

# Stressors and coping strategies among medical students in Jazan, Saudi Arabia: A cross-sectional study

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## ABSTRACT

**Background:** Medical education is known to be stressful and demanding. Medical students face a various stressors, which include academic pressure, fear of not reaching goals, and difficulty integrating into systems. This study aims to assess levels of stress and coping strategies among medical students at Jazan University in Saudi Arabia. **Materials and Methods:** A descriptive cross-sectional study was conducted that comprised of 240 students at Jazan Faculty of Medicine using a self-administrated questionnaire to obtain data on socio-demographic characteristics, perceived stress, stressors, and coping strategies. **Results:** Respondents mean age was  $22.08 \pm 1.82$  years and 52.7% were female. Of these, 51.9% were in preclinical years of study, 29.5% were in the second academic year, and 39.8% had a GPA greater than 4. Students stress level ranges from moderate to high. The most common causes were academic problems and frequency of examinations and work overload (92.1%), worrying about the future (61.8%), and lack of entertainment and time for recreation (58.9%). The most common coping strategy was recreational activity such as going to movies, watching TV, reading, sleeping, or shopping (36.5%). Mean perceived stress scale (PSS) and Brief-COPE scores were  $24.1 \pm 4.85$  and  $66.16 \pm 10.71$ , respectively. Participant age and PSS score have significant positive correlation ( $P < 0.05$ ). **Conclusion:** Stress level is moderate to high especially among students in preclinical years and among females. It is recommended to improve teaching and learning environment plus proper counseling and academic support. Also, active involvement of students in the educational process may help reduce academic stressors. **Plain Language Summary:** Medical students face a range of stressors due to the demands of study. This research found medical Students suffer stress level ranging from moderate to high. Most common causes of stress are academic problems, frequency of examinations, and work overload. Most common coping strategy performed by students was recreational activities like going to movies, watching TV, reading, sleeping, or shopping. It is recommended to improve teaching and learning environment plus proper counseling and academic support. Also, active involvement of students in the educational process may help reduce academic stressors.

**Keywords:** Academic performance, coping strategy, medical education, stress

## Introduction

Medical education is recognized as stressful and exhausting, with the substantial academic workload, which results into minimum chances for medical students to take break, relax, and recreate.<sup>[1]</sup>

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**How to cite this article:** Salih S, Mahmoud SS, Abudeyah MA, Albeladi FI, Mohsen WM, Hayyan AI, *et al.* Stressors and coping strategies among medical students in Jazan, Saudi Arabia: A cross-sectional study. J Family Med Prim Care 2023;12:2075-81.

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Received: 25-03-2023

Revised: 14-05-2023

Accepted: 14-06-2023

Published: 30-09-2023

### Access this article online

#### Quick Response Code:



**Website:**  
<http://journals.lww.com/JFMPC>

**DOI:**  
10.4103/jfmpc.jfmpc\_545\_23

Medical students face a range of stressors including the pressure of academia, fear of not reaching goals, and difficulty integrating into systems. Additionally, social, emotional, physical, and family issues are also faced by students.<sup>[2,3]</sup>

High levels of stress have a negative psychological and physical effects on medical students that in turn affect academic performance. These effects include reduced concentration, impaired judgment, loss of self-esteem, and feelings of fear, guilt, anxiety, or depression.<sup>[1,4,5]</sup> Stress can also affect academic and learning skills.<sup>[2,3]</sup> Medical students are expected to learn and master large amounts of knowledge and skills to maintain good academic results<sup>[4,5]</sup> and are placed under substantial stress in a highly competitive environment.<sup>[6]</sup>

Failure to adequately deal with stresses can affect academic performance and social relationships and may lead to depression,<sup>[7]</sup> but effective coping strategies have shown positive outcomes in reducing the negative effects of stress.<sup>[7]</sup>

