Section: Community Medicine

Original Research Article

EXPLORING STRESS LEVELS ACROSS HIGHER EDUCATION STREAMS: A COMPARATIVE CROSS-SECTIONAL STUDY OF MEDICAL, ENGINEERING, AND ARTS UNDERGRADUATES

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Received : 23/03/2026
Received in revised form : 13/05/2026
Accepted : 30/05/2026

Keywords:
Student Stress, College Life, Medical Education, Common Physical Complaints, Family Expectations, Campus Wellness.

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DOI: 10.47009/jamp.2026.8.3.240

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (3); 1355-1359

ABSTRACT

Background: Academic stress and associated somatosensory manifestations constitute a growing public health concern among tertiary education students. Divergent professional curricula subject undergraduates to distinct operational pressures, scholastic workloads, and evaluation modalities. This study aimed to evaluate and compare the prevalence of physical complaints, psychological strain, and perceived socio-parental pressure among undergraduate students enrolled in medical, engineering, and arts streams in an urban Indian setting. **Materials and Methods:** A comparative cross-sectional institutional study was executed over a three-month period in Chennai, India. A sample of 281 undergraduates—comprising 200 medical, 50 engineering, and 31 arts students—completed a validated, anonymous digital survey instrument assessing sociodemographic metrics, somatosensory symptoms, academic deadline pressures, and familial expectations. Statistical analyses were performed utilizing Fisher's Exact Test for categorical cohorts with sparse cells and Directional Lambda calculations to model environmental correlates. **Results:** Somatic complaints were highly prevalent across all academic disciplines. Recurrent headaches were reported by 39.0% of medical, 36.0% of engineering, and 29.0% of arts undergraduates. Conversely, engineering cohorts exhibited the highest vulnerability to sleep disruption (40.0%) and chronic fatigue (44.0%). Acute deadline stress impacted 68.0% of medical and 62.0% of engineering students. Socio-parental guilt regarding academic performance was significantly pronounced in medical tracks (54.5%) relative to engineering (42.0%) and arts (38.7%) cohorts. Residential status (hostel residency versus day scholarship) demonstrated no statistically significant association with stress indices ($\Lambda = .021$, $p = .865$). **Conclusion:** While scholastic stress is universal, its phenotypic presentation and environmental triggers are stream-dependent. Medical tracks are characterized by high socio-parental accountability and deadline anxiety, whereas engineering domains face profound sleep deficit and exhaustion. Institutional wellness frameworks must transition from generalized interventions toward department-specific, structurally integrated support mechanisms.

INTRODUCTION

The transition into higher education demands rapid adaptation to novel psychosocial, structural, and academic environments, frequently exposing undergraduate students to chronic psychological pressure. When sustained, these prolonged stressors manifest as physiological burdens, establishing a clear link between mental strain and somatosensory pathologies such as tension-type headaches, disrupted sleep architecture, and chronic fatigue syndrome. These clinical and sub-clinical presentations severely compromise global academic efficacy and long-term student well-being.

In the contemporary Indian socio-cultural matrix, particularly within urban educational hubs like Chennai, academic achievement is deeply intertwined with family dynamics and collective social status. Tertiary education is routinely viewed as a critical milestone for familial socioeconomic mobility, creating an environment where students

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

internalize profound performance anxieties. Consequently, academic setbacks or perceived underpreparedness trigger intense feelings of socio-parental guilt and failure, which often manifest physically as sleep disturbances and systemic somatic exhaustion.

While literature acknowledges the pervasive nature of undergraduate distress, existing studies frequently treat the student population as a homogenous cohort. This aggregative approach obscures the highly distinct etiologies of stress characteristic of individual academic disciplines. Medical pedagogy demands long years of extensive data memorization coupled with early clinical exposure and patient-care responsibilities. Engineering tracks prioritize tight project cycles, intensive computational logic, and high-frequency technical evaluations. In contrast, humanities and arts programs feature subjective evaluation parameters, open-ended assignments, and distinct long-term career trajectories.

The present investigation was designed to systematically delineate these stream-specific variations. Operating under the aegis of the Department of Community Medicine at Government Medical College, Omandurar Government Estate, Chennai, this study comparatively evaluates medical, engineering, and arts undergraduates. By identifying specific somatic complaints and environmental triggers unique to each academic path, this study provides actionable, localized data to help universities transition from generalized mental health programs toward targeted, stream-specific institutional interventions.

MATERIALS AND METHODS

Study Location and Timing

This cross-sectional investigation was conducted over a three-month period in Chennai, Tamil Nadu, India. As a prominent metropolitan educational center, Chennai hosts a diverse, multi-regional student demographic navigating uniform urban living standards and regional academic schedules, providing a standardized environment for comparative educational research.

