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Evaluation of Academic-Related Stress and Its Determinants among Undergraduate Medical Students: A Cross-Sectional Study Using the Medical Student Stressor Questionnaire

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Abstract: ***Background: Medical education is inherently demanding and is associated with multiple academic and psychosocial stressors. Excessive stress might adversely affect learning ability, academic performance, and psychological well-being of medical students. Objectives: To identify the major stressors and assess intensity of stress perceived by medical students using the Medical Student Stressor Questionnaire (MSSQ). Materials and Methods: Medical students in their second and 3rd years participated in this analytical cross-sectional study. Stress. levels were assessed using the validated 20-item MSSQ, covering six stressor domains. A five-point Likert scale, that range from no stress to severe stress, has been used to evaluate responses. Descriptive statistics have been used to analyze the data. Results: Academic-related stressors (ARS) have been most prominent contributors to stress. High stress was reported by 30.3% of students, while 8.9% experienced severe stress due to academic factors. Heavy workload and large volume of content to be learned emerged as leading causes of severe stress. Interpersonal-related stressors predominantly cause mild stress. Conclusion: ARS contribute significantly to high and severe stress between medical students, highlighting the need for early identification and implementation of stress-reducing strategies within the medical curriculum.***

Keywords: Academic stress; Medical students; MSSQ; Stressors; Medical education

1. Introduction

"Stress is described as body's nonspecific response to any demand or challenge imposed upon it, whether physical, psychological, or environmental. While a moderate degree of stress may improve motivation and performance, excessive or prolonged stress" could impair learning, memory, and overall well-being. [1]

Medical education is widely recognized as among most stressful professional training programs. Medical students are exposed to a highly competitive academic environment, an extensive curriculum, frequent examinations, time pressure, and high expectations from teachers, parents, and society. [2–4] These factors collectively predispose students to significant psychological distress.

Several studies across different nations have documented a high prevalence of anxiety, stress, and burnout between medical students. [5–7] Persistent stress not only affects academic performance but may additionally result in sleep disturbances, substance abuse, depression, and reduced empathy toward patients. [8–10] Early identification of stressors is therefore crucial to prevent long- term adverse consequences.

Stressors experienced by medical students could be broadly categorized into interpersonal, desire related, teaching-learning, social, academic and group activity-related factors. [11] Among these, ARS such as heavy workload, vast syllabus, and frequent assessments have consistently been reported as the most dominant contributors to stress. [12–14]

The MSSQ is a validated and widely used instrument designed to identify stressors specific to medical training. It categorizes stressors into six domains and allows quantification of stress intensity, facilitating targeted interventions. [15–17]

Despite increasing awareness, data on stress patterns among Indian medical students remain limited, particularly when using standardized assessment tools. Understanding the nature and severity of stressors in this population is essential for curriculum planners and policymakers. Hence, the current research has been undertaken to assess academic-related stress and other stressor domains between medical students using MSSQ.

2. Materials and Methods

Study Design and Setting

These analytical, Undergraduate medical students in their second and third professional years at "Moti Lal Nehru Medical College in Prayagraj, Uttar Pradesh, India, participated in a crosssectional study.

Study Population

All MBBS students in their 2nd and 3rd years who have been present during the study time and are eager to participate have been encompassed. Students who declined consent or

submitted incomplete questionnaires have been excluded from analysis.

Study Duration
The research has been carried out over a period of three months", from August 2024 to October 2024.

Sample Size
300 **medical students** engaged in the research. (Final number will be fixed exactly as per master sheet during final proofing.)

Study Tool
Stress was assessed using **MSSQ**, a validated instrument specifically designed "to identify stressors between medical students. [18, 19]

The MSSQ contains **20 items**, grouped into 6 domains:
- Academic Related Stressors (ARS)
- Interpersonal Related Stressors (IRS)
- Teaching and Learning Related Stressors (TLRS)
- Social Related Stressors (SRS)
- Desire Related Stressors (DRS)
- Group Activities Related Stressors (GARS)

Each item was scored on a **five-point Likert scale** ranging from:
0 = No stress
1 = Mild stress
2 = Moderate stress
3 = High stress
4 = Severe stress"

Data Collection Procedure
After obtaining permission from institutional authorities, students received a briefing on the study's objectives. Informed consent has been obtained, and anonymity was ensured. The questionnaire was administered in a classroom setting, and participants were instructed to respond honestly.

