Original Research Article

IMPACT OF STRESSORS ON MENTAL HEALTH WELLNESS AMONG FIRST YEAR MBBS STUDENTS OF A GOVERNMENT MEDICAL COLLEGE

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A B S T R A C T

Background: The transition into medical school is a critical period marked by significant academic and personal challenges. First-year MBBS students often experience elevated stress levels, which may negatively impact their mental health and academic performance. This study aimed to assess overall mental health, perceived stress, and academic stress among first-year MBBS students at a government medical college, and to compare these metrics between male and female students.

Material and Methods: In this cross-sectional analytical study, 200 first-year MBBS students (80 males [40%] and 120 females [60%]) were recruited using convenience sampling. Data were collected early in the academic year, prior to major examinations, to capture baseline stress levels. Three pre-validated instruments were administered: the Mental Health Inventory Score (MHIS) to assess overall mental health, the Perceived Stress Scale (PSS-14) to measure general stress levels, and a 40-item Academic Stress Scale (ASS), to evaluate academic-related stressors. Descriptive statistics (frequencies, means, and standard deviations) were calculated for demographic variables and scale scores. Independent samples t-tests and chi-square tests compared scores between genders. Pearson's correlation coefficients were computed to examine the relationships among MHIS, PSS-14, and ASS scores. A multiple linear regression analysis was performed with PSS-14 as the dependent variable and age, gender, and ASS scores as independent predictors.

Results: The mean age of participants was 19.70 ± 1.20 years. Overall, the MHIS, PSS-14, and ASS scores were 65.0 ± 12.0, 27.5 ± 8.1, and 26.18 ± 6.6 respectively. Female students had significantly higher PSS-14 scores (29.38 ± 5.44 vs. 25.05 ± 6.32, $p < 0.001$) and ASS scores (28.20 ± 5.80 vs. 24.80 ± 6.00, $p = 0.012$) than male students, while males recorded higher MHIS scores (69.0 ± 12.5 vs. 62.5 ± 11.5, $p = 0.017$). Pearson's correlation analysis showed a moderate-to-strong inverse relationship between MHIS and both PSS-14 ($r = -0.50$, $p < 0.001$) and ASS ($r = -0.45$, $p < 0.001$), and a strong positive correlation between PSS-14 and ASS ($r = 0.60$, $p < 0.001$). In multiple regression, academic stress (ASS) was a significant predictor of perceived stress ($B = 0.62$, $p = 0.004$), while gender showed a borderline effect ($B = 2.40$, $p = 0.054$), and age was not significant ($p = 0.22$).

Conclusions: Academic stress is a key determinant of overall perceived stress among first-year MBBS students, with female students exhibiting higher stress levels and poorer mental health. These findings underscore the need for targeted academic support and stress management interventions to improve both mental well-being and academic performance in this vulnerable population.

Keywords: Academic stress, Academic Stress Scale, Mental Health Inventory Score, Mental health, Perceived Stress Scale

INTRODUCTION

The transition into medical school represents a critical period characterized by significant academic, social, and personal changes. First-year MBBS students, in particular, encounter a steep learning curve accompanied by high academic expectations, which can lead to elevated stress levels (1). Psychological stress has been associated with adverse effects on both mental and physical health, and among medical students, high stress levels have been linked to impaired academic performance, burnout, and long-term mental health issues (2). First-year medical students in India experience high levels of stress that negatively impact their academic performance (3, 4).Recent study found that insufficient coping strategies exacerbate stress, thereby increasing the risk of burnout (5). In this context, evaluating perceived stress and its related factors is essential for early intervention and support.

Medical education is inherently demanding, and the first year lays the foundation for the rigorous curriculum that follows. The intense academic pressure, combined with environmental and interpersonal stressors, can overwhelm students' coping mechanisms. Evidence linking stress to reduced cognitive functioning and poorer academic outcomes underscores the critical need to understand stress patterns in this population (6). Academic stressors, such as a vast syllabus and frequent examinations, significantly contribute to stress among Indian medical students (7-10). Furthermore, inadequate coping mechanisms worsen the overall stress burden (5). Given that government medical college students face unique challenges including high competition and limited resources, it is imperative to study these stress patterns to design effective support programs tailored to this environment.