Ethical Clearances and Student Consent

The study protocol, psychometric questionnaires, and digital informed consent procedures were rigorously reviewed and granted formal approval by the Institutional Ethical Committee (IEC) of Government Medical College, Omandurar Government Estate, Chennai. Administrative authorization was obtained through the Department of Community Medicine. Participation was entirely voluntary; individuals completed a digital informed consent module prior to survey access. The data collection process was completely anonymized, excluding any personal identifiers, and participants retained the right to terminate session protocols at any juncture without academic penalty.

The Student Groups Involved

A non-probability convenience sampling methodology was used to recruit full-time undergraduate students across three primary academic streams: Medicine (MBBS), Engineering (B.E./B.Tech), and Arts and Sciences (B.A./B.Sc./B.Com). To ensure participants had sufficient exposure to the structural demands of their curricula, inclusion criteria restricted enrollment to students who had completed at least their first academic year. Exclusion criteria applied to any individuals with pre-existing, clinically diagnosed neuropsychiatric disorders, isolating the study's focus to general academic and environmental stress.

Data Collection and Survey Structure

Data acquisition was executed via a structured digital questionnaire distributed through institutional communication networks. The instrument was divided into four primary modules:

1. Sociodemographic profiles (including gender and residential status).
2. Somatosensory symptom presentation (assessing frequency of headaches, sleep architecture, and fatigue).
3. Familial dynamics (evaluating perceived parental pressure and communication quality).
4. Academic stress drivers (measuring deadline anxiety and examination readiness).

Handling Data and Fixing Discrepancies

Upon closure of the data collection window, raw datasets were audited for completeness and structural integrity. The preliminary spreadsheet recorded 278 responses; however, cross-verification with primary analytical software logs identified 3 complete records that had been omitted during initial export. Restoring these records brought the final verified sample size to exactly N=281, aligning perfectly with the master SPSS archive. The final sample comprised 200 medical students, 50 engineering students, and 31 arts students.

Somatic complaints were operationalized by treating responses of "Always" or "Frequent" on Likert items as "high-frequency" clinical indicators. Statistical analyses were tailored to handle variable cell sizes; specifically, when cell frequencies fell below 5, standard Chi-Square approximations were replaced with Fisher's Exact Test to ensure exact p-values. Directional Lambda (Λ) and Goodman-Kruskal Tau tests were applied to determine if residential status (hostel vs. day scholar) served as a statistically valid predictor of stress severity.

RESULTS

Background Details of the Students

Analysis of the final sample (N=281) revealed a well-distributed baseline cohort. The gender distribution consisted of 52.3% male (n=147) and 47.7% female (n=134). Stratification by academic stream showed that medical undergraduates constituted 71.2%

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

(n=200), engineering undergraduates 17.8% (n=50), and arts
undergraduates 11.0% (n=31). Regarding residential status, 58.3% (n=164) were classified as hostel residents, whereas 41.7% (n=117) operated as day scholars commuting from their primary residences.

Table 1: Baseline Demographic Profile of Undergraduates (N=281)

Demographic Variable	Frequency (n) / Percentage (%)
Gender	
- Male	147 (52.3%)
- Female	134 (47.7%)
Academic Stream	
- Medical (MBBS)	200 (71.2%)
- Engineering (B.E. / B.Tech)	50 (17.8%)
- Arts & Sciences	31 (11.0%)
Residential Status	
- Hostel Resident	164 (58.3%)
- Day Scholar (Commuter)	117 (41.7%)

Physical Symptoms and Health Complaints

Somatic distress was highly prevalent across all academic disciplines. High-frequency recurrent headaches were most common among medical students (39.0%), followed by engineering (36.0%) and arts cohorts (29.0%). However, engineering students exhibited the highest vulnerability to sleep disturbances (40.0%) and chronic fatigue (44.0%).

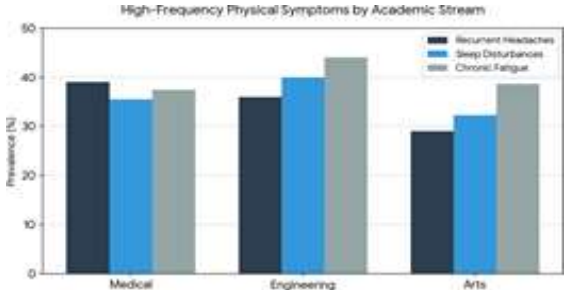

Figure 1: Stratified Somatosensory Symptom Presentation across Educational Tracks

Table 2: Stratified Somatosensory Symptom Presentation and Statistical Significance

Somatic Manifestation / Frequency	Medical (N=200)	Engineering (N=50)	Arts (N=31)	Statistical Metric
Recurrent Headaches				
- High Frequency	39.0% (78)	36.0% (18)	29.0% (9)	Fisher's Exact Test p = 0.442
- Low Frequency	61.0% (122)	64.0% (32)	71.0% (22)	
Sleep Disturbances				
- High Frequency	35.5% (71)	40.0% (20)	32.3% (10)	Fisher's Exact Test p = 0.612
- Low Frequency	64.5% (129)	60.0% (30)	67.7% (21)	
Chronic Fatigue				
- High Frequency	37.5% (75)	44.0% (22)	38.7% (12)	Fisher's Exact Test p = 0.589
- Low Frequency	62.5% (125)	56.0% (28)	61.3% (19)	

Daily Stress Causes and Family Dynamics

Evaluation of academic stress drivers revealed notable differences between streams. Impending project and assignment deadlines served as major stressors for medical (68.0%) and engineering (62.0%) cohorts, while proving less severe for arts undergraduates (51.6%).

