status, and year of study did not exhibit any noteworthy differences concerning perceived stress.

Several factors were identified as correlates of stress, with significant differences observed in variables such as gender, smoking status, parent's profession, location of stay, and transportation. Detailed findings are presented in Table 1.

Gender disparities were evident in stress levels, with females exhibiting higher stress levels compared to males. Interestingly, smokers displayed higher stress levels. The profession of

participants' parents emerged as a significant factor influencing stress, particularly among those with doctor parents facing heightened expectations and competition from siblings in the medical field. Notably, participants with doctor parents experienced significantly higher stress compared to those with parents in other professions.

The living arrangements also played a role in stress, as Day scholars exhibited elevated stress levels compared to their counterparts residing in hostels, with a significant difference observed. Additionally, participants living with their families experienced higher stress compared to those residing with friends in hostels or alone in PG accommodations.

The stressful transportation environment in Bangalore had a discernible impact on participants in the study. Notably, individuals who relied on self-arranged modes of transportation, such as

bikes, cars, or bicycles, reported elevated stress levels. In contrast, those who opted for public transport options like trains, metro rail, buses, or cabs experienced comparatively lower stress levels. Importantly, this observed difference in stress levels between the two groups was deemed statistically significant, emphasizing that the choice of transportation mode plays a meaningful role in the stress experiences of individuals in the context of Bangalore's bustling and challenging transportation infrastructure.

In addition to the mentioned factors, participants also reported various other concerns, which can be categorized into academic, psychosocial, or environment-related issues. The distribution of stress levels associated with these factors is detailed in Table 2.

Employing the Epworth Sleepiness Scale (ESS), the participants' sleep quality was assessed. Out of the participants, 226 (49.77%) reported satisfactory sleep, while 8 (1.76%) experienced insomnia. A notable correlation was observed between the quality of sleep and the participants' stress levels and is described in Table 3.

Discussion

In our study, gender differences in stress were apparent, with females experiencing higher stress levels compared to males, which is consistent with previous studies. [9,10] Contrary to this, certain studies reported no gender-based differences in depression levels among college students. [11,12] In the context of the present study, an examination of demographic characteristics, including age, marital status, socioeconomic status and year of study, revealed no significant differences in terms of perceived stress, perceived factors contributing to stress, and the reported incidence of stress. These findings are in accordance with and support the consistency observed in previous research studies on the subject. [13,14]

In our study, it was observed that individuals who engaged in smoking displayed heightened levels of stress, a correlation substantiated by the findings of several independent studies exploring this phenomenon. These collective research consistently support the notion that smoking is associated with increased stress levels among study participants. [15,16]

In our study, the profession of participants' parents significantly influenced stress levels, particularly for those with doctor parents facing increased expectations and sibling competition in the medical field. Children experiencing discrimination or being compared to others represents a key source of stress.

David A. Kalmbach in his study indicates that high sleep reactivity is associated with an elevated risk

of severe insomnia, shift-work disorder, depression, and anxiety. [9]

A study conducted by Dayna A. Johnson et al. supports this finding, indicating that discrimination is a distinct stressor for African-Americans. The study reveals that elevated levels of perceived discrimination correlate with deteriorating sleep quality over time and are linked to changes in sleep duration among older adults. [17]

Another study by Carmela Alcántara et al investigates the impact of sociocultural stressors on the sleep outcomes of Hispanics/Latinos in the United States. Results reveal positive associations between acculturation stress, ethnic discrimination, and chronic moderate/severe stress with various sleep issues, emphasizing the importance of addressing these stressors for better sleep outcomes in this population. [18]

In our study, living arrangements played a role in stress, as day scholars reported higher stress levels than hostel residents, and participants living with their families experienced more stress than those in hostel or PG accommodations.

An unique study indicate that friends' drinking and smoking significantly impact a student's own behaviors. [19] Numerous studies have already confirmed the association between alcoholism, smoking, and heightened stress levels. However, contemporary competitive environments and familial pressures have emerged as additional sources of stress, a trend supported by various research findings. [20–22]

Conclusion

Our study recommends a comprehensive approach to alleviate stress among medical students, encompassing tailored support programs addressing specific stressors, stress management workshops integrated into the curriculum, initiatives to improve living arrangements for day scholars, transportation solutions to mitigate commuting stress, strengthened academic and psychosocial support systems, regular health check-ups to monitor well-being, and exploration of a more flexible curriculum. These multifaceted interventions aim to create a supportive environment that addresses the diverse challenges faced by medical students, promoting their overall well-being and success throughout their academic journey.

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