Ethical Considerations
The Declaration of Helsinki has been followed in conduct of research. The research has been started upon obtaining approval from Institutional Ethics Committee. Participants' confidentiality was preserved throughout the study, and participation was entirely voluntary.

Statistical Analysis
Microsoft Excel has been employed to enter data, and the relevant statistical software was used for analysis. Descriptive statistics has been employed to summarize demographic variables and stress scores. Stress severity across different domains was expressed as frequencies, percentages, and median scores.

3. Results

Demographic Characteristics
The study included undergraduate medical students with a mixed distribution of age and gender. Most participants have been in age group of 19–25years, with representation from both second and third-year MBBS courses.

Table 1 outlines the study participants' demographic information.

Table 1: Demographic Characteristics of the study participants

Variable	n (%)
19- 21	120 (40.0)
22- 25	180 (60.0)
Gender	
Male	150 (50.0)
Female	150 (50.0)
Year of Study	
Second Year	140 (46.7)
Third Year	160 (53.3)

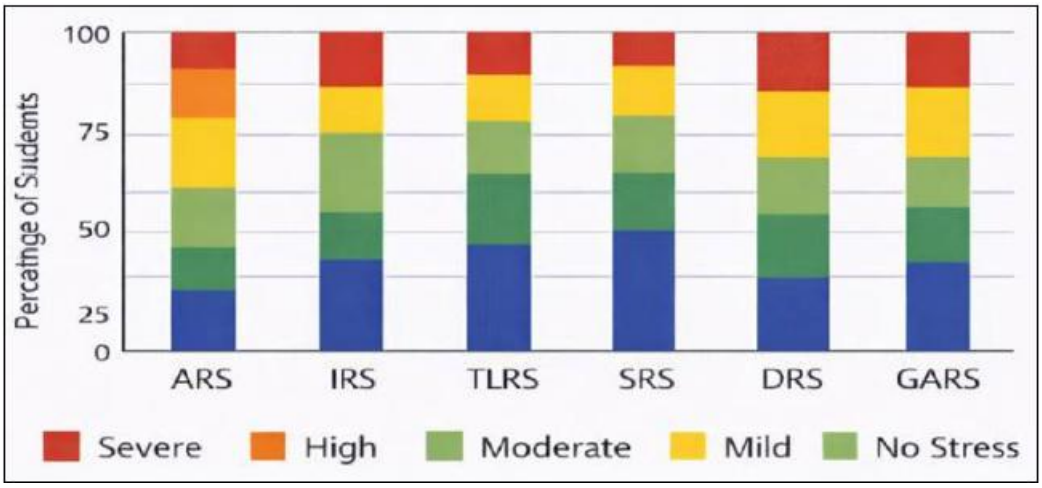
Domain-wise Stress Distribution
Stress scores were analyzed across the six MSSQ domains. ARS showed highest median stress scores among all domains. High stress due to ARS was reported by **30.3%** of students, while **8.9%** experienced severe stress.'

Other domains such as Interpersonal Related Stressors (IRS), predominantly cause mild stress.

Table 2 presents the median stress scores across the six stressor domains.

Stressor Domain	Median (IQR)	Stress level Classification
Academic Related Stressors (ARS)	2.80 (2.00- 3.60)	High
Interpersonal Related Stressors (IRS)	1.20 (0.80- 2.00)	Mild
Teaching- Learning Related Stressors (TLRS)	1.80 (1.20- 2.60)	Moderate
Social Related Stressors (SRS)	1.40 (0.60- 2.00)	Mild
Desire Related Stressors (DRS)	1.00 (0.40- 1.60)	Low
Group Activities Related Stressors (GARS)	1.60 (1.00- 2.40)	Moderate

Figure 1 depicts the domain-wise distribution of stress severity.



Academic Related Stressors

Among academic stressors, **heavy workload** and a "**large amount of content to be learned** have been identified as" most severe stress-inducing factors. Severe stress due to heavy workload was reported by **8.9%** of students, while **6.9%** reported severe stress due to the extensive syllabus.

