The Heavy Burden: Exploring Connections Between Mental Health, Burnout, and Academic Factors Among Medical Students at an Iranian University

Elham Faghihzadeh, Ali Eghtesad

Submitted to: JMIR Medical Education
on: March 02, 2024

Table of Contents

The Heavy Burden: Exploring Connections Between Mental Health, Burnout, and Academic Factors Among Medical Students at an Iranian University

Elham Faghihzadeh[1]; Ali Eghtesad[1]

[1]Zanjan university of medical education Zanjan IR

Corresponding Author:
Elham Faghihzadeh
Zanjan university of medical education
Mahdavi blv. Zanjan, Iran
Zanjan
IR

Abstract

Background: Medical students face high levels of burnout and mental health issues during training. Understanding associated factors can inform supportive interventions.

Objective: Examine burnout, psychological well-being, and related demographics among Iranian medical students.

Methods: Cross-sectional survey of 131 medical students at an Iranian university. Instruments included the Maslach Burnout Inventory-Student Survey (MBI-SS) plus a psychological symptom checklist (SCL-90). Descriptive, multivariate regression and tests for group differences analyzed data.

Results: Mean MBI-SS subscale scores showed moderate emotional exhaustion (15.00±7.08) and academic efficacy (14.98±6.29) but lower cynicism (10.85±5.89). The most commonly reported mental health issues were depression and obsessive-compulsive disorder. Worse psychological wellbeing associated with higher overall burnout, but no gender differences found. Upper academic level linked to changes in all MBI domains.

Conclusions: Despite health education, sampled students reported considerable burnout and mental health distress which associated strongly. This risks student persistence and post-graduation practice plans. Supporting wellbeing in training is critical for positive student and physician outcomes.

(JMIR Preprints 02/03/2024:58008)
DOI: https://doi.org/10.2196/preprints.58008

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

The Heavy Burden: Exploring Connections Between Mental Health, Burnout, and Academic Factors Among Medical Students at an Iranian University

Elham Faghihzadeh*[1], Ali Eghtesad[2],

1- Department of Biostatistics and Epidemiology, Zanjan University of Medical Sciences, Zanjan, Iran
2- School of Medicine, Zanjan University of Medical Sciences, Zanjan, Iran

*Corresponding Author

Running title: Educational Burnout and Mental Health

Abstract

Background: Medical students face high levels of burnout and mental health issues during training. Understanding associated factors can inform supportive interventions.

Objective: Examine burnout, psychological well-being, and related demographics among Iranian medical students.

Methods: Cross-sectional survey of 131 medical students at an Iranian university. Instruments included the Maslach Burnout Inventory-Student Survey (MBI-SS) plus a psychological symptom checklist (SCL-90). Descriptive, multivariate regression and tests for group differences analyzed data.

Results: Mean MBI-SS subscale scores showed moderate emotional exhaustion (15.00±7.08) and academic efficacy (14.98±6.29) but lower cynicism (10.85±5.89). The most commonly reported mental health issues were depression and obsessive-compulsive disorder. Worse psychological wellbeing associated with higher overall burnout, but no gender differences found. Upper academic level linked to changes in all MBI domains.

Conclusions: Despite health education, sampled students reported considerable burnout and mental health distress which associated strongly. This risks student persistence and post-graduation practice plans. Supporting wellbeing in training is critical for positive student and physician outcomes.

Keywords: Emotional Exhaustion, Cynicism, Academic Efficacy, Mental Health, Medical Students,

1. Introduction

The concept of tedium in academic life and its impact on students was initially posited by Kary and Pines [1]. Their work suggested that this phenomenon is not confined to any specific educational level but can manifest across various stages of schooling, including both school and university environments[1]. From their viewpoint, students might find themselves wrestling with a condition marked by a fading enthusiasm for learning, a noticeable lack of motivation, and an overwhelming sense of emotional exhaustion. Later Maslach and Jackson specified burnout as the experience of physical and emotional drain because of chronic stress [2, 3]. It is the state of physical and mental fatigue caused by work, study, or any caregiving activities. It can be known as a negative emotional, mental, and physical reaction to the study, work, and life pressure. Burnout was officially named by WHO (World Health Organization) as an occupational phenomenon in 2019 and was added to the International Classification of Disease (ICD-11).

