# PERCEIVED STRESS AMONG MEDICAL STUDENTS AT NORTHERN BORDER UNIVERSITY, SAUDI ARABIA

**Mohamed M Abd El Mawgod[1,2]*, Atheer Alhadi A Alruwaili[3], Rahaf Muslih N Almatrafi[3], Maram Mohammed A Alenezi[3], Fai Salamah Alenazi[3]**

**[1]Department of Family and Community Medicine, College of Medicine, Northern Border University, Arar, Saudi Arabia; [2]Department of Public Health and Community Medicine, Faculty of Medicine, Al Azhar University, Assiut, Egypt; [3]Medical student, College of Medicine, Northern Border University, Arar, Saudi**

Manuscrito recibido: 06/12/2024
Manuscrito aceptado: 15/12/2024

*Corresponding Author: Mohamed M Abd El Mawgod, Department of Family and Community Medicine, College of Medicine, Northern Border University, Arar, Saudi Arabia and Department of Public Health and Community Medicine, Faculty of Medicine, Al Azhar University. Assiut, Egypt

Correo-e: mossa20072006@yahoo.com

## Introduction

There is increasing evidence that the medical sciences have seen a rapid increase in medical knowledge. As they progress from a beginner to a skilled and knowledgeable physician, medical students encounter a variety of stresses.(Baig et al., 2016)

Academic achievement can be influenced by numerous important aspects, such as stress levels, an environment that supports learning, support from parents and teachers, student involvement, and worry regarding delays. (Wijaya et al., 2023)

One of the main causes of students' poor study performance is stress. Students who are exposed to stressful situations regularly suffer from poor physical, emotional, and mental health. Medical students experience the highest degree of stress among all academics. (Aamir, 2017)

The younger generation of students is constantly more susceptible to difficult life circumstances, particularly while pursuing higher educational opportunities in a setting where competition is fierce. (Saipanish, 2003) At different phases of their education, medical students who experience ongoing stress are linked to a variety of health issues. (Hill et al., 2018)

A survey conducted in Saudi Arabia found that 85.5% of medical students reported having moderate to severe stress. (Al-Shahrani et al., 2023) Additionally, a survey conducted among Umm Al-Qura University's medical and non-medical students in Makkah, Saudi Arabia, found that thirty-eight respondents experienced psychological stress. (Mirza et al., 2021)

Hill et al. In the United States noted that stress was linked to a less supportive and more competitive learning environment for medical students, and difficulty managing their other responsibilities in life with medical education. (Hill et al., 2018)

Schools, families, and society at large must pay attention to and take particular steps to alleviate stress in students because it is a mental health issue, especially for medical students. (Ngoc and Tuan, 2024)

This study is the first to assess stress among medical students, college of Medicine, Northern Border University, and potential stressors. The current study looked into medical students' perceptions of their stress levels as well as the causes and origins of stress at Northern Border University's faculty of medicine. Our findings would be important enough for educators and institutional policymakers to implement measures that could lessen stress and modifiable causes of stress.

## Methods

The survey was conducted from April 1, 2004, to October 30, 2024, at the College of Medicine Northern Border University, Arar, Saudi Arabia.

The College of Medicine uses a modular framework, with summative assessments following each module and assessment examinations one or two based on module length. Both multiple-choice questions (MCQs) and short answer questions (SAQs) make up the written test.

The objective structured practical exam (OSPE) is used for preclinical years, and the objective structured clinical exam (OSCE) is used for clinical years. Both short and extended cases are employed in a few clinical modules. Thus, a variety of assessment instruments are employed at the College of Medicine.

In the College of Medicine, in each class, there are 25–40 students, and we encouraged all 250 students to take part in the survey. The participants were recruited conveniently from each class by online questionnaire using a variety of social media platforms such as WhatsApp, and Instagram,

The possible stresses listed in the study questionnaire were drawn from earlier research. (Shah et al., 2010, Sreeramareddy et al., 2007, Gazzaz et al., 2018, El-Masry et al., 2013).

### Data Collection tools

Information on age, gender, marital status, academic grade, smoking habits, father and mother education, work, GPA, and family income.

