



PERCEIVED STRESS AND COPING STRATEGIES AMONG MEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

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ABSTRACT **Background:** Perceived stress is a major psychological concern among medical students because of academic pressure, emotional demands, and competition. Coping strategies influence how students manage stress and may affect their mental well-being. **Methods:** A descriptive cross-sectional study was conducted among 300 undergraduate medical students at a tertiary care teaching institution in Haryana, India, from January 2025 to December 2025. Data were collected using the Perceived Stress Scale-10 and the Brief COPE Inventory. Statistical analysis was carried out using IBM SPSS Statistics version 25. Descriptive statistics, independent-samples t-test, Pearson's correlation, and linear regression analysis were applied. **Results:** The mean perceived stress score was 21.8 ± 5.6 , indicating moderate to high levels of stress. Female students had significantly higher stress scores than male students (23.4 ± 5.2 vs. 20.2 ± 5.7 ; $p < 0.001$). Adaptive coping scores were higher among males (28.6 ± 6.2), whereas maladaptive coping scores were significantly higher among females (21.7 ± 5.4 ; $p < 0.001$). Perceived stress showed a strong positive correlation with maladaptive coping ($r = 0.61$, $p < 0.01$) and a significant negative correlation with adaptive coping ($r = -0.54$, $p < 0.01$). Regression analysis showed that coping strategies explained 58.3% of the variance in perceived stress ($R^2 = 0.583$, $p < 0.001$). **Conclusion:** Perceived stress was common among medical students and was closely related to the coping methods they used. Maladaptive coping was associated with a higher stress burden, whereas adaptive coping showed a protective relationship. The observed gender differences indicate the need for focused stress-management and mental health interventions.

KEYWORDS : Perceived stress, coping strategies, medical students, mental health, gender differences**BACKGROUND**

Stress is an inevitable part of life today, but the way people experience stress and the effects it has on them varies from one person to the next. Perceived stress is the extent to which people perceive situations as stressful, unpredictable, uncontrollable and overwhelming.^[1] It relies on external demands but also on coping ability, emotional strength, resilience and available support. Lazarus and Folkman characterize stress as "a condition in which the demands of the situation are appraised as greater than the personal and social resources the individual is able to mobilize."^[2]

Medical students are particularly vulnerable because medical education is very demanding, with frequent exams, difficult academic work, long hours of study, high expectations of performance, and constant pressure to perform well.^[3] Sleep deprivation, lack of personal time, and the challenge of balancing academic and personal duties can all add to stress. Illness, suffering, disability and death are also included in the clinical training of the students. This can be competition, comparison with peers, fear of failure, uncertain career prospects and expectations from family or institution.^[4,5]

The effects of chronic stress can influence emotional, physical, academic, social and occupational wellbeing. It has been associated with anxiety, depressive symptoms, burnout, sleep disturbance, substance use, concentration problems, poor academic performance and loss of motivation.^[6,7] Long-term stress can also result in decreased empathy, confidence, communication skills, professional behavior and interest in patient care.

The impact of stress is greatly affected by the way students deal with difficult circumstances. Coping is defined as "cognitive and behavioral efforts to manage demands that are appraised as stressful". Often such efforts are implemented as change.^[2] Carver's Brief Coping Inventory is a commonly utilized measure of coping responses.^[8] Adaptive coping involves active coping, planning, acceptance, positive reframing, seeking support, and problem solving. These strategies are associated with better adjustment and mental health. Maladaptive coping methods include denial, avoidance, behavioural, disengagement, substance use and self blame.^[8] Although these methods can provide short-term relief, they may lead to greater psychological distress in the long run.

Medical students may experience considerable stress and use different ways to cope.^[4,6] Sociocultural expectations, lack of mental health support, fear of stigma, reluctance to seek help and poor access to counselling may affect stress management.^[9] Gender may also influence stress perception and coping.^[10]

Therefore, the present study aimed to assess perceived stress, identify

common coping methods, investigate gender differences and to explore the relation between perceived stress and coping patterns among medical students.

Objectives of the Study

1. To assess the level of perceived stress among medical students
2. To evaluate coping strategies used by medical students
3. To examine gender differences in stress and coping
4. To determine the relationship between perceived stress and coping strategies

METHODS

Study design and setting: A descriptive, observational, cross-sectional study was conducted on undergraduate medical students of a tertiary care teaching hospital in Haryana, India. The study was done in the Department of Psychiatry from January 2025 to December 2025.