Educational Burnout (EB) is one type of burnout that happens during studying. For having a better view of educational burnout, it was expanded to three factors including emotional exhaustion, cynicism, and feeling of inefficacy [4, 5]. Emotional exhaustion means feelings of exceeding emotional resources due to the necessities of the study. Cynicism is a negative, unresponsive, or overly snapped response to a phenomenon. Feelings of inefficacy refer to cutting down academic efforts which lead to incompetence and reduced achievement as a student. Based on findings from a systematic review published in 2021, it was determined that educational burnout affected more than 40 percent of students [6]. his outcome implies a heightened susceptibility to burnout among medical

students on a global scale. However, few studies have examined this problem among medical students in Iran specifically. While 16% of Iranian medical students reported burnout in one study [7], assessing prevalence rates at individual universities could further inform supportive programs. EB has an important role in the general health of medical students and could easily have an impact on the quality of their learning [8].

The research on 14,000 students from different countries showed that about 35 percent of the students had been diagnosed with at least one of the mental health diseases such as depression, anxiety, and so on [9]. Among students, university students met a higher likelihood of mental health diseases and among them medical students' issues were considerable. Medical school poses multiple demands on students. Firstly, matriculation coincides with adolescence and early adulthood, already vulnerable periods for mental health disorders [10–12]. Second, the intense nature of medical education exposes students to assimilating vast amounts of health information while also coping with exposure to myriad diseases [11, 12]. Consequently, researchers report substantial rates of depression (11-37%), anxiety (7.4-30%), and other issues in this population internationally [13–15]. Evidence suggests positive mental health aids coping [16], yet remains understudied in Iranian cultures.

Extensive evidence demonstrates intricate connections between burnout and mental health issues among medical students. Additional studies reveal substantially higher risks of depression, anxiety, suicidal ideation, concentration deficits, and physical symptoms relative to peers [12, 17–20]. Up to half of graduating students show burnout, linking this syndrome to exacerbated mental health decline [18]. Ultimately, these concerning rates significantly exceed general population trends, underscoring the crisis of psychological wellbeing in medical education. Implementing supportive interventions requires further investigating specific student populations.

The aims of this study are twofold. Primarily, we assess the prevalence of mental health issues and burnout among native Iranian medical students at Zanjan University of Medical Sciences. Additionally, we delineate connections between mental health status and burnout risk by evaluating associated academic and personal factors. By understanding these relationships, targeted interventions can eventually be developed to promote the psychological wellbeing of Iran's future physicians during this demanding training period.

2 Materials and Methods

2.1 Study design and participants

This cross-sectional study was conducted at Zanjan University of Medical Sciences, Zanjan, Iran, focusing on the experiences of 1500 medical students. These trainees were the target of our research, with their perspectives and characteristics as students comprising the central subject of investigation. Participants were recruited using a convenience sampling method. Our research team personally contacted the students, explained the study's aims, invited their voluntary participation, and emphasized the confidentiality of their responses. We then sent an electronic survey link to consenting participants. Strict data quality control measures were implemented, with incomplete questionnaire submissions excluded from analysis to uphold integrity of results. Regarding to the previous study [21], the minimum required sample size was 120 students however 140 surveys were distributed, and 131 fully completed questionnaires were returned without any missing data. This study was approved by the Ethics Committee of Zanjan University of Medical Science (IR.ZUMS.REC.1400.418).

2.2 Measures

2.2.1 Demographics

The basic socio-demographic information included age, gender, residence, positive COVID-19 test history, underlying diseases, and level of education. The level of education is separated into three sections: the initial seven semesters referred to as preclinical, followed by a two-semester externship, and finally, a three-semester internship. At the preclinical level, students learned about basic sciences and pathophysiology, and in the externship, they would pass a short course in each unit of the hospital. Residence comprised parental home, own home, and dormitory. Underlying diseases which

included diabetes, hypertension and chronic disease were asked directly from students.