We employed the Perceived Stress Scale (PSS-14) to measure perceived stress levels. It was developed and validated by Cohen et al. in 1983, with Cronbach's Alpha 0.85. (Cohen et al., 1983)

PSS consists of 14 questions that assess feelings and thoughts during the previous month. A five-point Likert scale, with 0 denoting "Never" and 4 denoting "Very Often," is used to rate each item. The Likert scale, which runs from 0 to 4, is inverted for questions 4, 5, 6, 7, 9, 10, and 13, with 0 denoting Very Often and 4 denoting Never. The current study used the Arabic-validated version of PSS (Almadi et al., 2012)

The total score ranges from 0 to 56. Stress levels were calculated by adding up all the items: low stress ranged from 0 to 18, moderate stress ranged from 19 to 37, and high stress ranged from 38 to 56.

The likely stressors utilized in the study were taken from a related study conducted in Pakistan. (Shah et al., 2010) Thirty-three stressors are categorized for measuring: psychosocial, health-related, and academic stress and the students. The frequency of occurrence of each stressor was labeled as never, rarely, sometimes, often, and always; The corresponding scores were 1, 2, 3, and 4.

To assess the questionnaire, identify any necessary changes, and determine the time required to gather data, a pilot study was conducted on 20 students who were not included in the study results; and nothing has been changed.

Then, a Google Forms-based online survey was made available to second through sixth-year medical students through social media platforms namely WhatsApp, and Snapchat.

### Sample size

With a 0.05 margin of error and an estimated 59% prevalence (Gazzaz et al., 2018), the sample size was calculated to be 243 using the Epi Info program version 7.2.2.0. The sample size was adjusted to 250.

### Statistical analysis

Data was analyzed using IBM SPSS V.22. Categorical data were presented as frequency and percentage while numerical data was analyzed as mean±SD.

### Ethical clearance

The study received approval from Northern Border University's local bioethical committee (HAP-09-A-043) on May 23, 2024, with decision number 61/24/H.

## Results

Table 1 The survey involved 250 students, whose mean age was 21.8±1.5 years. Of them, more than half (142, or 56.8%) were female, the majority were single 246 (98.4%), half of them (125, or 50%) had a GPA of at least four; more than 60% of mothers and fathers have a secondary education; slightly less than 50% of mothers, and little more than fifty percent of fathers work in government; and only 10% of the students were smokers. Roughly two-thirds of participants said that family income suffices.

Fig. 1 The distribution of stress among the studied participants is shown in Fig.1 Most of the students experience moderate (75.2%) stress levels.

Table 2 displays the distribution of the participants' academic and psychosocial stressors. Concerning the academic stressors exam frequency was reported more frequently (171, 62.4%); followed by exam performance (140, 56%); the educational curriculum (128, 51.2%); dissatisfaction with both class lectures and lack of leisure time (113, 45.2%); fear of becoming a physician (109, 43.6%); peer competition (89, 35.6%), lack of special guidance from the college (85, 34%); insufficient educational resources (30.2%)and practical performance (27.2%).

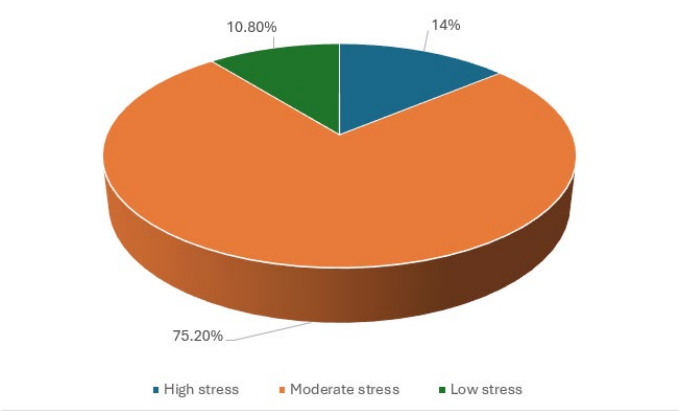


**Figure 1.** Stress distribution among the study participants.

Regarding the psychosocial stressors, the world political situation was mentioned most often (118,47.2%); followed by high parental expectation (100, 40%); loneliness (98,39.2%); inadequate entertainment in the city and at the university (87, 34.8%); interaction with the other gender (64,25.6%); having family problems (60, 24%); financial strains (55, 22%), and having trouble in reading textbooks (52, 20.8%).

