

## Perceived Stress among Undergraduate Medical Students in Dehradun: Prevalence and Demographic Correlates

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### CITATION

Juyal R, Sen S, Shikha D, Vallabh V, Verma N, Srivastava AK. Perceived Stress among Undergraduate Medical Students in Dehradun: Prevalence and Demographic Correlates. Indian J Comm Health. 2025;37(6):1031-1035.

<https://doi.org/10.47203/IJCH.2025.v37i06.023>

### ARTICLE CYCLE

Received: 29/11/2025; Accepted: 18/12/2025; Published: 31/12/2025

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### ABSTRACT

**Background:** Medical students experience significant stress due to the rigorous demands of their academic training. Unmanaged stress may lead to poor academic performance and deterioration of mental health. **Aim & Objective:** To determine the prevalence of perceived stress among undergraduate medical students and to assess its relationship with selected demographic characteristics. **Settings and Design:** A questionnaire-based cross-sectional study was carried out among MBBS students enrolled in a private medical college in Dehradun. **Methods and Material:** This analytical cross-sectional study was conducted among undergraduate medical students using self-administered questionnaires. The Perceived Stress Scale-10 (PSS-10) was used to assess perceived stress. **Statistical analysis used:** Descriptive statistics, t-test, ANOVA, Pearson's correlation, multivariate and ordinal logistic regressions. **Results:** Moderate to high perceived stress was reported by 88.2% of participants. Female students had significantly higher mean PSS scores than males ( $21.5 \pm 6.3$  vs  $19.4 \pm 6.1$ ,  $p = 0.027$ ). Ordinal logistic regression indicated a non-significant trend toward higher stress among female students ( $p = 0.059$ ). **Conclusions:** A substantial proportion of undergraduate medical students experienced elevated levels of perceived stress, with higher stress scores observed among female students. These findings underline the need for targeted, gender-responsive mental health interventions and structured stress-management initiatives within medical training programs.

### KEYWORDS

Perceived stress, Medical undergraduates, Mental health, Gender differences, India, Cross-sectional study

### INTRODUCTION

Medical education is well-known for its challenging curriculum structure. The undergraduate medical students go through rigorous academic schedules, long teaching hours, frequent assignments and exams, and prolonged clinical training, to stay updated with recent advances in the medical field. Their demanding schedule hardly leaves time for rest or recreation, putting them under constant stress and vulnerable to mental strain (1,2). The demanding medical curriculum, intense teaching pressure, and continuous stress of patient care take a serious toll on the mental well-being of an aspiring medical undergraduate (3).

Perceived stress is a person's own experience of stress, regardless of how severe it actually is. In medical education, high stress levels are often connected to anxiety, depression, and burnout in students (4).

Perceived stress also describes how people estimate the pressures they face, based on external demands and their capacity to meet them. Several studies conducted in various countries, including India, have repeatedly shown high levels of perceived stress among medical students. High stress levels are reported by the medical students due to high academic pressure, fear of poor performance, little time to unwind, and personal

problems. Chronic stress can impact students' mental health, usually causing anxiety, burnout, and difficulties in adapting to clinical responsibilities (5).

Given the key role future doctors will play in healthcare, managing stress during their training is essential. It benefits their mental health and, in turn, the quality of care they will provide. There is a lack of data on stress levels among medical students in Uttarakhand state. To address this, the present study was planned to determine the prevalence of perceived stress and assess its association with demographic factors among students at a private medical college in Dehradun, Uttarakhand.

## MATERIAL & METHODS

**Study type:** cross-sectional analytical study

**Reporting Guidelines:** STROBE guidelines

**Study population:** undergraduate medical students

**Study area:** Private medical college in Dehradun.

**Study duration:** 6 months.

**Sample size calculation:** The minimum required sample size to estimate the prevalence of perceived stress with precision was calculated as 97, considering an expected stress prevalence of 50% and a 95% confidence level. To account for a potential 20% nonresponse rate, the sample size was increased to 116 students. However, 212 students across all academic years participated voluntarily.