2.2.2 Burnout Measurement

Burnout symptoms were measured by the Persian version of the Maslach Burnout Inventory-Student Survey (MBI-SS) [3, 22, 23]. It has 15 items which are divided into three dimensions subsumed under Emotional exhaustion (EX), Cynicism (CY), and Academic Efficacy (AE). Each Item has been rated on a 7-pointed Likert scale. AE had a reverse answer; therefore, it was scored oppositely. A high score in three dimensions means more burnout. And also, EX, CY, and AE have maximum scores of 30, 24, and 36 respectively.

2.2.3 Mental Health Measurement

The Symptom Checklist 90 (SCL-90), developed by Derogatis, was employed as a tool to assess mental health. This scale consists of 90 items, with each item rated on a 5-point Likert scale, and it effectively measures ten primary psychological symptoms [24]. The ten psychological symptoms measured by the Symptom Checklist 90 (SCL-90) are somatization (SOM), obsessive-compulsive (O-C), interpersonal sensitivity (INT), depression (DEP), anxiety (ANX), hostility (HOS), phobic anxiety (PHOB), paranoid ideation (PAR), psychoticism (PSY), and sleep problems (SLE). If a person's average score for the questions related to these symptoms is higher than 2, it indicates potential psychological problems. For our analysis, the Global Severity Index (GSI) was calculated, which measures the extent or depth of psychiatric disturbances. Specifically, the GSI is the average score across all responded items and serves as an overall measure of psychiatric distress. Therefore, in this study, the positive rate of each subscale and the GSI were analyzed. Notably, the validated Persian version of the SCL-90 was utilized for this student population [25].

2.3 Statistical Analysis

We performed all statistical analyses by SPSS 20 and Stata 12. Regarding the correlation between response variables, Multivariable Regression was used for assessing the factors associated with 3 subscales of burnout. In the model, socio-demographic variables such as a history of COVID-19, place of residence, and mental health were included. The variables that were found to have a significant impact on the outcome were kept in the model.

3 Result

The socio-demographic characteristics of students was summarized in table 1. About 66% of the students were female and only 10% of the participants were married. An almost equal percentage of different grades have completed the questionaries. 62% and 3.8% of the students had positive COVID-19 test history and underlying diseases respectively.

Table 1: socio-demographic characteristics

		n	%
Gender	Male	44	33.6
	Female	87	66.4
Marital Status	Single	118	90.1
	Married	13	9.9
Residence	Parental Home	53	40.5
	Own Home	43	32.8
	Dormitory	35	26.7
Positive COVID-19 Test History	No	50	38.2
	Yes	81	61.8
Underline Diseases	No	126	96.2
	Yes	5	3.8
Level	preclinical	42	32.1
	externship	47	35.9
	internship	42	32.1

Table 2 shows the positive rate of SCL-90 subscales by gender. Regarding this table, OCD and depression had most percentages among the symptoms. The chi-square test was used to examine the differences in percentages between males and females. The only symptom found to be statistically different between the two genders was phobic anxiety. Paranoid ideation had the highest percentage of female symptoms.

Table 2: Comparison of SCL-90 subscales between Gender

	Male positive rate n (%)	Female positive rate n (%)	Total positive Rate n (%)
Hostility	10 (22.7)	13(14.9)	23(17.6)
Anxiety	11(25.0)	14(16.1)	25(19.1)
Obsessive-compulsive disorder	14(31.8)	18(20.7)	32(24.4)
Interpersonal sensitivity	10(22.7)	19(21.8)	29(22.1)
Somatization	6(13.6)	12(13.8)	18(13.7)
Psychoticism	5(11.4)	7(8.0)	12(9.2)
Paranoid ideation	8(18.2)	21(24.1)	29(22.1)
Depression	12(27.3)	20(23.0)	32(24.4)
Phobic anxiety*	9(20.5)	7(8.0)	16(12.2)
Others	8(18.2)	11(12.6)	19(14.5)

*p-value (chi-square test) =0.041 male vs. female

Figure 1 shows the boxplot of MBI subscales across gender. According to this figure, academic efficacy in males had the widest range. Moreover, females had the smallest mean score in all subscales scores compare with males. Also figure 1 summarizes MBI-SS dimensions by different levels of grade. As stated by these boxplots, internships had more burnout scores. More descriptive details could be found in appendix 1. Figure 2 compares the total score of SCL-90 between different levels, regarding this figure externships had the highest score.