While numerous studies have investigated stress among medical students globally, relatively few have focused exclusively on first-year MBBS students in Indian government institutions (1,2). Many previous investigations have combined students from various academic years or were conducted in private institutions and developed settings, limiting the applicability of their findings to our local environment. Academic stress in government-run institutions may differ due to resource constraints and higher levels of competition. Moreover, research examining gender differences in stress perception within this specific context is sparse. Thus, there is a clear need to elucidate the specific stressors impacting first-year MBBS students at government medical college, and to determine how these stressors differentially affect male and female students.

This study is novel in its exclusive focus on first-year MBBS students at a government medical college in India, a population that is underrepresented in existing research. Unlike previous studies that combined data from multiple academic years or focused on private institutions (7, 8) our study specifically examines the early stress experiences of first-year students at government medical college. Moreover, we employ three pre-validated instruments—the Mental Health Inventory Score, Perceived Stress Scale (PSS-14), and Academic Stress Scale (ASS)—to capture a comprehensive picture of both overall mental health and the specific academic and psychosocial stressors experienced during this formative period. Additionally, the direct comparison of stress scores between male and female students offers fresh insights into gender-specific stress responses. Recent studies have underscored the importance of examining these dimensions (3, 5); however, our study uniquely integrates these measures within the context of a government medical college, thereby providing evidence that may inform targeted stress management interventions tailored to this specific setting.

Aim

To assess the levels of perceived stress, academic stress, and overall mental health among first-year MBBS students at a government medical college, and to compare these metrics between male and female students.

Objectives

1. To measure mental health, overall perceived stress, and academic-related stress using the Mental Health Inventory Score (MHIS)(11), Perceived Stress Scale (PSS-14)(12), and the 40-item Academic Stress Scale (ASS)(13).
2. To compare the mean scores of MHIS(11), PSS-14(12), and ASS(13) between male and female first-year MBBS students.
3. To examine the correlations among academic stress, overall perceived stress, and mental health.
4. To identify key predictors of high perceived stress from demographic and academic stressor variables using multiple linear regression analysis.

MATERIALS AND METHODS

This study was designed as a cross-sectional analytical study conducted at a government medical college. Data collection was scheduled during a designated period early in the academic year to capture baseline stress levels before major examinations. A total sample of 200 first-year MBBS students was targeted. All first-year MBBS student studying at the government medical college who are willing to participate between the age of 17 and 22 years were included. Students with a self-reported history of psychiatric disorder or those currently receiving psychiatric treatment and participants with incomplete questionnaire responses were excluded in the study.A convenience sampling

method was employed; all eligible students were invited during scheduled classroom sessions and through institutional announcements.This study protocol was approved by the Institutional Ethics Committee (IEC/RMC/2023/948A) and followed the principles of the Declaration of Helsinki. All participants provided written informed consent and were assured that their responses would be kept confidential and used exclusively for research purposes. Detailed information regarding the study's objectives, procedures, and the voluntary nature of participation was provided to all potential participants, who were also informed that they could withdraw at any time without facing any penalty.

Three pre-validated, standardized instruments were used to measure the key constructs:

1. Mental Health Inventory Score (MHIS)(11):
This self-report scale assesses overall mental health wellness, including dimensions such as anxiety, depression, and general well-being.The MHIS has demonstrated strong internal consistency (Cronbach's alpha typically ≥0.80) in similar populations.

2. Perceived Stress Scale (PSS-14)(12):
The PSS-14 is a 14-item questionnaire designed to assess the degree to which situations in one's life are appraised as stressful.Items are rated on a 5-point Likert scale (0 = never to 4 = very often), with seven positively worded items reverse scored.Total scores range from 0 to 56, with higher scores indicating greater perceived stress. The PSS-14 has been widely validated in diverse student populations (Cronbach's alpha ≈0.85).