Stress is defined as a “physiological non-specific reaction to external or internal demands.” Accordingly, stress is caused by factors like individual’s perception and reaction through emotions to stress rather than the stressors themselves.<sup>[8]</sup> Coping strategies are defined as frequently changing cognitive and behavioral efforts by an individual to control specific external or internal demands perceived to be taxing or exceeding the resources of the individual.<sup>[4]</sup> Active coping strategies include behavioral and psychological responses to changing circumstances or the stressor itself and include planning, instrumental support, venting, positive reframing, humor, and acceptability.<sup>[9]</sup> Avoidant coping strategies “lead people into activities (such as drug use) or mental states (such as withdrawal) that keep them from directly addressing stressful events.”<sup>[8,9]</sup>

Accordingly, there is a need to identify sources of stress among medical students, which have previously been reported to include demands from academics, exams, family problems, failure to cope, hopelessness, high psychological pressure, mental tension, excessive workload, lack of exercise, and poor diet.<sup>[1]</sup> In addition, management strategies for dealing with a range of stressors are required for student wellbeing and the delivery of high-quality medical education.<sup>[1]</sup>

A study conducted at Monash Medical University in Malaysia in 2009 demonstrated that the predominant reasons of stress among medical students were reduced sleep, financial problems, and issues related to family. Common strategies adopted by the medical students to cope with stress included meditation, adequate sleep, going out with friends, and counseling.<sup>[9]</sup>

In the Kingdom of Saudi Arabia (KSA), a cross-sectional study was performed to understand the stress perception and coping strategies used by first-year medical students at King Saud University college of Medicine, Riyadh, Kingdom of Saudi Arabia. The study revealed that there was high prevalence of stress

in medical students, which may affect academic performance and all aspects student wellbeing. This study also reported that there was high levels of stress in single male and female students.<sup>[10]</sup> A separate study used the dental environmental stress, perceived stress scale (PSS), and brief coping scale (BCS) to evaluate stress among dental students in King Saud University, Saudi Arabia, and reported self-efficacy and workload were positively and independently correlated with perceived stress scores.<sup>[11]</sup>

The aim of the present study is to assess levels of stress and coping strategies among medical students at Jazan University given the lack of previous studies in this cohort.

## Methods

### Study design and setting

This descriptive cross-sectional study was conducted at the Jazan Faculty of Medicine, Saudi Arabia, between 2019 and 2020.

### Population and sampling

During the study period, the total number of students at the Jazan Faculty of Medicine was 931 (478 females and 453 males). The present study comprised students from the second to sixth academic years and included both genders. The sample size required for the study was calculated according to the following formula:

$$n = \frac{Nz^2P(1-P)}{(N-1)d^2 + P(1-P)z^2}$$

where N is the total number of eligible students, d is degree of precision, P is the percentage of primary indicator, and z is standard normal distribution. Giving the following result for this study cohort:

$$n = \frac{(931) \times (1.69)^2 \times 0.5(1-0.5)}{(931-1) \times (0.05)^2 + 0.5(1-0.5) \times (1.69)^2} = 218.61 \approx 219$$

The required number of additional study participants to account for a 10% nonresponse rate was calculated as follows:

$$\frac{219 \times 10}{100} = 21.9 \approx 22$$

Accordingly, the target sample size was 241 (219 + 22) students form all classes using stratified random sampling according to year of study.

### Data collection tools

The present study used a self-administrated questionnaire that included questions covering socio-demographic characteristics, perceived stress, stressors, and coping strategies. The second part of the questionnaire included the Arabic version of PSS that has previously been used in a study conducted in Saudi Arabia.<sup>[12]</sup>

The PSS is a 10-item questionnaire that evaluates the effect of different situations on the perception of stress. Each question is scored from 0 (never) to 5 (very often) with total scores ranging from 0 to 40, with higher scores indicating greater perceived stress.<sup>[12]</sup> The third part of the questionnaire listed 15 causes of stress identified from review of previous literature. The fourth part included the Brief-COPE questionnaire, which focuses on identifying the nature of coping strategies executed by individuals. The Brief-COPE questionnaire is a 28-item questionnaire designed by Dr. Carver at the University of Miami. Scores range from 1 to 4 with higher scores indicating greater effort to deal with stress.<sup>[13,14]</sup> The questionnaire was validated by conducting a pilot study comprising 33 students. Information from the pilot study was used to refine and modify the questionnaire. Cronbach's alpha was used for the evaluation of the internal consistency of the questionnaire yielding a value of 0.747.