A small percentage of respondents mentioned stressors related to not being able to communicate with peers (46, 18.4%); living away from home (36, 14.4%); living conditions in dorms (30, 12%); not having a personal interest in medicine (31, 11.6%); having difficulty returning home (27, 10.8%); being a member of a student association, and worrying about the future (26, 10.4%); and adjusting with roommates (24, 9.6%).

Table 3 The health-related stressors among the studied respondents are shown in Table 3. The most common cited stressors are sleeping difficulty (126, 50.4%), followed by nutrition (100, 40%), class attendance (82, 32.8%), physical activity (76, 30.4%), the quality of the food at the university restaurant (54, 21.6%), smoking (18, 7.2), and physical disabilities (17, 6.8%).

## Discussion

The study shows that the average PSS of the students under study is 28.6±7.6. This is consistent with comparable research in Egypt (31.8 ± 8.6) (Ebrahim et al., 2024), Saudi Arabia (28.5±3.8) (Gazzaz et al., 2018) and India (27.98 + 3.09) (Chaudhuri, 2019). However, this is higher than that demonstrated in Saudi Arabia. (Khalil et al., 2020), and China (Song et al., 2020), where the mean PSS values were 22.97 ± 5.80, and 16.29 ± 5.71. The possible explanation for this

**Table 1**. Demographic characteristics of the studied participants.

| **Item** | | **N (%)** |
|---|---|---|
| Age | Mean ± SD= 21.8±1.5 | |
| Sex | Male | 108(43.2) |
| | Female | 142(56.8) |
| Academic level | 2nd year | 47(18.8) |
| | 3rd year | 51(20.4) |
| | 4th year | 50(20) |
| | 5th year | 48(19.2) |
| | 6th year | 54(21.6) |
| Marital status | Single | 246(98.4) |
| | Married | 4(1.6) |
| *GPA | 2.5-2.99 | 7(2.9) |
| | 3-3.49 | 9(3.6) |
| | 3.50-3.99 | 33(13.2) |
| | 4-4.49 | 92(36.8) |
| | 4.5 and above | 109(43.5) |
| Smoking habits | Smoker | 25(10) |
| | Ex-smoker | 9(3.6) |
| | Non-smoker | 216(86.4) |
| Mother education | Uneducated | 27(10.8) |
| | Primary | 18(7.2) |
| | Intermediate | 45(18) |
| | Secondary | 160(64) |
| Mother job | Housewife | 109(43.6) |
| | Governmental | 118(47.2) |
| | Private | 9(3.6) |
| | Other | 14(5.6) |
| Father education | Uneducated | 18(7.2) |
| | Primary | 16(6.4) |
| | Intermediate | 60(24) |
| | Secondary | 156(62.4) |
| Father job | Unemployed | 6 (2.4) |
| | Governmental | 131(52.4) |
| | Private | 11(4.4) |
| | Other (Freelancer) | 102(40.8) |
| Family income | Unsatisfactory | 69(27.6) |
| | Enough | 168(67.2) |
| | More than enough | 13(5.2) |