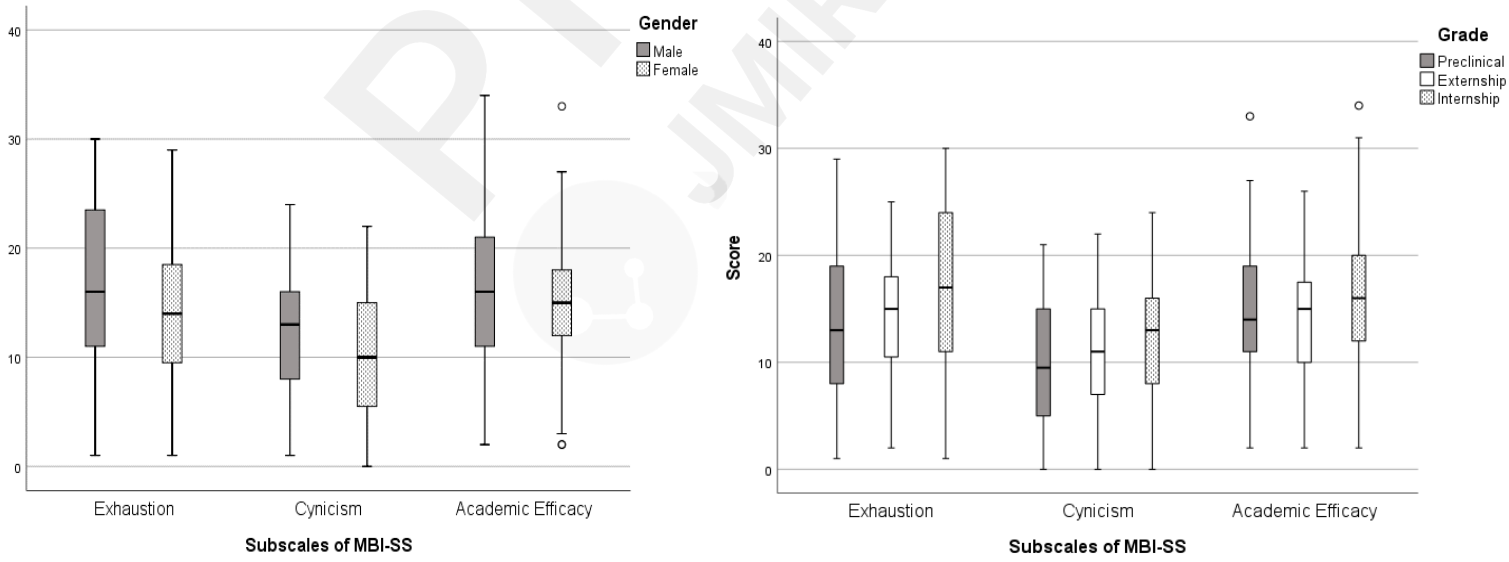

Figure1: comparisons of MBI-SS across gender and grade

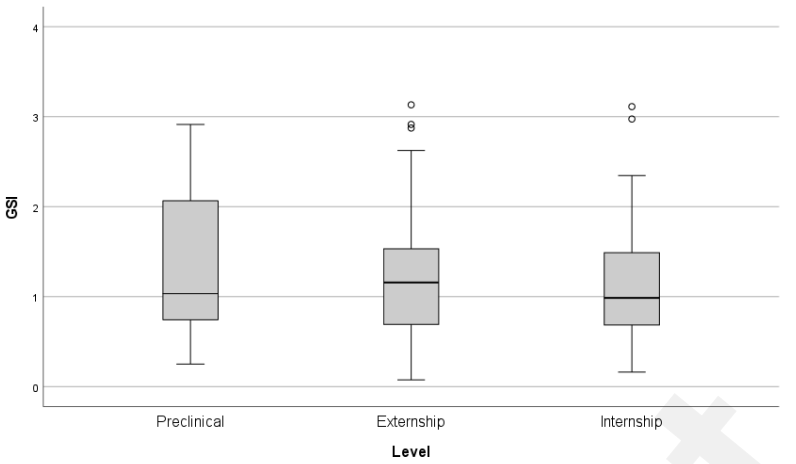

Figure2: comparisons of GSI across grade

In the level of modeling data, first of all, the correlation between the three dimensions of burnout was checked. The result shows that academic efficacy significantly correlated to cynicism and emotional exhaustion with a Pearson correlation equal to 0.41 and 0.37. The Pearson correlation between emotional exhaustion and cynicism was 0.78 and statistically significant. Regarding this correlation, multivariable regression was decided to run. Table 3 shows the result of multivariable regression. As can be seen in this table, an increase of one score in GSI would be increased 5.67, 1.71, and 4.69 scores in emotional exhaustion, cynicism, and academic efficacy respectively. Overall, the internships have 4.19, 3.02 scores more than preclinical in emotional exhaustion and academic efficacy, whereas they have 0.24 scores less in cynicism. Furthermore, males had 1.53 and 0.10 scores less than females respectively. The comparison of βs shows that GSI and internships grade had significantly different effects on three dimensions of MBI.

Table 3: The association of educational burnout with mental, grade, and gender.

	Emotional Exhaustion			Cynicism			Academic Efficacy			Equality of βs
	β	95%CI	F-value p-value	β	95%CI	F-value p-value	β	95%CI	F-value p-value	F-value p-value
GSI	**5.67**	**(4.02, 7.32)**	**6.55 <0.001**	**1.71**	**(1.41, 2.00)**	**5.56 <0.001**	**4.69**	**(3.31, 6.07)**	**4.79 <0.001**	**18.72 <0.001**
Grade										
Preclinical	-	-	-	-	-	-	-	-	-	