### Ethical considerations

The study obtained ethical approval from the Standing Committee for Scientific Research, approval number REC-44/06/434. Informed written consent was obtained from medical students before participation in the present study. The importance and benefits of the study were explained, and students had the right to withdraw at any time. All collected data were used for research purposes only and remained confidential.

### Data analysis

For data analysis, SPSS version 25 was used. Qualitative data were expressed as numbers and percentages. Quantitative data were presented as the mean and standard deviation (SD). The Mann-Whitney and Kruskal-Wallis tests were used to assess relationships between non-parametric variables. The independent sample *t*-test and one-way ANOVA test were used to determine the relationship between parametric variables. Spearman's correlation test was used to identify significant correlations between variables. *P* values less than 0.05 were considered statistically significant.

This work has been reported in line with the Strengthening The Reporting Of Cohort Studies in Surgery (STROCSS) guidelines.<sup>[15]</sup>

## Results

### Demographic characteristics

Participating students mean age was  $22.08 \pm 1.82$  years and 52.7% were female. Of these, 51.9% were in preclinical years of study, 29.5% were in the second academic year, and 39.8% had a GPA greater than 4. More than half (54.8%) were living in rural areas and 90.5% were living with family or relatives. Table 1 presents the study participants' demographic characteristics.

### Stress factors

The most common causes of stress among the study participants were academic problems, frequency of examinations, and work

**Table 1: Distribution of study participants according to socio-demographics, academic year, GPA, and living situation (n=241)**

Variable	n (%)
Age	
Preclinical years	125 (51.9)
Clinical years	116 (48.1)
(Mean±SD)	22.08±1.82
Gender	
Male	114 (47.3)
Female	127 (52.7)
Academic year	
2 <sup>nd</sup>	71 (29.5)
3 <sup>rd</sup>	54 (22.4)
4 <sup>th</sup>	48 (19.9)
5 <sup>th</sup>	39 (16.2)
6 <sup>th</sup>	29 (12)
GPA	
<2	1 (0.4)
2–3.5	78 (32.4)
3.6–4	66 (27.4)
>4	96 (39.8)
Residence	
Village	132 (54.8)
City	109 (45.2)
Residential status	
Living alone	9 (3.7)
With family or relatives	218 (90.5)
With friends	14 (5.8)

overload (92.1%); worrying about the future (61.8%); and lack of entertainment and time for recreation (58.9%). Other stress factors included high parental expectation (39%), financial problems (37.3%), and family problems (34.4%). Other stress factors were loneliness (32.8%), competition with peers (29%), relationship with the opposite sex (14%), Qat use (10.8%), and alcohol consumption or drug abuse (7.9%). Figure 1 illustrates the frequency of common stressors among the study participants.

### Coping strategies

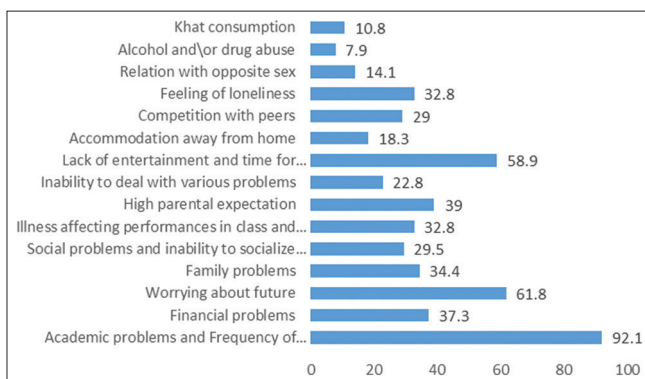
The most common coping strategies used by the study participants were: recreation such as going to the movies, watching TV, reading, daydreaming, sleeping, or shopping (36.5%); trying to find comfort in one's religion or spiritual beliefs (34%); learning to live with stress (27.4%); and thinking hard about what steps to take (26.1%). Table 2 shows the number and frequency distribution of coping strategies reported by study participants.

