Journal of Medical Education Development
e-ISSN: 2980-7670
https://edujournal.zums.ac.ir
Volume 19, Issue 2
December 2026
Pages: 80–87

Original Article

Academic resilience in medical students and its relationship with extracurricular activities

Hamed Saki[1], Fariba Jokar[2,3], Maryam Avizhgan[2,3*]

[1]Medical Education Research Center, Faculty of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran
[2]Medical Education Research Center, Isfahan University of Medical Sciences, Isfahan, Iran
[3]Medical Education Development Center, Department of Medical Education, Isfahan University of Medical Sciences, Isfahan, Iran

Article info

Article history:
Received 11 Oct. 2025
Revised 10 Dec. 2025
Accepted 22 Feb. 2026
Published 1 Apr. 2026

***Corresponding author:**
Maryam Avizhgan, Medical Education Research Center, Isfahan University of Medical Sciences, Isfahan, Iran, Medical Education Development Center, Department of Medical Education, Isfahan University of Medical Sciences, Isfahan, Iran.
Email: maryamavizhgan@gmail.com

How to cite this article:
Saki H, Jokar F, Avizhgan M. Academic resilience in medical students and its relationship with extracurricular activities. *J Med Edu Dev*. 2026;19(2):80-87.

Abstract

Background & Objective: Medical students face significant psychological pressures during their education, making academic resilience—the capacity to overcome academic difficulties—critical for their well-being and success. This study aimed to assess academic resilience levels and their relationship with extracurricular activities among medical students.

Materials & Methods: This descriptive-correlational study was conducted in 2024. The target population included all medical students (N = 2000). A sample of 362 participants was selected using proportional sampling based on student distribution across basic sciences, physiopathology, clerkship, and internship stages, with convenience sampling applied within each stage. Data were collected using an extracurricular activity registration form and the standard Academic Resilience Scale (ARS-30), with scores ranging from 30 to 150. Data were analyzed using SPSS version 16 through descriptive statistics (means, standard deviations, frequencies) and analytical tests (independent t-test, Pearson correlation).

Results: The mean total resilience score was 103.67 ± 15.86 (out of 150). Among the three dimensions, perseverance received the highest score (48.68 ± 8.03), while negative affect and emotional response received the lowest (24.14 ± 5.06). Students with GPAs > 15 and those in the internship stage showed significantly higher resilience scores ($p < 0.001$). Sports were the most popular extracurricular activity (70.4%), with no significant differences across academic stages. A weak but significant positive correlation was found between total hours spent on extracurricular activities and academic resilience ($r = 0.12$, $p = 0.01$).

Conclusion: Academic resilience among medical students was above average. Higher resilience scores in students with better GPAs and those in advanced academic stages suggest that these students could serve as mentors to support and guide newer students. While individual extracurricular activities showed no significant relationship with resilience, total hours spent on such activities demonstrated a weak but significant correlation. This finding may stem from the perception that engaging in non-academic activities could interfere with academic progress. The high frequency of sports participation highlights the need for simple, low-cost interventions to improve access to these activities.

Keywords: academic resilience; medical students; extracurricular activities

Introduction

Medical education is often accompanied by severe psychological pressures for students [1]. They are exposed to mental health challenges such as anxiety and depression [2]. This vulnerability primarily stems from complex stressors present in their educational environment [3]. Resilience, as a vital capacity, enables individuals to show adaptive and positive responses to stressful conditions and adversities [4]. A key aspect of

this, academic resilience, involves students' capacity to adjust to and overcome academic difficulties. These difficulties can include heavy coursework, poor exam results, or educational environmental stressors [5].

Research findings indicate that academic resilience significantly strengthens students' mental health and enhances their overall well-being [6]. High levels of academic resilience are associated with positive mental health indicators and considerably reduced stress [7]. This advantage, in turn, helps increase their functional potential and markedly improves the quality of their educational experience and personal life [8]. Furthermore, academic resilience promotes students' self-efficacy and self-confidence [9]. As an important psychological characteristic, resilience is influenced by several factors, including the role of extracurricular activities. By creating a space for stress reduction and improving problem-solving skills, extracurricular activities act as a key factor in increasing resilience against academic pressures [10].