Externship	1.17	(-1.83, 4.18)	0.68 0.442	-0.32	(-0.86, 0.21)	-1.00 0.234	0.56	(-1.95, 3.08)	0.52 0.659	0.59 0.491
Internship	**4.19**	**(0.97, 7.41)**	**2.41 0.011**	-0.24	(-0.81, 0.33)	-1.98 0.403	**3.02**	**(0.33, 5.71)**	**3.10 0.028**	**2.01 0.044**
Gender										
Female	-	-	-	-	-	-	-	-	-	
Male	-1.53	(-4.25, 1.20)	-1.29 0.269	-0.10	(-0.58, 0.38)	-1.40 0.687	**2.34**	**(0.06, 4.61)**	**2.02 0.044**	0.99 0.211
R-squared	0.303			0.523			0.513			

4 Discussion

Zanjan University, a prominent institution in Iran, attracts students from various cities. Therefore,

studying the mental and physical well-being of its students can provide valuable insights into the overall condition of Iranian students.

In previous studies, depression, stress, and anxiety have been found to be the three most prevalent mental health issues among medical students [7, 11, 13, 15, 26–28]. Cultin et al, who reviewed studies of Asia at their meta-analysis, showed that 30 percent of Middle East students faced depression [13]. Our result was not far from their conclusion, but a little bit less in our study. This difference could be caused by the university's environment, sample size, and social and climatic differences. Still, the rate of depression was considerable. Aghajani Liasi et al., who studied the prevalence of burnout and mental health in one of Tehran universities, reported about 37 percent of depression among medical students [7]. They used DASS questionnaire for surveying mental health. Therefore, the main reason for this varies between our result and theirs, while both in the same nationality would be because of different questionnaires.