*GPA=Grade point average

**Table 2**. Distribution of Academic and psychosocial stressors among students.

| Stressors | Never No (%) | Almost never No (%) | Sometimes No (%) | Often No (%) | Very often No (%) |
|---|---|---|---|---|---|
| Academic stressors | | | | | |
| Frequency of examination | 11(4.4) | 15(6) | 63(25.2) | 93(37.2) | 68(27.2) |
| Performance in Exams | 18 (7.2) | 19(7.6) | 73(29.1) | 79(31.6) | 61(24.4) |
| Academic Curriculum | 16(6.4) | 24(9.6) | 82(32.8) | 75(30) | 53(21.2) |
| Dissatisfaction with class lectures | 18(7.2) | 27(10.8) | 92(36.8) | 73(29.2) | 40(16) |
| Lack of time for recreation | 28(11.2) | 28(11.2) | 81(32.4) | 60(24) | 53(21.2) |
| Fear of becoming a physician | 34(13.6) | 35(14) | 72(28.8) | 55(22) | 54(21.6) |
| Competition with Peers | 44(17.6) | 39(15.6) | 78(31.2) | 51(20.4) | 38(15.2) |
| Lack of special guidance from the college | 41(16.4) | 48(19.2) | 76(30.4) | 44(17.6) | 41(16.4) |
| Inadequate learning materials | 37(14.8) | 52(20.8) | 85(34) | 46(18.4) | 30(12) |
| Performance in practical | 60(24) | 46(18.4) | 75(30) | 44(17.6) | 25(10) |
| Psychosocial stressors | | | | | |
| Political situation in the world | 36(14.4) | 27(10.8) | 69(27.6) | 55(22) | 63(25.2) |
| High Parental Expectations | 32(12.8) | 44(17.6) | 74(29.6) | 63(25.2) | 37(14.8) |
| Loneliness | 35(14) | 36(14.4) | 81(32.4) | 70(28) | 28(11.2) |
| Lack of entertainment in the institution and the city | 44(17.6) | 40(16) | 79(31.6) | 45(18) | 42(16.8) |
| interaction with the other gender | 45(18) | 54(21.6) | 87(34.8) | 49(19.6) | 15(6) |
| Family Problems | 77(30.8) | 49(19.6) | 64(25.6) | 45(18) | 15(6) |
| Financial strain | 83(33.2) | 41(16.4) | 71(28.4) | 34(13.6) | 21(8.4) |
| Difficulty in reading textbooks | 72(28.8) | 51(20.4) | 75(30) | 37(14.8) | 15(6) |
| Inability to communicate with peers | 85(34) | 43(17.2) | 76(30.4) | 32(12.8) | 14(5.6) |
| Accommodation away from home | 150(60) | 23(9.2) | 41(16.4) | 26(10.4) | 10(4) |
| Living conditions in the hostel | 157(62.8) | 22(8.8) | 41(16.4) | 20(8) | 10(4) |
| Lack of personal interest in medicine | 138(55.2) | 28(11.2) | 55(22) | 18(7.2) | 11(4.4) |
| Worrying about the future | 145(58) | 40(16) | 39(15.6) | 19(7.6) | 7(2.8) |
| Difficulty in the journey back home | 123(49.2) | 47(18.8) | 53(21.2) | 18(7.2) | 9(3.6) |
| Being a member of a student association | 156(62.4) | 27(10.8) | 41(16.4) | 20(8) | 6(2.4) |
| Adjustment with roommate/s | 161(64.3) | 26(10.4) | 39(15.5) | 17(6.8) | 7(2.8) |

**Table 3.** Health-related stressors.

| Health-related stressor | Never No (%) | Rarely No (%) | Sometimes No (%) | Often No (%) | Very often No (%) |
|---|---|---|---|---|---|
| Sleeping Difficulties | 22(8.8) | 24(9.6) | 78(31.2) | 79(31.6) | 47(18.8) |
| Nutrition | 29(11.6) | 48(19.2) | 73(29.2) | 67(26.8) | 33(13.2) |
| Class Attendance | 28(11.2) | 43(17.2) | 97(38.8) | 55(22) | 27(10.8) |
| Physical exercise | 54(21.6) | 44(17.6) | 76(30.4) | 52(20.8) | 24(9.6) |
| Food quality in the university restaurant | 97(38.8) | 35(14) | 64(25.6) | 29(11.6) | 25(10) |
| Smoking | 175(70) | 14(5.6) | 44(17.6) | 13(5.2) | 4(1.6) |
| Physical disabilities | 181(72.4) | 14(5.6) | 37(14.8) | 13(5.2) | 5(2) |

disparity is that students at Northern Border University reside in an area of Saudi Arabia with limited access to recreational opportunities.

According to the study findings, most students (89.8%) felt moderate to severe stress. This is in line with the finding of Al-Sharani et al. who discovered that the majority of medical students (85.5%) in Abha, Saudi Arabia, had moderate to severe stress (Al-Shahrani et al., 2023), Al-Dabal et al. who found that most students (96.3%) in Dammam, Saudi Arabia, have been stressed out by their studies. (Al-Dabal et al., 2010), and in Sudan (86.2%) of medical students experienced moderate to severe stress (Ibrahim et al., 2024). In Egypt, Al-Masry et al. observed that students in their last year (6th-year students) had a much higher frequency of severe stress (82.5%) (El-Masry et al., 2013), Ebrahim et al. reported that 93.2% of medical students experienced moderate to high stress. (Ebrahim et al., 2024)