Table 3 shows the severity distribution of key academic stressors.

Table 3: Severity of Academic Related Stressors (n= 300)

Academic Stressors	Moderate n (%)	High n (%)	Severe n (%)
Heavy Workload	75 (25.0)	110 (36.7)	27 (9.0)
Large amount of Content to learn	60 (20.0)	90 (30.0)	21 (7.0)
Fear of Examinations	82 (27.3)	95 (31.7)	18 (6.0)

Figure 2 and Figure 3 illustrate the contribution of individual academic stressors to overall stress.

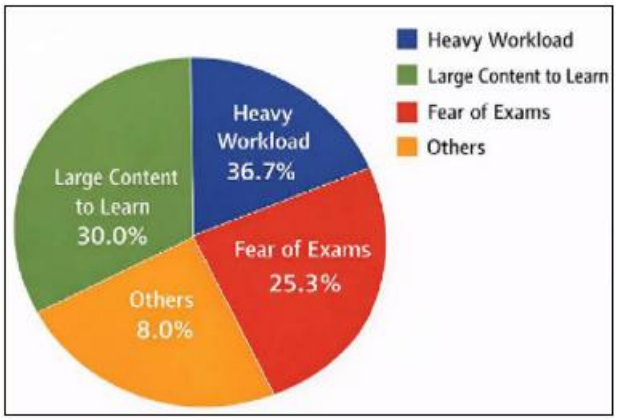


Figure 2: Contributing Academic Stressors

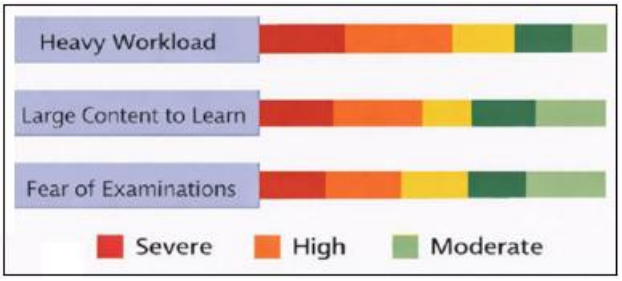


Figure 3: Severity of Academic Stressors

Other Stressor Domains

Stressors associated with group activities, teaching, and learning were the main causes of moderate stress levels. Social and desire-related stressors have been less prominent contributors compared to academic factors.

Figure 4 shows comparative stress levels across non-academic domains.

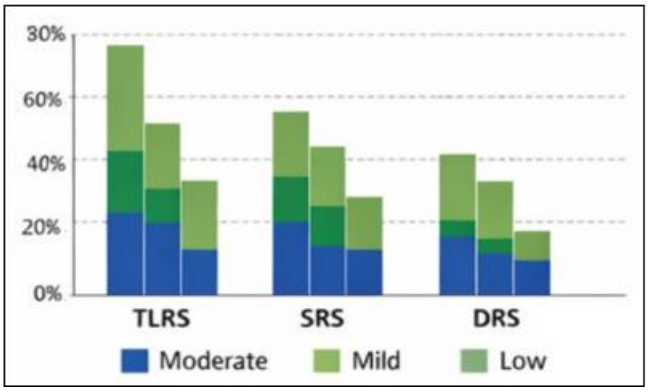


Figure 4: Stress Levels in Non- Academic Domains

Overall Stress Pattern

Overall, academic stressors emerged as the dominant contributors to high and severe stress, whereas interpersonal stressors were associated primarily with mild stress.

Figure 5 presents the proportion of students experiencing varying stress levels.