3. Academic Stress Scale (ASS)(13):
In this study, academic stress was measured using a 40-item Academic Stress Scale (ASS), originally developed by Kim (1970).The ASS assesses academic-related stressors by examining various domains such as academic expectations, workload, and examination-related pressures.Respondents rate the frequency of each stressor on a Likert-type scale and indicate severity using a numerical rating scale. The ASS has demonstrated acceptable reliability and validity in measuring academic stress among students.

The questionnaires were administered in a quiet classroom setting to minimize distractions. Participants received standardized instructions and were allotted approximately 30–40 minutes to complete the instruments.Data were collected over a two-week period during the academic year to capture baseline stress levels.

Data Management and Statistical Analysis
Data Entry: Completed questionnaires were coded and entered into Microsoft Excel for initial data cleaning. The dataset was then imported into SPSS (version 25) for statistical analysis.
Descriptive Statistics: Frequencies, means, and standard deviations were calculated for demographic variables and scale scores (MHIS, PSS-14, and ASS)(11-13).

Comparative Analysis
Independent Samples t-tests were used to compare mean scores between male and female students.
Chi-square tests were employed to assess relationships between categorical variables (e.g., stress categorization into low, moderate, and high).
Correlation Analysis: Pearson's correlation coefficients were computed to evaluate relationships between academic stress (ASS scores)(13) and overall mental health (MHIS scores)(11) as well as perceived stress (PSS-14 scores)(12).
Multivariate Analysis: A multiple linear regression analysis was conducted to identify predictors of high perceived stress. Independent variables included demographic factors (e.g., age, gender) and specific academic stressors from the ASS(13). Variables with a p-value < 0.05 were considered statistically significant.
Effect Sizes: Partial eta squared values and standardized regression coefficients were reported to quantify the magnitude of observed effects.

RESULTS

1. Descriptive Statistics
A total of 200 first-year MBBS students participated in the study, including 80 males (40%) and 120 females (60%). The mean age of the participants was 19.70 ± 1.20 years. The overall scores were shown in Table 1:
The sample exhibited moderate levels of overall perceived stress (PSS-14) and academic stress (ASS), with a relatively balanced gender distribution.

2. Comparative Analysis
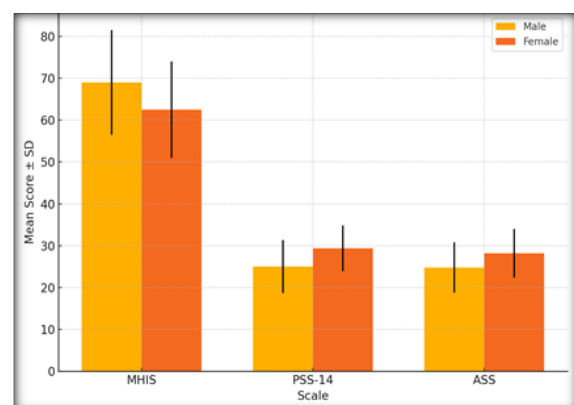Independent samples t-tests were conducted to compare scale scores between male and female students.

Figure 1: Comparison of Scale Scores by Gender

Female students reported significantly higher perceived stress (PSS-14) and academic stress (ASS) compared to male students, whereas male students scored significantly higher on the MHIS, indicatingbetter overall mental health.
Chi-square tests assessed the distribution of stress categorization (low, moderate, high) by gender.
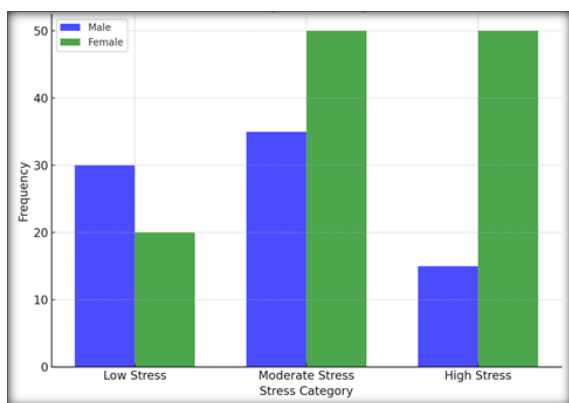
Figure 2: Comparison of Scale Scores by Gender

A significantly higher proportion of female students were classified as having high stress compared to male students (χ^2 = 12.68, df = 2, p = 0.002).