Contrary to Gazzaz et al. 59.2% of medical students in Jeddah, Saudi Arabia, reported experiencing stress. (Gazzaz et al., 2018), Mirza et al. in Makka 37.6%(Mirza et al., 2021), Rahman et al. in Al Ahsaa (53%) (Rahman et al., 2013), 47% in Bahrain (Al Ubaidi et al., 2018), and 47.3% of nursing students in Vietnam reported mild to extremely severe stress.(Ngoc and Tuan, 2024). This disparity could be explained by

Concerning the possible academic stressors, the study demonstrates that more than fifty percent of participants cited increased exam frequency, exam performance, and educational curriculum often\ most often. More than 40% indicated dissatisfaction with class lectures, lack of leisure time, and fear of becoming a physician, while little more than one-third stated peer competition and lack of guidance. Approximately thirty percent mentioned insufficient learning materials, whereas more than a quarter reported performance in practical.

Regarding potential psychosocial stressors, slightly less than half highlighted political issues often/, approximately forty percent indicated high parental expectations and loneliness, about one-third said lacked entertainment, and a quarter mentioned interaction with another gender. Approximately one-fifth mentioned family, financial, and test-book reading challenges.

Stressors associated with the inability to communicate with peers, living away from home, living in dorms, not having a personal interest in medicine, having trouble going home, belonging to a student association and worrying about the future, and adjusting with roommates were cited by only a small percentage of respondents.

In Abha, Saudi Arabia, most medical students (97.1%) indicated they experienced moderate to severe stress because of academic pressure such as assessments, grades, and grading schemes. Education and learning (93.1%) such as assignment and faculty-student relationships, group activities (88.3%),

and drive and desire (64.8%) came next.(Al-Shahrani et al., 2023)

Similar research revealed that the primary sources of stress for medical students were academics and medical education in China. (Liu et al., 2023), Iran (Jowkar et al., 2020), and India (Tm et al., 2020).

In line with a systematic review academic stress was found to be the main driver of high levels of student stress because it influenced medical students' mental health conditions. (Abdulghani et al., 2011)

Ebrahim et al. in Egypt reported that academic-related stressors were the main ones (81.2%), followed by, social interactions (72.3%), group activities (53%), motivation and desire (51.6%), and intrapersonal relationships (50.1%). (Ebrahim et al., 2024)

Mirza, et al in Makka, Saudi Arabia found that Students with married, living parents were less likely to experience stress (OR=0.43, p=0.008). Moreover, family disputes (OR: 2.69, p<0.001) and a history of mental illnesses (OR: 5.21, p=0.002) were linked to stress. (Mirza et al., 2021)

Rahman et al. in Saudi Arabia discovered that, failure to finish the course content before the examination was the most often mentioned academic stressor (63.8%), followed by scheduling conflicts (59.6%), the difficulty of the exam questions (57.1%), difficulty reading textbooks (55.9%), and the frequency of exams. High parental expectations (58.2%), living with parents (57.9%), future careers (65.4%), and familial motivation (59.3%) were the most prevalent familial stressors. (Rahman et al., 2013)

Similar research by Gazzaz et al. in Jeddah, Saudi Arabia, revealed that the most common causes of stress were the frequency of exams (60%), long academic curriculum (55%), practical performance (51%), difficulty returning home (47%)], concerns about the future (47%), performance on periodic exams (42%), becoming a doctor (44%), and peer competition and lack of interest in medicine (39%). (Gazzaz et al., 2018)

El-Gilany et al. in a comparative study of Saudi and Egyptian medical students found that academic problems were reported by 39.4% of Saudis and 91.1% of Egyptians. Relationship problems with the parents were reported by 22% of Egyptians and 14.8% of Saudis. 26.6% of Egyptians and 11.6% of Saudis were worried about the future. Financial problems were stated by (8.8%) of Saudis and (20.4%) of Egyptians, fear of the future was cited by (26.6%) of Egyptians and (11.6%) of Saudis, accommodation problems mentioned by (19.1%) of Egyptians and (12%) of Saudis, trouble with classmates reported by 21.4% of Egyptians and 17.3% of Saudis, lack of recreation indicated by 25% of Egyptian and 3.5% of Saudis. (El-Gilany et al., 2008)

According to Hill et al. in the United States, 33.7% of respondents mentioned academic workload, followed by performance pressure (31%), time constraints (29%), career planning and future-focused worries (9%), and financial concerns (15%) medical school administration, faculty, and structure (7%), and negative health impact (3%). (Hill et al., 2018)

## Limitations

There are numerous limitations to the study. First, the study relied on participant self-report; second, the sampling strategy was convenient, making it unable to generalize the findings; and third, the study's descriptive cross-sectional design made it impossible to ascertain the cause-and-effect link.