### Participants Perceived Stress Scale (PSS) and Brief Coping Scale (BCS) scores

The mean PSS and Brief-COPE questionnaire scores were  $24.1 \pm 4.85$  and  $66.16 \pm 10.71$ , respectively. This indicate moderate to high level of stress. A significant positive correlation was observed between participant age and PSS score [ $P < 0.05$ ; Figure 2]. A nonsignificant positive correlation was observed between participant age and Brief-COPE questionnaire score [ $P > 0.05$ ; Figure 3]. A highly significant positive correlation

**Table 2: Number and frequency of reported coping methods**

Coping strategy	I haven't been doing this at all n (%)	A little bit n (%)	A medium amount n (%)	I've been doing this a lot n (%)
I've been turning to work or other activities to take my mind off things	52 (21.6)	88 (36.5)	61 (25.3)	40 (16.6)
I've been concentrating my efforts on doing something about the situation I'm in.	54 (22.4)	106 (44)	60 (24.9)	21 (8.7)
I've been saying to myself "this isn't real."	102 (42.3)	72 (29.9)	46 (19.1)	21 (8.7)
I've been using alcohol or other drugs to make myself feel better.	218 (90.5)	9 (3.7)	10 (4.1)	4 (1.7)
I've been getting emotional support from others.	48 (19.9)	76 (31.5)	72 (29.9)	45 (18.7)
I've been giving up trying to deal with it.	64 (26.6)	77 (32)	56 (23.2)	44 (18.3)
I've been taking action to try to make the situation better.	20 (8.3)	68 (28.2)	95 (39.4)	58 (24.1)
I've been refusing to believe that it has happened.	102 (4.3)	86 (35.7)	32 (13.3)	21 (8.7)
I've been saying things to let my unpleasant feelings escape.	64 (26.6)	84 (34.9)	50 (20.7)	43 (17.8)
I've been getting help and advice from other people.	53 (22)	93 (38.6)	56 (23.2)	39 (16.2)
I've been using alcohol or other drugs to help me get through it.	196 (81.3)	28 (11.6)	7 (2.9)	10 (4.1)
I've been trying to see it in a different light, to make it seem more positive.	30 (12.4)	91 (37.8)	74 (30.7)	56 (19.1)
I've been criticizing myself.	41 (17)	87 (36.1)	56 (23.2)	57 (23.7)
I've been trying to come up with a strategy about what to do.	35 (14.5)	70 (29)	86 (35.7)	50 (20.7)
I've been getting comfort and understanding from someone.	68 (28.2)	84 (34.9)	53 (22)	36 (14.9)
I've been giving up the attempt to cope.	12 (46.5)	80 (33.2)	37 (15.4)	12 (5)
I've been looking for something good in what is happening.	31 (12.9)	84 (34.9)	83 (34.4)	43 (17.9)
I've been making jokes about it.	57 (23.7)	89 (36.9)	61 (25.3)	34 (14.1)
I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	30 (12.4)	57 (23.7)	66 (27.4)	88 (36.5)
I've been accepting the reality of the fact that it has happened.	31 (12.9)	83 (34.4)	77 (32)	50 (20.7)
I've been expressing my negative feelings.	51 (21.3)	87 (36.3)	63 (26.3)	40 (16.3)
I've been trying to find comfort in my religion or spiritual beliefs.	30 (12.4)	62 (25.7)	67 (27.8)	82 (34)
I've been trying to get advice or help from other people about what	46 (19.1)	93 (38.6)	65 (27)	37 (15.4)
I've been learning to live with it.	15 (6.2)	72 (29.9)	88 (36.5)	66 (27.4)
I've been thinking hard about what steps to take.	26 (10.8)	66 (27.4)	86 (35.7)	63 (26.1)
I've been blaming myself for things that happened	48 (19.9)	85 (35.3)	51 (21.2)	57 (23.7)
I've been praying or meditating	28 (11.6)	60 (24.9)	78 (32.4)	75 (31.1)
I've been making fun of the situation.	73 (30.3)	76 (31.5)	49 (20.3)	43 (17.8)

**Figure 1: Distribution of reported stressors**

was observed between PSS and Brief-COPE scores [ $r = 0.23$ ;  $P < 0.001$ ; Figure 4].