3. Correlation Analysis

Pearson's correlation coefficients were computed to evaluate the relationships among MHIS, PSS-14, and ASS scores.

There is a moderate-to-strong inverse relationship between mental health (MHIS) and both perceived stress (PSS-14) and academic stress (ASS). In contrast, a strong positive correlation exists between perceived stress and academic stress, indicating that academic stress significantly contributes to overall perceived stress.

4. Multivariate Analysis

A multiple linear regression analysis was performed with the PSS-14 score as the dependent variable. Independent variables included age, gender, and ASS scores.

The regression model is statistically significant, explaining 45% of the variance in perceived stress (R^2 = 0.45). Academic stress (ASS) is a significant predictor of perceived stress, with each unit increase in ASS score associated with a 0.62 point increase in PSS-14 score (p = 0.004). Gender shows a borderline effect (p = 0.054), with female students tending to report higher stress. Age does not significantly predict perceived stress in this model.The Variance Inflation Factor (VIF) values for all predictors are below 2.5, indicating that multicollinearity is not a concern in this model.

5. Effect Size Estimates

Effect sizes were calculated to quantify the magnitude of the observed differences and associations.

The Cohen's d value of 0.75 for the PSS-14 score indicates a medium-to-large difference between male and female students. The partial eta squared (η^2) for the gender effect in MANOVA (0.08) suggests a medium effect size. The standardized β for ASS is 0.30, indicating that academic stress has a moderate positive impact on overall perceived stress, whereas the gender effect is relatively smaller (β = 0.15).

Table 1: Descriptive Statistics for Demographic Variables and Scale Scores (N = 200)

Variable	Mean ± SD	Frequency (%)
Age (years)	19.70 ± 1.20	–
MHIS Score	65.0 ± 12.0	–
PSS-14 Score	27.5 ± 8.1	–
ASS Score	26.18 ± 6.6	–
Gender		Male: 80 (40%); Female: 120 (60%)

Table 2: Comparison of Scale Scores by Gender (Independent Samples t-test)

Scale	Male Mean ± SD	Female Mean ± SD	t-value	p-value
MHIS	69.0 ± 12.5	62.5 ± 11.5	2.42	0.017
PSS-14	25.05 ± 6.32	29.38 ± 5.44	-3.81	<0.001
ASS	24.80 ± 6.00	28.20 ± 5.80	-2.55	0.012

Table 3: Stress Categorization by Gender (Chi-square Analysis)

Stress Category	Male (n=80)	Female (n=120)	χ^2	df	p-value
Low Stress	30 (37.5%)	20 (16.7%)			
Moderate Stress	35 (43.8%)	50 (41.7%)			
High Stress	15 (18.8%)	50 (41.7%)	12.68	2	0.002

Table 4: Pearson Correlation Coefficients among Scale Scores (N = 200)

Variables	MHIS	PSS-14	ASS	
MHIS	1.00	-0.50***	-0.45***	*** **p-value**< 0.001
PSS-14	-0.50***	1.00	0.60***	
ASS	-0.45***	0.60***	1.00	

Table 5: Multiple Linear Regression Analysis Predicting PSS-14 Score (N = 200)

Predictor	B	SE	t-value	p-value	Standardized β	VIF
Age	0.32	0.26	1.23	0.22	0.10	1.23
Gender	2.40	1.23	1.95	0.054	0.15	1.05
ASS (Academic Stress)	0.62	0.21	2.95	0.004	0.30	2.43

Model Summary:F(3,196) = 34.12, p < 0.001; R^2 = 0.45, Adjusted R^2 = 0.44.