## Conclusion

The current survey objective was to assess medical students' stress levels and primary stressors. Regretfully, moderate to high stress levels were experienced by the majority of medical students in the study. The performance and frequency of exams were the most important academic stressors mentioned. High parental expectations and the world political climate were the prevalent psychosocial stresses. Therefore, to help medical students manage their stress, interventions are required. It is strongly advised to reduce academic overload and offer academic support and counseling. Students should get such interventions during their academic careers.

**Conflict of interest:** We have no conflicts of interest to disclose.

**Funding:** None

**Author Contributions**: M.M.A. PI of the research. Conceptualization, M.M. A, A.A.A., R.M.A., M.A and F.S.A., A.A.A., R.M.A., M.A and F.S.A data collection, coding, M.M.A. data entry, cleaning, and analysis, M.M.A. and A.A.A. writing the first draft. All authors have read and approved the final version of the manuscript.

## References

1. AAMIR, I. S. 2017. Stress Level Comparison of Medical and Nonmedical Students: A Cross Sectional Study done at Various Professional Colleges in Karachi, Pakistan. Acta Psychopathologica, 03, 8.
2. ABDULGHANI, H. M., ALKANHAL, A. A., MAHMOUD, E. S., PONNAMPERUMA, G. G. & ALFARIS, E. A. 2011. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. J Health Popul Nutr, 29, 516-22.
3. AL-DABAL, B. K., KOURA, M. R., RASHEED, P., AL-SOWIELEM, L. & MAKKI, S. M. A comparative study of perceived stress among female medical and non-medical university students in Dammam, Saudi Arabia. Sultan Qaboos Univ Med J, 2010. 231.
4. AL-SHAHRANI, M. M., ALASMRI, B. S., AL-SHAHRANI, R. M., AL-MOALWI, N. M., AL QAHTANI, A. A. & SIDDIQUI, A. F. 2023. The Prevalence and Associated Factors of Academic Stress among Medical Students of King Khalid University: An Analytical Cross-Sectional Study. Healthcare (Basel), 11, 2029.
5. AL UBAIDI, B. A., JASSIM, G. & SALEM, A. 2018. Burnout Syndrome in Medical Students in the Kingdom of Bahrain. Global Journal of Health Science, 10, 86-94.
6. ALMADI, T., CATHERS, I., HAMDAN MANSOUR, A. M. & CHOW, C. M. 2012. An Arabic version of the perceived stress scale: translation and validation study. Int J Nurs Stud, 49, 84-9.
7. BAIG, M., SAYEDALAMIN, Z., ALMOUTERI, O., ALGARNI, M. & ALLAM, H. 2016. Perceptions, Perceived Barriers, and Practices of Physicians' towards Evidence-Based Medicine. Pak J Med Sci, 32, 49-54.
8. CHAUDHURI, A. 2019. A study to compare the effects of perceived stress on waist hip ratio and cardiovascular profile of MBBS and paramedical students in a Medical College of West Bengal. People.
9. COHEN, S., KAMARCK, T. & MERMELSTEIN, R. 1983. A global measure of perceived stress. J Health Soc Behav, 24, 385-96.
10. EBRAHIM, O. S., SAYED, H. A., RABEI, S. & HEGAZY, N. 2024. Perceived stress and anxiety among medical students at Helwan University: A cross-sectional study. J Public Health Res, 13, 22799036241227891.
11. EL-GILANY, A. H., AMR, M. & HAMMAD, S. 2008. Perceived stress among male medical students in Egypt and Saudi Arabia: effect of sociodemographic factors. Ann Saudi Med, 28, 442-8.