Anxiety is one of the major issues with which medical students are faced. A systematic review revealed the wide range of anxiety in different countries (15.5% to 70.0%) [28]. Our study found an anxiety disorder prevalence of 19% amongst students at Zanjan University of Medical Sciences. This places our sampled student population in the lower quartile of anxiety rates compared to the broader range reported in medical trainees across world.

Unlike the questionnaire used in our study (SCL-90), many previous studies on student stress used the DASS scale and reported high rates of stress among students. For example, a meta-analysis found that 52.7% of medical students reported major stress during training [13]. Additionally, studies by Aghajani Liasi et al. and Moutinho et al. found stress rates around 30% and 47% respectively in their student samples, even though the countries differed. While the exact percentages vary, these studies collectively highlight that clinically significant stress is common and impactful for many students across educational contexts [7, 29]. Our study did not directly measure student stress, which is a limitation compared to much existing research.

Our study also examined other mental health issues like hostility, obsessive-compulsive disorder, and interpersonal sensitivity in medical students. However, due to differences in methodology, specifically the use of the SCL-90 questionnaire rather than tools used in other studies, we cannot directly compare the prevalence rates found in our sample to rates reported elsewhere. In brief, our analysis did not detect any statistically significant differences in overall mental health scores between students across grades or genders.

Prior studies have found that medical students experience some of the highest rates of burnout compared to other populations [4, 6, 11, 20]. However, previous findings on the relationship between gender and burnout have been mixed [30–33]. Still, there was more evidence that male students are more likely to face any kind of burnout compared to female students [6]. The results of our study showed that although there was no statistically significant difference in burnout scores between males and females, females reported lower burnout levels in the three burnout subscales compared to males. Therefore, it can be concluded that the relationship between gender and burnout in medical students may be influenced by various factors such as the specific population, sample sizes, and the definition of burnout used in the research.

The relationship between the years of education in medicine and burnout levels is a topic of interest. While some studies have suggested that burnout levels may increase with advancing years of medical education due to prolonged exposure to stressors, the evidence remains inconclusive[33, 34]. In our study, we wondered if students in later years, closer to becoming doctors, would report higher burnout than students just starting out. Our results suggested this may be true - the interns about to graduate showed higher burnout, especially feeling emotionally drained. This hints that the intense pressures of medical school take an accumulating toll.

Our study explored several potential influencing factors on the three burnout dimensions in medical students, including mental health status, gender, and academic level. We found these variables had a significant impact on emotional exhaustion, cynicism, and academic efficacy scores. No prior work

had directly examined the linkage between mental health disorders and burnout in this population, representing a gap in understanding. But related research by Dyrbye et al. showed associations between positive wellbeing and professionalism, which burnout may undermine[16]. Additionally, psychologists have proposed students with psychiatric conditions demonstrate greater emotional exhaustion [17, 18, 35]. Notably, in our analysis mental health had a much larger effect on emotional exhaustion compared to the other burnout facets. Other studies found students with higher burnout reported more suicidal thoughts and behaviors [6, 17, 18, 26, 28, 35, 36]. Integrating those findings with our results suggests mental health could play an intermediary role between burnout and suicidal risks. Overall, these interrelationships between wellness, distress, and functioning highlight the need for more holistic support to promote student resilience.

This study has some limitations. The cross-sectional design cannot determine causal relationships between variables. Additionally, the convenience sampling and voluntary participation mean students with psychological issues may have been less inclined to take part or answer honestly. While different variables were recorded, some others such as physical activity, social support, and economic status should still be considered. To better understand the impact of mental health on burnout trajectories, longitudinal follow-up studies are warranted.

5 Conclusion

Medical students face a variety of pressures in their academic work and personal lives, which can negatively impact mental health and lead to burnout. Although students are educated about physical and mental health, they often do not take care of their own health. This research confirmed that any mental health issues directly influence students' emotional exhaustion, cynicism, and feelings of academic efficacy. Both burnout and psychological problems can cause students to drop out or decide not to work as general practitioners after graduating, wasting human and financial resources spent training them. Most importantly, if a society cannot ensure the mental well-being of its future doctors, the health of the overall population will suffer. There is a linkage between the health of medical trainees and the community's health. Ensuring student resilience and ability to cope with pressures must be made a priority, as their own health and ability to care for patients in the future depends on it.