Table 6: Effect Size Estimates

Analysis	Effect Size Measure	Value	Interpretation
Independent t-test (PSS-14)	Cohen's d	0.75	Medium-to-large difference
MANOVA (Gender effect on PSS)	Partial eta squared (η^2)	0.08	Medium effect size
Regression (ASS predictor)	Standardized β	0.30	Moderate positive effect
Regression (Gender predictor)	Standardized β	0.15	Small-to-moderate effect

DISCUSSION

The transition to medical college is a critical period that presents a unique blend of academic challenges, personal adjustments, and high expectations. These factors contribute to elevated levels of perceived stress, anxiety, and depression among first-year MBBS students.[4,9-10,14] In our study, we observed that the rigorous and competitive academic environment, coupled with pressures to succeed and social isolation, significantly affects students' mental health and overall well-being. A key physiological mechanism underlying the response to stress is the Hypothalamic–Pituitary–Adrenal (HPA) axis. Psychological stressors such as anxiety, depression, fear, and anger can significantly influence HPA axis activity. Persistent negative emotions may lead to chronic stress, resulting in prolonged activation of the HPA axis and elevated cortisol levels. This hormonal imbalance can cause adverse effects such as immunosuppression, metabolic dysregulation, and hippocampal atrophy.[15] These findings underscore the importance of early intervention in the first year of medical education to prevent the cascade of chronic stress and its associated negative health outcomes.

Our study provides valuable insights into the academic stress and overall mental well-being of first-year MBBS students at a government medical college. The average scores on the Perceived Stress Scale (PSS-14) and the Academic Stress Scale (ASS) indicate moderate stress levels overall. Notably, female students reported significantly higher levels of perceived stress and academic stress compared to male students, while males demonstrated better overall mental health as measured by the Mental Health Inventory Score (MHIS). The moderate-to-strong inverse correlations between MHIS and both PSS-14 (r = –0.50) and ASS (r = –0.45) further confirm that higher stress is associated with poorer mental health. Moreover, the strong positive correlation between PSS-14 and ASS (r = 0.60) suggests that academic stressors are a substantial component of overall stress perception.

Our findings are consistent with previous research. Several studies have identified heavy academic loads and frequent examinations as key stressors among Indian medical students,[4,7,16] while other research has shown that academic stress can significantly impair mental health in government institutions.[8,17] In addition, prior investigations have linked high stress levels with increased burnout and poorer overall well-being.[1,2] Recent studies have further highlighted that female medical students tend to experience higher stress levels— potentially due to differing social expectations and coping strategies.[3,5] These notable gender differences underscore the need for targeted interventions designed to address these stressors and improve mental health outcomes in this vulnerable population. Our multiple linear regression analysis further revealed that academic stress, as measured by the ASS, is a significant predictor of overall perceived stress (B = 0.62, p = 0.004), even after controlling for demographic factors such as age and gender. Although gender showed only a borderline effect (B = 2.40, p = 0.054), descriptive statistics and t-test results indicate that female students tend to experience higher stress. Age did not emerge as a significant predictor, likely due to the narrow age range of the cohort.

Practical Implications and Recommendations

The practical implications of these findings are clear. There is an urgent need for targeted interventions that focus on reducing academic stress through curricular reforms, time management workshops, and accessible counselling services. Evidence supports the use of Cognitive Behavioural Therapy (CBT) to help students reframe negative thought patterns and manage stress.[18] Additionally, regular physical exercise has been shown to reduce basal cortisol levels and promote neurogenesis in the hippocampus, thereby preventing the overactivation of the HPA axis.[19,20] Social interventions, such as fostering healthy mentor-mentee relationships, can also buffer stress by promoting the release of oxytocin, which in turn reduces cortisol levels.

Limitations and Future Directions

While our study offers important insights, it is not without limitations. The cross-sectional design limits causal inferences, and the reliance on self-report measures may introduce response biases. Moreover, our sample is drawn from a single government medical college, which may limit the generalizability of the findings. Future research should incorporate longitudinal designs and include multiple institutions with diverse student populations to further elucidate the evolving nature of stress and its impacts.

CONCLUSION

In conclusion, our study demonstrates that academic stress is a significant determinant of overall perceived stress among first-year MBBS students, with female students being particularly vulnerable. Early and targeted interventions are essential to enhance mental health, improve coping

mechanisms, and ultimately foster both academic success and psychological well-being.

Conflict of Interest: Nil

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