Study population and sample size: The study included a total of 300 undergraduate medical students. Calculation of sample size was based on an expected prevalence of around 50%, 95% confidence level and 5% margin of error and adjusted for possible non-response. Convenience sampling was used to recruit subjects. MBBS students from first year to final year who were willing to give informed consent, 18 years or above were included. Medical interns, students with known psychiatric illness and those with incomplete questionnaires were excluded.

Data Collection

Students were approached during class time and the aim and procedure of the study was explained. Participation was voluntary and written informed consent was obtained prior to data collection. The questionnaires were administered in an appropriate academic setting with sufficient time for completion.

Data were collected using sociodemographic proforma, Perceived Stress Scale-10 and Brief COPE Inventory. The age, gender, year of study and place of residence were recorded using a sociodemographic proforma.

Perceived stress was measured using the Perceived Stress Scale-10, which is a measure of participants' perceived life stress over the past month.^[11] The scale is composed of 10 items and the total score is ranging from 0 to 40. Scores were classified into low stress (0–13), moderate stress (14–26), and high stress (27–40). Higher score indicated higher level of perceived stress.

The coping styles adopted by the participants were assessed using the Brief COPE Inventory.^[8] It is a 28-item self-report instrument that evaluates different responses to stressful situations. For the present analysis, coping responses were categorized into adaptive and

maladaptive coping methods. Adaptive coping was typified by constructive strategies, including active coping, planning, acceptance and positive reframing, and maladaptive coping was typified by denial, self-blame, behavioural disengagement and substance use. The study forms did not capture the participants' identity. Confidentiality and anonymity were preserved throughout the data collection and analysis process.

Statistical analyses: Data were analyzed with IBM SPSS Statistics version 25. Continuous variables were presented as mean $\pm$ SD and categorical variables as frequency and percentage. The independent-samples t-test was used to assess gender differences. Pearson's correlation was used to investigate the association between stress and coping scores. Linear regression was used to investigate the contribution of coping methods to perceived stress. Statistical significance was set at $p < 0.05$.

RESULTS

Table 1. Demographic characteristics of the participants

Characteristic	Study participants (N=300)
Age, years, mean $\pm$ SD	21.1 $\pm$ 1.5
Male, n (%)	150 (50.0)
Female, n (%)	150 (50.0)

SD: Standard deviation.

Table 2. Distribution of participants according to perceived stress level

Perceived stress level	Participants (%)
Low stress	18
Moderate stress	62
High stress	20
Total	100

The majority of participants had moderate stress, while 20% had high stress.

Table 3. Comparison of perceived stress and coping scores according to gender

Variable	Male (n=150), mean $\pm$ SD	Female (n=150), mean $\pm$ SD	Total (N=300), mean $\pm$ SD	p-value
Perceived stress score	20.2 $\pm$ 5.7	23.4 $\pm$ 5.2	21.8 $\pm$ 5.6	<0.001
Adaptive coping score	28.6 $\pm$ 6.2	25.9 $\pm$ 5.8	27.2 $\pm$ 6.1	<0.001
Maladaptive coping score	18.3 $\pm$ 5.1	21.7 $\pm$ 5.4	20.0 $\pm$ 5.5	<0.001

Independent-samples t-test was applied. SD: Standard deviation. A p-value <0.05 was considered statistically significant.

Female students had significantly higher perceived stress and maladaptive coping scores, whereas male students had significantly higher adaptive coping scores.

Table 4. Correlation between perceived stress and coping scores

Variable	Perceived stress	Adaptive coping	Maladaptive coping
Perceived stress	1.00	-0.54	0.61
Adaptive coping	-0.54	1.00	-0.48
Maladaptive coping	0.61	-0.48	1.00

Values represent Pearson's correlation coefficients. The correlations of perceived stress with adaptive and maladaptive coping were statistically significant at $p < 0.01$.

Perceived stress was negatively correlated with adaptive coping and positively correlated with maladaptive coping.

Table 5. Linear regression model for perceived stress

Model	R	R ²	Adjusted R ²	Standard error of estimate	p-value
1	0.763	0.583	0.579	2.81	<0.001

The regression model showed that coping strategies explained 58.3% of the variance in perceived stress.