Participants in preclinical years and female students had significantly higher PSS scores ( $P < 0.05$ ; [Table 3]). On the other hand, participant academic year, GPA, and residential situation were nonsignificantly correlated with PSS ( $P > 0.05$ ). Participant age, gender, academic year, GPA, and residential situation were non-significantly correlated with Brief-COPE scores [ $P > 0.05$ ; Table 4].

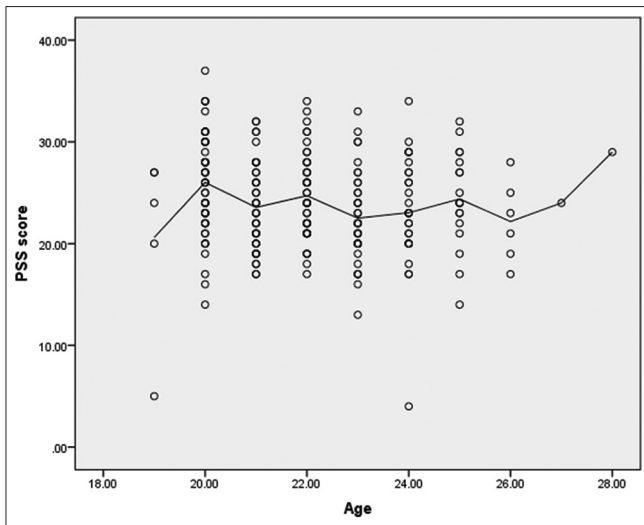
## Discussion

### Prevalence of stress

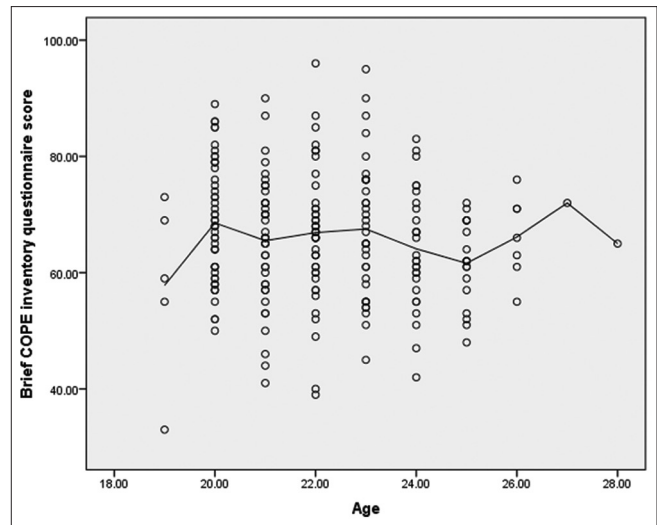
Students in preclinical years who had a mean PSS score of  $24.88 \pm 5.1$  has highest prevalence of stress. This result corroborates those of a previous study conducted at Jazan medical college<sup>[16]</sup>; however, our results are in contrast with those of a study conducted in Jeddah that reported no difference in levels of stress between preclinical and clinical students.<sup>[17]</sup> Furthermore, the prevalence of stress was higher in female students than male students (mean PSS score; female students,  $25.37 \pm 4.29$ ; male students,  $22.68 \pm 5.06$ ). This result corroborates the results of a previous study conducted at Jizan medical college that show females in general are affected more by stress.<sup>[16]</sup>