12. EL-MASRY, R., GHREIZ, S., HELAL, R., AUDEH, A. & SHAMS, T. 2013. Perceived stress and burnout among medical students during the clinical period of their education. Ibnosina J Med BS 5, 179-188.
13. GAZZAZ, Z. J., BAIG, M., AL ALHENDI, B. S. M., AL SULIMAN, M. M. O., AL ALHENDI, A. S., AL-GRAD, M. S. H. & QURAYSHAH, M. A. A. 2018. Perceived stress, reasons for and sources of stress among medical students at Rabigh Medical College, King Abdulaziz University, Jeddah, Saudi Arabia. BMC Med Educ, 18, 29.
14. HILL, M. R., GOICOCHEA, S. & MERLO, L. J. 2018. In their own words: stressors facing medical students in the millennial generation. Med Educ Online, 23, 1530558.
15. IBRAHIM, D., AHMED, R. M., MOHAMMAD, A. Z., IBRAHIM, B., MOHAMMED, T., MOHAMED, M. E., ABDELGADIR, T., MOHAMMED, B., IBRAHIM, M. & SHAABAN, K. M. A. 2024. Prevalence and correlates of generalized anxiety disorder and perceived stress among Sudanese medical students. BMC Psychiatry, 24, 68.
16. JOWKAR, Z., MASOUMI, M. & MAHMOODIAN, H. 2020. Psychological Stress and Stressors Among Clinical Dental Students at Shiraz School of Dentistry, Iran. Adv Med Educ Pract, 11, 113-120.
17. KHALIL, A. M., ALMUTAIRI, N. M., ALHEJAILI, S. S., ALSAEDI, M. Q. & ALHARBI, W. K. 2020. Prevalence of Stress and Its Association with Body Weight among Medical Students in Taibah University. Pharmacophore, 11, 36-45.
18. LIU, Z., XIE, Y., SUN, Z., LIU, D., YIN, H. & SHI, L. 2023. Factors associated with academic burnout and its prevalence among university students: a cross-sectional study. BMC Med Educ, 23, 317.
19. MIRZA, A. A., MILAAT, W. A., RAMADAN, I. K., BAIG, M., ELMORSY, S. A., BEYARI, G. M., HALAWANI, M. A., AZAB, R. A., ZAHRANI, M. T. & KHAYAT, N. K. 2021. Depression, anxiety and stress among medical and non-medical students in Saudi Arabia: An epidemiological comparative cross-sectional study. Neurosciences (Riyadh), 26, 141-151.
20. NGOC, N. B. & TUAN, N. V. 2024. Stress among nursing students in Vietnam: Prevalence and associated factors. Int Nurs Rev, 71, 28-34.
21. RAHMAN, A. A., AL HASHIM, B., AL HIJI, N. & AL-ABBAD, Z. 2013. Stress among medical Saudi students at college of medicine, King Faisal University. Prev Med Hyg, 54, 195.

22. SAIPANISH, R. 2003. Stress among medical students in a Thai medical school. Med Teach, 25, 502-6.

23. SHAH, M., HASAN, S., MALIK, S. & SREERAMAREDDY, C. T. 2010. Perceived stress, sources and severity of stress among medical undergraduates in a Pakistani medical school. BMC Med Educ, 10, 2.

24. SONG, X., DING, N., JIANG, N., LI, H. & WEN, D. 2020. Time use in out-of-class activities and its association with self-efficacy and perceived stress: data from second-year medical students in China. Med Educ Online, 25, 1759868.

25. SREERAMAREDDY, C. T., SHANKAR, P. R., BINU, V. S., MUKHOPADHYAY, C., RAY, B. & MENEZES, R. G. 2007. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. BMC Med Educ, 7, 26.

26. TM, R., MS, S., VELAYUDHAN, R., SIVAN, S. & PREMNATH, A. 2020. Effect of a Stress Reduction Programme on Academic Stress and Coping Skills of First Year Medical Students. Kerala Journal of Psychiatry, 33, 27-33.

27. WIJAYA, T. T., YU, B., XU, F., YUAN, Z. & MAILIZAR, M. 2023. Analysis of Factors Affecting Academic Performance of Mathematics Education Doctoral Students: A Structural Equation Modeling Approach. Int J Environ Res Public Health, 20, 4518.