DISCUSSION

1. Demographic Characteristics

The study population represented young adults undergoing undergraduate medical training, with equal participation of male and

female students. Kumar et al. examined stress among undergraduate dental students, a comparable group exposed to demanding healthcare education, repeated assessments, clinical training, and performance expectations.^[10] Supe also assessed medical students from different academic years and observed that the experience of stress varied according to the stage of training.^[11] These comparisons indicate that the demographic profile of the present participants was appropriate for examining stress within a healthcare education setting. The equal gender distribution was an additional strength, as it allowed a balanced comparison of perceived stress and coping scores between male and female students.

2. Distribution of Participants According to Perceived Stress Level

The predominance of moderate to high perceived stress indicates that psychological strain was common among the participating medical students. Dyrbye et al. reported that depression, anxiety, burnout, and other forms of psychological distress were frequent during medical education.^[6] Firth identified academic workload, examinations, clinical responsibilities, and fear of failure as important sources of stress among medical students.^[3] Yusoff et al. also found that academic demands, examinations, and concerns regarding performance were major contributors to student stress.^[5] Together, these reports suggest that stress is closely linked with the structure and demands of medical training.

Supe observed that stress was particularly marked during the middle years of medical education and that academic factors were the most common sources.^[11] Students in the earlier years may experience difficulty adjusting to the large syllabus and new learning environment, whereas senior students may face greater clinical responsibility, examinations, career decisions, and concern about future practice.

Anuradha et al. reported an overall perceived stress score of 25.64 $\pm$ 5.44 among medical undergraduates, which was higher than the score observed in the present study.^[12] Satpathy et al. also reported higher stress scores among undergraduate medical students in Mumbai.^[13] Differences in stress levels may arise from examination schedules, academic year, institutional environment, teaching methods, accommodation, student support, and the timing of data collection. Despite these differences, all three studies indicate that a substantial proportion of medical students experience meaningful stress.

Abdulghani et al. reported stress in 63% of medical students, including severe stress in 25%.^[14] Ebrahim et al. found an even higher proportion of moderate to high stress among their participants.^[15] Variation in prevalence across studies may reflect differences in measurement tools, cut-off values, curriculum, cultural setting, and access to support. However, the common finding remains that stress is a major concern during medical education.

3. Perceived Stress According to Gender

Female students experienced greater perceived stress than male students. This pattern agrees with Anuradha et al., who reported higher mean stress scores among female medical students.^[12] Satpathy et al. also recorded higher perceived stress among females, although the absolute scores in their study were higher than those observed here.^[13]

Abdulghani et al. found stress among 75.7% of female students compared with 57% of males.^[14] Ebrahim et al. also identified female gender as a factor associated with greater perceived stress.^[15] Goebert et al. reported a higher burden of depressive symptoms among female medical trainees, while Singh et al. highlighted the presence of depression and psychological distress among medical students.^[7,9] These reports support the need to consider gender while assessing emotional well-being during medical training.

The difference may be related to social expectations, family responsibilities, safety concerns, emotional expression, available support, and willingness to report distress. Academic and institutional conditions may also affect male and female students differently. Therefore, higher stress among female students should not be explained only by individual or biological differences. It may reflect a combination of personal, social, and educational factors.

4. Adaptive Coping Strategies According to Gender

The greater use of adaptive coping among male students suggests a difference in the way stressful demands were managed. Adaptive coping includes active coping, planning, acceptance, positive

reframing, problem-solving, and seeking emotional or social support. These strategies allow students to understand the source of stress and take practical steps to manage it.

Neufeld and Malin found that coping behaviours among medical students varied according to gender and academic year.^[16] Their findings suggest that coping is not fixed and may change with personal experience, stage of training, and the type of stressor faced. However, gender differences in coping are not uniform across all populations and should be interpreted within the academic and social setting of each institution.

Al-Dubai et al. reported that active coping, religious coping, planning, positive reframing, and acceptance were commonly used by medical students.^[17] Sreeramareddy et al. also found frequent use of positive reframing, planning, acceptance, active coping, self-distraction, and emotional support.^[18] Salih et al. observed that students used several coping strategies while dealing with academic pressure, fear of not achieving their goals, and difficulty adjusting to medical education.^[19]

These reports show that students rarely depend on a single coping method. They may combine planning, acceptance, support-seeking, and other responses depending on the situation. Greater adaptive coping may help students feel more confident and capable of handling academic and personal demands, although it may not completely remove stress arising from heavy workloads or difficult institutional conditions.