### Stress factors

In the present study, the five most common causes of stress among medical students included academic problems and frequency of examinations and work overload, worrying about the future, lack of entertainment and time for recreation, inability to deal with various problems, and financial problems. This result is in-keeping with those of a previous study conducted in Pakistan and a qualitative study from the Medical Faculty in Malaysia. Academic and



**Figure 2:** Spearman's correlation analysis of participant age and PSS score ( $r = 0.15$ ;  $P = 0.017$ )



**Figure 3:** Spearman's correlation analysis between participant age and Brief-COPE score ( $r = 0.09$ ;  $P < 0.151$ )

**Table 3: Relationship between PSS scores and socio-demographics, academic year, GPA, and residential status (n=241)**

Variable	PSS score (mean±SD)	Test	P
Age			
Pre-clinical years	24.88±5.1	2.58*	0.01
Clinical years	23.26±4.43		
(Mean±SD)	24.1±4.85		
Gender			
Male	22.68±5.06	4.59*	<0.001
Female	25.37±4.29		
Academic year			
2 <sup>nd</sup>	24.8±5.19	4**	0.135
3 <sup>rd</sup>	24.98±5.03		
4 <sup>th</sup>	23.20±3.42		
5 <sup>th</sup>	23.58±4.41		
6 <sup>th</sup>	22.92±5.91		
GPA			
<2	21	3**	0.445
2–3.5	23.72±4.05		
3.6–4	24.86±5.27		
>4	23.92±5.14		
Residence			
Village	23.91±5.11	0.94*	0.354
City	24.34±4.52		
Residential status			
Living alone	22.12±3.09	2**	0.324
With family or relatives	24.15±4.83		
With friends	24.5±5.88		

\*Mann–Whitney test; \*\*Kruskal–Wallis test

concerns related to psychosocial were the most common sources of stressors. In these previous studies, frequency of examinations, vastness of academic curriculum, worrying about the future, becoming a doctor, and performance in periodic examinations were the most frequent and impactful sources of stress.<sup>[4,18]</sup>

Previous recommendations have suggested modifications to the medical curriculum to balance between content and time

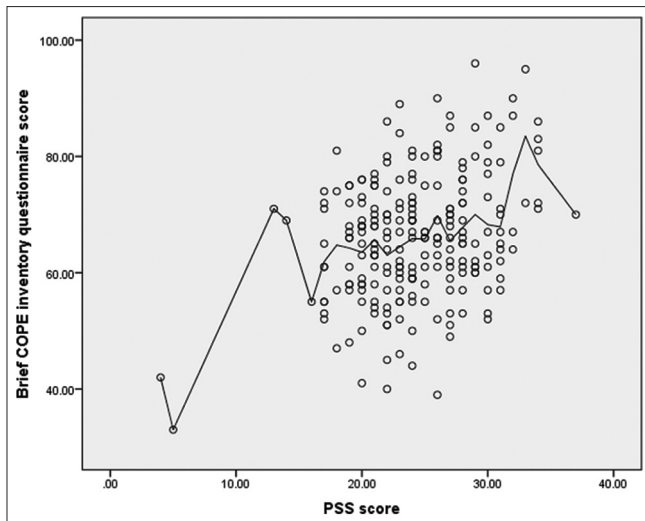
distribution, more student-friendly campuses, modification teaching and examination methods, setting up of a student counseling center on the campus with competent and experienced staff, facilities improvement for extracurricular activities on campus to reduce psychological stress, and implementing and strengthening a tutorial system in medical colleges.<sup>[16]</sup>

In our study participants, academic stressors were more prevalent, which indicate frequent examinations should be avoided, and the teaching and learning environment should be favorable to a relaxed learning environment with more emphasis on active teaching and learning activities. We believe that if students are actively involved in the educational process, then this may help to reduce academic stressors, with appropriate counseling and academic support which would likely play important roles. Other potential changes include starting of student counseling body, increased sports activities, and other extracurricular activities at the medical college.<sup>[17]</sup>

### Coping strategies

Most of the students reported that counseling and meditation, such as yoga, taichi, or prayers, were the most productive ways to cope up with stress. Furthermore, students also reported that sufficient sleep and going out with friends were among the best ways to deal with stress. Few students said that the use of aromatherapy helps them to manage stress.