Acknowledgment

The authors are very grateful for the suggesting the questionnaires by Dr Omid Saed, Department of clinical Psychology, Zanjan University of Medical Sciences.

Authors’ contributions

E.F. Conceptualization, Visualization, Analysis, Methodology, Resources, Writing - original draft, Writing - Review & Editing. A.E. Data Collecting & Analysis. M.T. Reviewing Draft & Editing.

Funding

No funding was received for this study.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Ethical issues regarding present study were approved by the Ethics Committee of Zanjan University of Medical Sciences (IR.ZUMS.REC.1400.418). All experimental protocols were approved by this committee. Authors Confirmed that all experiments were performed in accordance with relevant guidelines and regulations. No participant has age below 16 years. All students/ participants provided written informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

References

1. Kafry D, Pines A. The Experience of Tedium in Life and Work. Human Relations. 1980;33:477–503.
2. Maslach C, Jackson SE. The measurement of experienced burnout. J Organ Behav. 1981;2:99–113.
3. Maslach C. Burnout: a Multidimensional Perspective. In: Professional Burnout. Routledge; 2018. p. 19–32.
4. Abreu Alves S, Sinval J, Lucas Neto L, Marôco J, Gonçalves Ferreira A, Oliveira P. Burnout and dropout intention in medical students: the protective role of academic engagement. BMC Med Educ. 2022;22.
5. Schaufeli WB, Martínez IM, Pinto AM, Salanova M, Barker AB. Burnout and engagement in university students a cross-national study. J Cross Cult Psychol. 2002;33:464–81.
6. Rosales-Ricardo Y, Rizzo-Chunga F, Mocha-Bonilla J, Ferreira JP. Prevalence of burnout syndrome in university students: A systematic review. Salud Mental. 2021;44:91–102.
7. Aghajani Liasi G, Mahdi Nejad S, Sami N, Khakpour S, Ghorbani Yekta B. The prevalence of educational burnout, depression, anxiety, and stress among medical students of the Islamic Azad University in Tehran, Iran. BMC Med Educ. 2021;21.
8. Zis P, Artemiadis A, Bargiotas P, Nteveros A, Hadjigeorgiou GM. Medical Studies during the COVID-19 Pandemic: The Impact of Digital Learning on Medical Students' Burnout and Mental Health. Public Health. 2021;18:349.
9. Auerbach RP, Alonso J, Axinn WG, Cuijpers P, Ebert DD, Green JG, et al. Mental disorders among college students in the World Health Organization World Mental Health Surveys - CORRIGENDUM. Psychol Med. 2017;47:2737.
10. Gerber M, Lang C, Feldmeth AK, Elliot C, Brand S, Holsboer-Trachsler E, et al. Burnout and mental health in swiss vocational students: The moderating role of physical activity. Journal of Research on Adolescence. 2015;25:63–74.
11. Wassif GO, Gamal-Eldin DA, Boulos DNK. Stress and Burnout among Medical Students. 2019.
12. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students. JAMA. 2016;316:2214.
13. Cuttilan AN, Sayampanathan AA, Ho RCM. Mental health issues amongst medical students in Asia: A systematic review [2000-2015]. Ann Transl Med. 2016;4.
14. Healy C, Ryan Á, Moran CN, Harkin DW, Doyle F, Hickey A. Medical students, mental health and the role of resilience – A cross-sectional study. Med Teach. 2022;:1–9.
15. Zeng W, Chen R, Wang X, Zhang Q, Deng W. Prevalence of mental health problems among medical students in China: A meta-analysis. Medicine (United States). 2019;98.
16. Dyrbye LN, Harper W, Moutier C, Durning SJ, Power D v., Massie FS, et al. A Multi-institutional study exploring the impact of positive mental health on medical students' professionalism in an era of high burnout. Academic Medicine. 2012;87:1024–31.
17. Morcos G, Awan OA. Burnout in Medical School: A Medical Student's Perspective. Acad Radiol. 2023;30:1223–5.
18. Klein HJ, McCarthy SM. Student wellness trends and interventions in medical education: a narrative review. Humanit Soc Sci Commun. 2022;9:92.
19. Hu W, Yu Z, Liang X, Abulaiti A, Aini X, Kelimu A. A cross-sectional study on the analysis of the current situation of depression and anxiety among primary and secondary school students in