Extracurricular activities refer to activities that students voluntarily engage in outside the university's educational curriculum, based on their personal interests [11]. These include sports and club activities, music-related activities such as playing musical instruments or listening to music, reading, social activities, membership in charities, political and religious organizations, and many others [12]. Engaging in extracurricular activities serves as a mediator between stress and adaptation, reducing anxiety and depressive symptoms [13], helping develop creativity [14], and enabling students to respond appropriately to stressors and adjust to difficult circumstances [11].

A 2022 study by Thouin and colleagues showed that consistent and sustained participation in extracurricular activities among at-risk students significantly reduces the likelihood of dropping out. Their findings indicated that continuity of involvement in extracurricular activities matters more than the number or type of activities and can serve as a protective factor against early dropout [15]. Similarly, a 2025 study by Qiu and colleagues found that sports activities expose individuals to physical and psychological challenges, teaching them how to cope with failure and improve their resilience against pressures. This process directly leads to strengthening psychological resilience [16].

Despite numerous studies examining the effects of extracurricular activities and resilience, the precise relationship between these two concepts in medical student populations has received less attention. Although previous research has separately pointed to the role of sports or other activities in strengthening resilience, the researchers found no comprehensive study simultaneously investigating the role of various dimensions of extracurricular activities (sports, arts, social, etc.) on academic resilience in medical students. This study aimed to fill this gap and provide evidence-based findings on the relationship between extracurricular activities and academic resilience among medical students. The results will not only lead to a deeper understanding of factors contributing to resilience but may also serve as a practical foundation for developing educational programs and supportive interventions in universities to help students cope with academic pressures and improve their mental health and performance.

Materials & Methods

Design and setting(s)

This descriptive-correlational study was conducted at the Faculty of Medicine, Isfahan University of Medical Sciences between February 10, 2024, and August 23, 2025.

Participants and sampling

The target population comprised all medical students enrolled in the third semester or higher during the 2023–2024 academic year. According to available statistics, the total population was 2000 students. Based on Cochran's formula and Morgan's table, the minimum required sample size was determined to be 323. Accounting for a 10% attrition rate, the final sample size was set at 362 participants. Proportional sampling was employed based on student distribution across basic sciences, physiopathology, clerkship, and internship stages, with convenience sampling applied within each stage. Inclusion criteria were medical students at Isfahan University of Medical Sciences who had completed at least two academic semesters and provided consent to participate. Questionnaires with less than 70% completion were excluded from the analysis.

Tools/Instruments

Data collection tools consisted of three parts:

Demographic information form, including age, academic stage, residence type, gender, marital status, and grade point average (GPA).

An extracurricular activity registration form assessing student participation in eight categories: sports, charitable activities, visual arts, performing arts, music, research, religious activities, and participation in associations and organizations. Students specified whether each activity took place inside the university, outside the university, or both, and approximately how many hours per week they dedicated to each activity.

The Academic Resilience Scale (ARS-30), developed by Cassidy in 2016, consisting of 30 items across three dimensions. The "negative affect and emotional

response" dimension (7 items) assessed the ability to manage negative emotions such as anxiety and frustration when facing academic problems. The "perseverance" dimension (14 items) measured sustained effort and persistence in achieving goals despite obstacles. The "reflective and adaptive help-seeking" dimension (9 items) evaluated the ability to use cognitive strategies such as planning and positive thinking, as well as seeking help from appropriate sources. Responses were scored on a five-point Likert scale from "very unlikely" (1) to "very likely" (5), with total scores ranging from 30 (lowest) to 150 (highest). Each dimension had an independent score range: negative affect and emotional response from 7 to 35, perseverance from 14 to 70, and reflective and adaptive help-seeking from 9 to 45 [17]. To interpret scores, each dimension's mean score was compared with its respective scale midpoint. The Persian adapted version of this questionnaire has been validated in Iran, with Cronbach's alpha reported as 0.84, 0.86, and 0.96 for the respective dimensions [18]. Another study reported a Cronbach's alpha of approximately 0.85, confirming the instrument's reliability [19].