In this study, students identified other strategies to cope up with stress, these strategies were shouting, singing, management of time, dancing, crying, massage, vacation, shopping, drinking adequate water, watching cartoons or comedies, chocolate eating, psychological treatment, positive approach, and breathing. Others reported coping strategies included maintaining a healthy lifestyle, such as having a balanced diet, regular exercise, and avoiding consumption of tobacco and alcohol, or practicing meditation, such as yoga, taichi, or listening to soft music.



**Figure 4:** Spearman's correlation analysis between PSS and Brief-COPE scores ( $r = 0.23$ ;  $P = 0.001$ )

**Table 4: Relationships between Brief-COPE score and participant socio-demographics, academic year, GPA, and residential status (n=241)**

Variable	Brief COPE inventory questionnaire (mean±SD)	Test	P
Age			
Pre-clinical years	67.25±1.49	1.6*	0.111
Clinical years	65±9.72		
(Mean±SD)	66.16±10.71		
Gender			
Male	65.11±9.94	1.39**	0.163
Female	67.09±11.1		
Academic year			
2 <sup>nd</sup>	67.40±10.74	1.32**	0.261
3 <sup>rd</sup>	67.05±12.49		
4 <sup>th</sup>	66.70±9.51		
5 <sup>th</sup>	64.64±10.21		
6 <sup>th</sup>	62.46±8.88		
GPA			
>2	75	1.28**	0.28
2–3.5	64.85±10.3		
3.6–4	68.06±10.87		
<4	65.85±10.88		
Residence			
Village	65.31±10.48	1.3*	0.1921
City	67.16±10.94		
Residential status			
Living alone	64.22±6.68	1.11**	0.131
With family or relatives	65.98±10.93		
With friends	70.07±8.95		

\*Independent sample t-test; \*\*One-way ANOVA test

Surprisingly, one student reported salt intake as a means of preventing stress.<sup>[4]</sup>

Table 3 depicts the responses of the study participants to the 28 items of the BCS. The most frequently employed active stress-coping strategies was finding comfort in religion or spiritual beliefs including praying or meditating, learning to live with stress, and considering and planning actions to reduce stress. These

findings are consistent with the study results conducted in 2012 among medical residents.<sup>[19]</sup>

The most commonly reported coping strategies in the present study were self-distraction techniques such as going to movies, watching TV, reading, daydreaming, sleeping, shopping, criticizing, or self-blaming. Similar findings were reported by a previous study conducted in Saudi Arabia.<sup>[19]</sup>

### Limitations

This research investigated many stress factors and coping strategies among medical students. It also used standardized tools that are validated and previously used, which strengthens the comparability and generalizability of results. However, it is limited by the descriptive nature of research. No cause and effect factors can be defined and also recall and selection bias can be limitations.

### Conclusion

Stress level is high especially among students in preclinical years and among females. The most stressors are academic problems and frequency of examinations and work overload. These findings indicate the need to improve environment related to teaching and learning. We believe that students active involvement in the educational process may help in reducing academic stressors, with appropriate counseling and academic support likely to play important roles. Other potential changes include the starting up of a student counseling body, increased sports activities, and other extracurricular activities at the medical college.

### Ethical approval

Ethical approval was obtained from the Standing Committee for Scientific Research with approval number REC-44/06/434.

### Consent

Informed written consent with waiver of identity was obtained from medical students before participation in the study. All collected data were used for research purposes only and remained confidential.

### Acknowledgments

The authors would like to acknowledge all the medical students who contributed their valuable time to this research.

The authors would also like to thank Enago ([www.enago.com](http://www.enago.com)) for the English language review.

All authors has contributed equally to the conceptualization, conduction, and manuscript writing and all authors reviewed and approve the final version of this article.

### Financial support and sponsorship

Nil.

## Conflicts of interest

This project was self-funded.

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