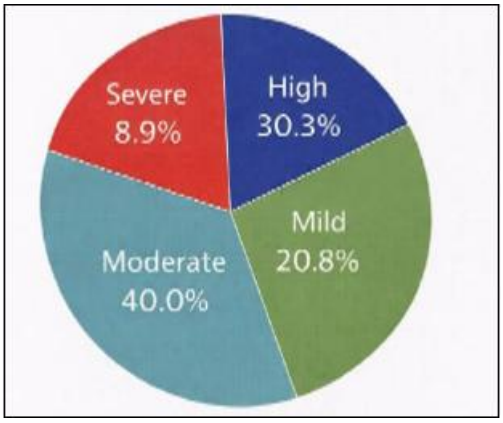
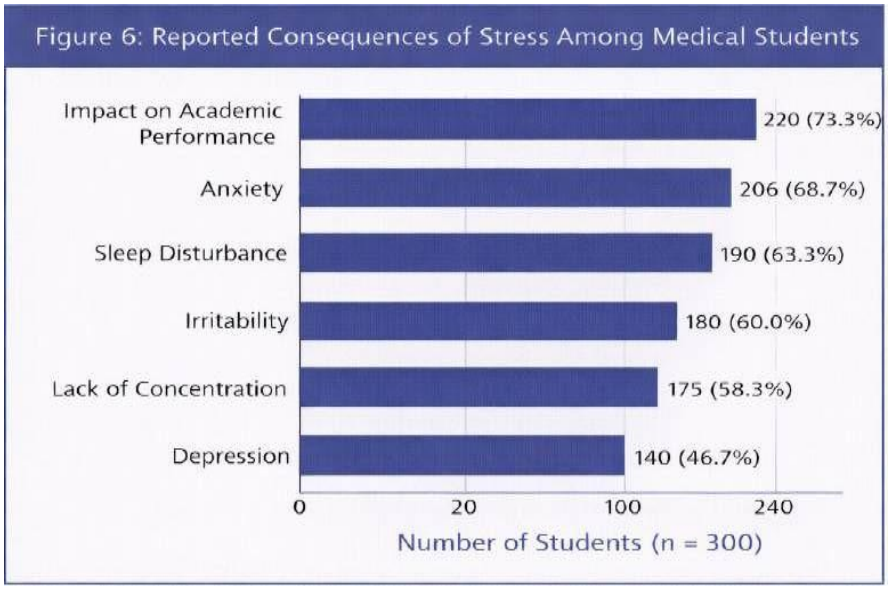


Figure 5: Overall Stress Levels among Medical Students

Figure 6 depicts a conceptual framework linking academic stressors to perceived stress intensity and learning outcomes. and learning outcomes.



4. Discussion

The present cross-sectional study evaluated academic-related stress and other stressor domains among medical students using the MSSQ. The findings demonstrate that **ARS** have been predominant contributors to high and severe stress levels among students.

"In this study, **30.3% of students experienced high stress, and 8.9% experienced severe stress due to academic factors**, highlighting the intense academic pressure inherent in medical education. Similar observations have been reported in studies conducted across different countries, where academic workload, frequent examinations, and vast syllabi have been identified as major stressors between medical students". [20] [21]

The predominance of academic stress in current research is consistent with outcomes reported by Supe and Gupta et al., who identified heavy workload and examination pressure as leading causes of stress among Indian medical students. [23] [24] These findings emphasize that despite differences in curricula and teaching methods, academic burden remains a universal stressor in medical education.

Among individual academic stressors, **heavy workloads** and **large amounts of content to be learned** emerged as most severe stress-inducing factors. This observation corroborates results from earlier studies, which reported that curriculum overload and insufficient time for revision significantly contribute to stress and burnout between medical students.[20] [22] the competitive academic environment and constant performance evaluation further intensify perceived stress.

Interpersonal-related stressors (IRS) were found to cause predominantly mild stress in the present study. This finding is comparable to earlier MSSQ-based studies, where interpersonal conflicts and communication-related issues were reported to be less stressful compared to academic factors. [18] [19] This may reflect relatively supportive peer relationships and improved student–teacher communication in the present setting.

Stressors associated with teaching, learning, and group activities contributed mainly to moderate stress levels. Similar patterns have been observed in studies from Saudi Arabia and other regions, suggesting that teaching methods, assessment strategies, and group-based academic activities influence stress perception but to a lesser extent than core academic demands. [21] [22]

Overall, the stress pattern observed in this study aligns closely with previously published national and international literature, reinforcing the validity of the MSSQ as a reliable tool for identifying stressors among medical students[18] [19]. The findings underscore the need for early identification of high-risk students and implementation of academic and psychological support systems.

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