**Sampling technique:** Complete enumeration of students was done.

**Inclusion criteria:** Students across all academic years who voluntarily participated and returned fully completed questionnaires were included in the final analysis.

**Ethics approval:** Institutional Ethics Committee approval was obtained from Swami Rama Himalayan University. Informed consent was obtained from all participants.

**Measurement Tool:** Perceived stress was measured using the **Perceived Stress Scale-10 (PSS-10)**, a validated tool widely used for assessing stress in academic and clinical populations (6). PSS scores (range 0 to 40) were categorised as:

**Low stress:** 0–13

**Moderate stress:** 14–26

**High stress:** 27–40

**Statistical Analysis:** Descriptive statistics were used to summarise participant demographics and perceived stress levels. Independent t-tests compared the mean PSS scores between genders, while One-Way ANOVA assessed differences across academic years. Pearson's correlation was applied

to examine the relationship between age and PSS scores. Multivariate logistic regression analysis was conducted to identify factors associated with high perceived stress. All statistical analyses were performed using SPSS (Version 30.0), and a p-value of <0.05 was considered statistically significant.

## RESULTS

A total of 212 MBBS students participated in the study. The mean age of the participants was  $20.6 \pm 1.65$  years.

A higher proportion of the participants were female students (58.0%), and first-year students were the largest group (44.8%). The majority of participants (54.2%) belonged to the 20–22 years age group, while 30.7% were in the 17–19 years group, and 15.1% were 23 years or older. The maximum participation was from first-year students (44.8%), while second-, third-, and fourth-year students accounted for 10.8%, 13.7%, and 30.7% of the sample, respectively.

**Prevalence of Perceived Stress:** The mean Perceived Stress Scale (PSS) score among the participants was  $20.67 \pm 6.30$ , indicating moderate stress levels on average. As shown in **Fig. 1**, 16.0% of the respondents reported high stress, while 72.2% of students reported moderate stress levels. Only 11.8% of the respondents exhibited low or no stress levels. Thus, nearly nine out of ten students were experiencing moderate to high stress, highlighting a significant mental health burden within this group.

The mean PSS scores were compared between male and female students (**Table 2**). Female students had a significantly higher mean PSS score ( $21.5 \pm 6.3$ ) compared to male students ( $19.4 \pm 6.1$ ). An independent t-test yielded a statistically significant difference ( $t = -2.23$ ,  $p = 0.027$ ), indicating that female students perceived higher stress levels as compared to their male counterparts.

**Figure 2** illustrates the distribution of Perceived Stress Scale (PSS) scores among male and female students using a boxplot. Female students exhibited higher median and mean PSS scores compared to their male counterparts, with a wider interquartile range, indicating greater variability in stress levels. This visual trend aligns with the independent t-test findings ( $p = 0.027$ ).

Table 3 shows the average perceived stress scores across different academic years. First-year students had a mean score of  $20.8 (\pm 6.4)$ , while second-year students reported a slightly higher score of  $21.2 (\pm 6.1)$ . The third and fourth years recorded mean scores of  $20.0 (\pm 6.0)$  and  $20.3 (\pm 6.2)$ , respectively. However, the difference in mean scores across

academic years was not statistically significant (ANOVA  $F = 0.28$ ,  $p = 0.84$ ), suggesting that stress levels remained consistently elevated throughout medical training.

No significant correlation was observed between students' age and their perceived stress scores ( $r = -0.03$ ,  $p = 0.68$ ), suggesting that stress levels remained relatively consistent across different age groups.

Multivariate logistic regression was performed to identify potential predictors of high stress (vs. low/moderate stress), adjusting for gender, age group, and academic year. The results are shown in Table 4. None of the predictors, including gender, age group, or academic year, were statistically significant. Although females had 1.27 times higher odds of reporting high stress compared to males, the association was not found to be significant ( $p = 0.509$ ). Similarly, second, third, and fourth-year students did not exhibit significantly different odds as compared to first-year students. However, the fourth-year students showed a trend towards lower stress (AOR = 0.31,  $p = 0.066$ ), though not statistically conclusive.