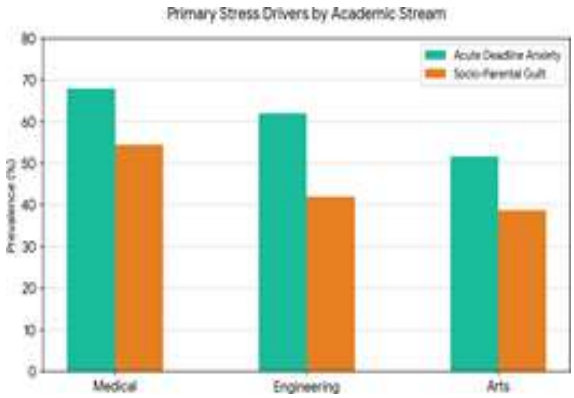

Figure 2: Primary Environmental Stress Drivers and Socio-Cultural Triggers by Stream

Socio-parental dynamics also varied significantly: 54.5% of medical students reported chronic guilt regarding their ability to fulfill parental performance expectations, compared to 42.0% in engineering and 38.7% in arts. To determine whether residential

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

settings influenced these stress profiles, Directional Lambda and Goodman-Kruskal Tau calculations were performed. The resulting directional value (Λ = .021, p = .865) confirmed that hostel residency versus day-scholar commuting has no statistically significant directional influence on student stress levels.

DISCUSSION

The empirical findings of this cross-sectional study demonstrate that while undergraduate stress is a widespread phenomenon, its presentation is significantly shaped by the student's academic discipline. The high prevalence of somatic complaints—such as tension headaches, fragmented sleep architecture, and chronic fatigue across all cohorts—reaffirms that prolonged psychological pressure regularly manifests as physical illness, regardless of academic track. By separating non-medical students into distinct engineering and arts cohorts rather than analyzing them as a single group, this study successfully isolated specific stress dynamics that are often missed in broader investigations.

For medical undergraduates, the stress profile is driven by heavy academic workloads combined with acute personal accountability. The high rates of deadline anxiety (68.0%) and socio-parental guilt (54.5%) indicate that medical education carries a unique emotional and psychological burden. Because medical programs demand the rapid assimilation of vast amounts of information and introduce high-stakes clinical responsibilities early on, these students often internalize high performance standards. Consequently, they tend to view any academic difficulty as a personal failure that disappoints their families.

Conversely, engineering undergraduates showed the highest vulnerability to sleep disruptions (40.0%) and chronic fatigue (44.0%). This clinical pattern reflects the operational environment of engineering colleges, which are characterized by rigid project timelines, intense programming tasks, and frequent laboratory assessments.

These compact, deadline-driven schedules disrupt normal sleep hygiene, leading to cumulative sleep deficits and systemic physical exhaustion. Meanwhile, arts undergraduates recorded lower somatic symptoms and deadline anxiety, facing instead more open-ended assignments and less structured future career pathways.

Crucially, the application of Directional Lambda modeling disproved a common assumption in educational planning. The finding that residential status (hostel living versus commuting) had no statistically significant link to stress patterns (p = .865) challenges the simple notion that moving away from home inherently increases student distress. Instead, these results demonstrate that the primary drivers of undergraduate stress are rooted directly within the academic curriculum and internalized family expectations, rather than physical living arrangements.

Study Limitations: Several limitations must be noted. Because the sample was drawn exclusively from urban institutions in Chennai, the results reflect specific regional family expectations and localized institutional structures, which may limit generalizability to rural areas or different states. Furthermore, data collection relied on self-reported digital surveys, introducing subjectivity regarding how individual participants define "frequent" or "regular" symptoms. Future research should utilize multi-centric, longitudinal designs to track cohorts across diverse geographical regions over their entire academic programs.

CONCLUSION

In conclusion, while academic stress remains a shared challenge in higher education, its environmental causes and somatic presentations depend heavily on the field of study. Medical undergraduates are highly vulnerable to rigid schedules, deadline anxiety, and socio-parental guilt, which frequently present as tension headaches. Engineering students face severe sleep disruption and chronic exhaustion driven by intense technical workloads, while arts undergraduates report lower overall somatic distress.

The absence of a statistical link between residential status and stress confirms that academic demands and internalized family expectations are the primary drivers of student distress. These insights indicate that universities must move beyond generic, campus-wide wellness lectures. Effective intervention requires department-level strategies designed around the specific schedules and workflows of each discipline. By implementing structured assignment timelines, institutionalizing sleep-hygiene education, and providing stream-specific academic mentorship, departments can more effectively protect both student health and academic success.

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

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