Urumqi City in 2021: A case study of S district. J Affect Disord. 2023. https://doi.org/10.1016/j.jad.2023.11.079.
20. Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J, et al. Burnout Among U.S. Medical Students, Residents, and Early Career Physicians Relative to the General U.S. Population. Academic Medicine. 2014;89:443–51.
21. Koutsimani P, Montgomery A, Georganta K. The Relationship Between Burnout, Depression, and Anxiety: A Systematic Review and Meta-Analysis. Front Psychol. 2019;10.
22. Rostami Z, Abedi MR, Schuffli VB. Standardization of Maslash burnout inventory among female students at University of Isfahan. New Educational Approaches. 2016;6:21–38.
23. Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory. Third. Scarecrow Education; 1997.
24. Derogatis LR, Melisaratos N. The Brief Symptom Inventory: an introductory report. Psychol Med. 1983;13:595–605.
25. Akhavan Abiri F, Shir Mohammadi R. Validity and Reliability of Symptom Checklist-90-Revised (SCL-90-R) and Brief Symptom Inventory-53 (BSI-53). Clinical Psychology and Personality. 2019;17:169–95.
26. Fares J, Al Tabosh H, Saadeddin Z, El Mouhayyar C, Aridi H. Stress, burnout and coping strategies in preclinical medical students. North American Journal of Medical Sciences. 2016;8:75–81.
27. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students. JAMA. 2016;316:2214.
28. Mirza AA, Baig M, Beyari GM, Halawani MA, Mirza AA. Depression and Anxiety Among Medical Students: A Brief Overview. Adv Med Educ Pract. 2021;Volume 12:393–8.
29. Moutinho ILD, Maddalena N de CP, Roland RK, Lucchetti ALG, Tibiriçá SHC, Ezequiel O da S, et al. Depression, stress and anxiety in medical students: A cross-sectional comparison between students from different semesters. Rev Assoc Med Bras. 2017;63:21–8.
30. Galán F, Sanmartín A, Polo J, Giner L. Burnout risk in medical students in Spain using the Maslach Burnout Inventory-Student Survey. Int Arch Occup Environ Health. 2011;84:453–9.
31. Backović D V, Zivojinović JI, Maksimović J, Maksimović M. Gender differences in academic stress and burnout among medical students in final years of education. Psychiatr Danub. 2012;24:175–81.
32. Briggs LG, Riew GJ, Kim NH, Aharon S, Klickstein JA, Cao AQ, et al. Racial and Gender Differences in Medical Student Burnout. Mayo Clin Proc. 2023;98:723–35.
33. Almutairi H, Alsubaiei A, Abduljawad S, Alshatti A, Fekih-Romdhane F, Husni M, et al. Prevalence of burnout in medical students: A systematic review and meta-analysis. International Journal of Social Psychiatry. 2022;68:1157–70.
34. Grech M. The Effect of the Educational Environment on the rate of Burnout among Postgraduate Medical Trainees – A Narrative Literature Review. J Med Educ Curric Dev. 2021;8:238212052110187.
35. Ishak W, Nikravesh R, Lederer S, Perry R, Ogunyemi D, Bernstein C. Burnout in medical students: A systematic review. Clinical Teacher. 2013;10:242–5.
36. Frajerman A, Morvan Y, Krebs MO, Gorwood P, Chaumette B. Burnout in medical students before residency: A systematic review and meta-analysis. European Psychiatry. 2019;55:36–42.

Supplementary Files