**Table 1: Demographic Profile of Study**

Participants		
Demographic Variable	N	%
<b>Gender</b>		
Male	89	42.0
Female	123	58.0
<b>Age Group</b>		
17–19 years	65	30.7
20–22 years	115	54.2
≥23 years	32	15.1
<b>Academic Year</b>		
1st Year	95	44.8
2nd Year	23	10.8
3rd Year	29	13.7
4th Year	65	30.7

**Table 2: Gender Differences in Mean PSS Scores among Medical Student**

Group	Mean PSS Score ± SD	t-value	p-value
Male	19.4 ± 6.1	-2.23	0.027*
Female	21.5 ± 6.3		

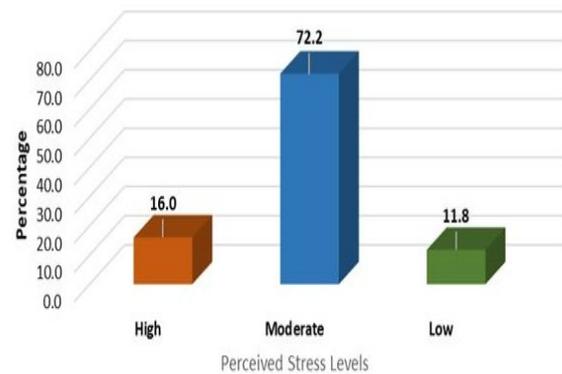
**Table 3: Mean Perceived Stress Scores across Academic Years**

Academic Year	Mean PSS Score ± SD
1st Year	20.8 ± 6.4
2nd Year	21.2 ± 6.1
3rd Year	20.0 ± 6.0
4th Year	20.3 ± 6.2

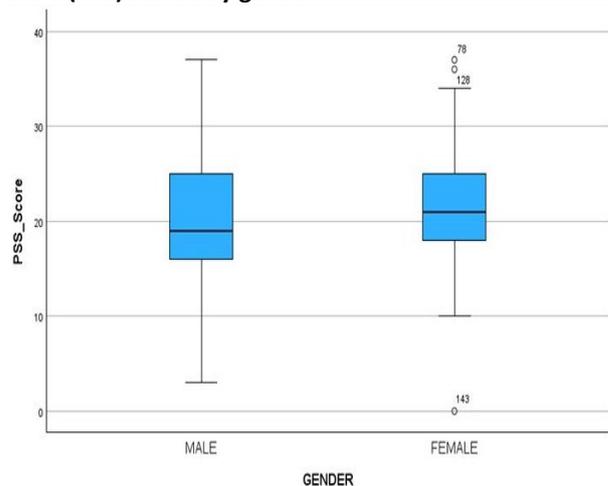
**Table 4: Multivariate Analysis of Variables Predicting High Stress**

Predictor	AOR	95% CI	p-value
Female (vs. Male)	1.27	0.63 – 2.54	0.509
Age 20–22 (vs. 17–19)	0.84	0.37 – 1.92	0.681
Age ≥23 (vs. 17–19)	0.42	0.08 – 2.10	0.292
2nd Year (vs. 1st)	0.76	0.19 – 3.00	0.695
3rd Year (vs. 1st)	0.61	0.15 – 2.48	0.492
4th Year (vs. 1st)	0.31	0.09 – 1.08	0.066

**Figure 1 Prevalence of Perceived Stress among Medical Students**



**Figure 2 Boxplot illustrating Perceived Stress Scale (PSS) scores by gender**



**DISCUSSION**

This study demonstrated a substantial prevalence of perceived stress among medical students of a private medical college from Dehradun, Uttarakhand, with over 88% reporting moderate to high stress levels. A limitation of our study was the absence of participation from final-year students,

as they were occupied with their pre-university examinations during the data collection period. Additionally, involvement from second-year students was lower, likely due to their upcoming sessional exams at the time. Similar findings have been reported in recent studies across India. A survey conducted among students at another private medical college in North India reported that 75–80% of students experienced moderate to severe stress based on the Perceived Stress Scale (PSS). (7) Our study also reported a higher prevalence of perceived stress than many other published studies. This might be because students from all the participating batches had exams in the past or the upcoming month.