5. Maladaptive Coping Strategies According to Gender

Female students showed greater use of maladaptive coping methods. These include denial, avoidance, self-blame, behavioural disengagement, and substance use. Such responses may reduce emotional discomfort for a short period but generally do not address the actual source of stress. Continued use may therefore allow the problem to remain unresolved.

Shaikh et al. reported that medical students used personal, social, emotional, and avoidance-based methods to manage academic stress.^[4] Sreeramareddy et al. also identified a wide range of coping responses, although substance use was among the less commonly reported strategies.^[18] Salih et al. found that coping behaviour changed according to academic pressure, fear of failure, and difficulty adapting to the demands of medical education.^[19]

The higher maladaptive coping observed among female students may partly contribute to their greater perceived stress. However, the relationship may operate in both directions. Avoidance, disengagement, or self-blame may increase stress by preventing effective problem-solving, while students who already experience greater stress may be more likely to withdraw or use unhelpful coping methods. Because both factors were measured at the same time, the direction of this relationship cannot be confirmed.

6. Relationship Between Perceived Stress and Coping Strategies

The negative relationship between adaptive coping and perceived stress indicates that constructive coping was associated with lower stress. Singh et al. reported that acceptance, positive reframing, humour, planning, and active coping were related to lower perceived stress among final-year medical students.^[20] Their study also found an association between perceived stress, psychological symptoms, and burnout. This supports the view that constructive coping may reduce some of the emotional effects of academic and clinical demands.

In contrast, maladaptive coping was positively related to perceived stress. Denial, self-blame, avoidance, substance use, and behavioural disengagement may leave the source of stress unchanged and reduce the likelihood of seeking timely support. Students who repeatedly use these methods may therefore remain distressed for longer periods.

The negative relationship between adaptive and maladaptive coping indicates that students who relied more on constructive methods generally used fewer unhelpful responses. However, these categories are not completely separate. The same student may use planning and acceptance in one situation but avoidance or self-blame in another. Coping may change according to the nature of the stressor, the level of control felt by the student, and the support available at that time.

The regression findings showed that coping strategies accounted for a substantial proportion of the variation in perceived stress. This

indicates that the way students respond to difficult situations is closely related to how stressful those situations are perceived to be. However, this association should not be interpreted as proof that coping strategies caused the observed level of stress. Factors such as examination timing, sleep, academic performance, personality, family support, financial concerns, physical health, residence, and year of study may also influence perceived stress.

These findings support the introduction of regular stress screening, confidential counselling, mentoring, peer-support programmes, sleep education, and training in active coping, planning, acceptance, positive reframing, and healthy help-seeking. Students who repeatedly use avoidance, self-blame, behavioural withdrawal, or substance use may require early psychological assessment and support. Gender differences should also be considered while planning student mental health services.

LIMITATIONS

The study was conducted at a single teaching institution and used convenience sampling, which may limit the general application of its findings. Stress and coping were assessed through self-reported questionnaires and may have been influenced by recall error or the tendency to provide socially acceptable responses. The timing of data collection in relation to examinations was not recorded. Students with known psychiatric illness and those who submitted incomplete questionnaires were excluded, which may have resulted in a lower observed stress burden. The broad classification of coping into adaptive and maladaptive groups may have hidden differences between individual Brief COPE subscales. In addition, the cross-sectional design measured stress and coping at one point in time and cannot establish a cause-and-effect relationship.

CONCLUSION

Perceived stress was common among medical students, with most participants experiencing moderate to high stress. Coping patterns were closely related to stress levels: adaptive strategies were associated with lower perceived stress, while maladaptive strategies were linked with a greater stress burden. Female students showed higher stress and greater use of maladaptive coping, indicating the need for focused support. Medical institutions should promote early identification, confidential counselling, peer support, and practical training in healthy coping skills. Strengthening these measures may improve students' emotional well-being, academic functioning, professional growth, and readiness to provide compassionate patient care.

DECLARATION

- **Conflict of interest:** None
- **Funding:** No external funding received
- **Ethical approval:** Obtained from the Institutional Ethics Committee
- **Informed consent:** Written informed consent was obtained from all participants
- **Confidentiality:** Participant anonymity and confidentiality were maintained
- **Author contribution:** Both authors contributed to the study and approved the final manuscript

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