Perceived stress among medical students is a well-recognized global issue, with studies reporting consistently high stress levels across various countries. Research shows that mean PSS scores typically range between 24.91 and 26.03, with female and junior-level students often experiencing high stress (8, 9). Academic demands, psychosocial pressures, and health concerns are common contributing factors. The adverse effects of stress extend to students' academic performance, physical health, and mental well-being. A descriptive cross-sectional study involving 315 medical students from two medical colleges reported a 12.38% prevalence of severe stress, with higher rates among female students. (10).

In the present study, gender differences in perceived stress were evident, with female students reporting significantly higher PSS scores ( $21.5 \pm 6.3$ ) than male students ( $19.4 \pm 6.1$ ). This pattern aligns with previous research findings. While Veena Shriram et al. (2015) found no significant gender difference in perceived stress among first-year medical students (11), several other studies reported higher stress levels in female students. Worly et al. (2019) and Agrawal et al., 2021 noted a greater prevalence of stress, emotional exhaustion, and personal distress among female medical students (12, 13). More recently, Anand et al. (2023) also documented significantly higher levels of depression, anxiety, and stress in female students, despite their better performance in cognitive assessments (14). Such findings stress the necessity of incorporating gender-specific measures in medical education to better support female students dealing with unique stressors.

High levels of psychological stress are common among medical undergraduates, and these levels tend to fluctuate across the academic years. However, no significant association was found in the present study between stress levels and age or year of study, suggesting that stress remained constant across different years. In contrast, several

studies reported higher stress levels among final-year students, often attributed to academic pressures, fear of underperformance, lack of recreational time, and personal difficulties (15,16). High-level stress has been linked to emotional distress and lower academic achievement, especially among older female students. (17, 18). Studies have reported that medical students report higher levels of perceived stress and anxiety, and depression than the reference sample (19). These findings highlight the need for effective stress management strategies and strong support systems within medical institutions. The absence of final-year students in our study may partly explain the differences observed when compared to other studies.

### CONCLUSION

There is a high level of perceived stress among medical students in India. Women students tend to report higher levels of stress. Tackling this issue needs a comprehensive approach within medical institutions.

### RECOMMENDATION

The constantly high levels of stress among medical students in India and globally emphasize the urgent need to incorporate stress management endeavours into medical education. Interventions such as comprehensive counselling services, systematic stress management workshops, and creating more supportive academic conditions may help in reducing the stress levels of students and improving their overall well-being.

### LIMITATION OF THE STUDY

This study has a few limitations. Since the study was cross-sectional, it couldn't follow how stress levels changed over time. Another limitation was the absence of region-specific data from Uttarakhand, which means the findings may not apply to all areas. Also, final-year students were left out because the data collection coincided with their pre-university exams, which may have influenced the results. Future studies should track stress across the whole curriculum and explore the long-term impact of stress management programs. Studying how cultural, social, and environmental factors impact stress in medical students from different regions can help develop more effective support strategies.

### RELEVANCE OF THE STUDY

The study on perceived stress among undergraduate medical students in Dehradun is relevant as it quantifies stress prevalence in this high-pressure academic environment. It identifies

demographic correlates, which is crucial for developing targeted and effective mental health interventions and support programs specifically tailored to address the unique stressors faced by future healthcare professionals in this region.

#### **AUTHORS CONTRIBUTION**

All authors have contributed equally.

#### **FINANCIAL SUPPORT AND SPONSORSHIP**

Nil

#### **ACKNOWLEDGEMENT**

The authors are grateful to Swami Rama Himalayan University, Dehradun, for providing the opportunity and support to conduct this study at the Himalayan Institute of Medical Sciences. We are also thankful to the medical students who voluntarily participated in the study.

#### **DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS**

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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