Data collection methods

Data were entered into SPSS version 16. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize demographic characteristics, resilience scores, and extracurricular activity participation patterns. The mean total resilience score and mean scores for each of the three dimensions (perseverance, negative affect and emotional response, and reflective and adaptive help-seeking) were computed.

To assess the relationship between academic resilience and categorical demographic variables (gender, marital status, residence type, and academic stage), independent t-tests and one-way ANOVA were used as appropriate. The association between resilience scores and continuous variables (age, GPA, and hours spent on extracurricular activities) was examined using Pearson correlation coefficient. For all analyses, statistical significance was set at $p < 0.05$.

Results

The questionnaire response rate was 100% (362 students). Of these, 267 participants (73.8%) were male and 95 (26.2%) were female. The majority of participating students were clerks (29.3%), single (98.3%), and living at home with their families (83.7%). The mean GPA of students was 15.73 ± 1.2 (**Table 1**). The mean total resilience score was 103.67 ± 15.86 (out of 150). **Figure 1** shows the scores across the three dimensions. The highest score was observed for the perseverance dimension (48.69 ± 8.03), while the lowest score was for the negative affect and emotional response dimension (24.14 ± 5.06).

Table 1. Demographic and academic characteristics of participants (n = 362)

Characteristic	Value
Age (years), mean ± SD	22.44 ± 1.53
Gender, n (%)	
Male	267 (73.8)
Female	95 (26.2)
Marital status, n (%)	
Married	6 (1.7)
Single	356 (98.3)
Residence type, n (%)	
Dormitory	54 (14.9)
With family	303 (83.7)
With roommate(s)	4 (1.1)
Alone	1 (0.3)
Academic stage, n (%)	
Basic sciences	104 (28.7)
Physiopathology	68 (18.8)
Clerkship	106 (29.3)
Internship	84 (23.2)
GPA, mean ± SD	15.73 ± 1.20
≥ 15	266 (73.5)
< 15	96 (26.5)

Note: Data are presented as mean ± standard deviation for continuous variables and number (percentage) for categorical variables.
Abbreviations: GPA, grade point average; n, number of participants; SD, standard deviation.

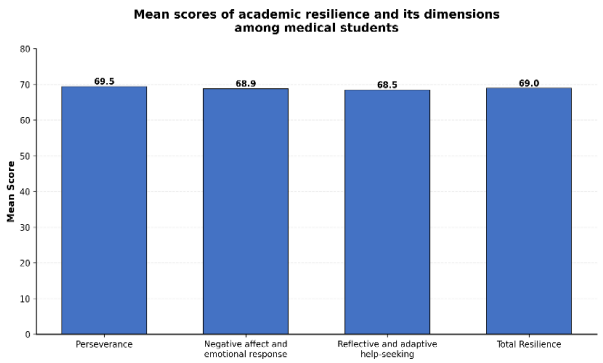

Figure 1. Mean scores of academic resilience and its dimensions among medical students
Note: Data are presented as mean ± standard deviation. The total resilience score range is 30–150. Dimension score ranges: Perseverance (14–70), Negative affect and emotional response (7–35), Reflective and adaptive help-seeking (9–45).

When examining resilience scores based on demographic variables using independent t-tests, students with GPAs > 15 showed significantly higher academic resilience scores compared to those with GPAs < 15 ($p < 0.001$). Furthermore, one-way ANOVA revealed a significant

difference in resilience scores across academic stages ($p < 0.01$), with internship students having the highest mean score (108.00 ± 14.56). No significant relationships were found between resilience and gender, marital status, residence type, or individual extracurricular activities (**Table 2**).

Table 2. Resilience scores by demographic variables

Variable	Mean ± SD	Sig.
GPA		
≥ 15	106.53 ± 14.37	t = 5.54
< 15	95.70 ± 17.07	p < 0.001
Gender		
Male	104.12 ± 15.82	t = 0.92
Female	102.36 ± 15.96	p = 0.358
Academic stage		
Basic sciences	101.22 ± 16.09	
Physiopathology	101.26 ± 14.80	F(3, 358) = 3.55
Clerkship	104.16 ± 16.66	p = 0.015
Internship	108.00 ± 14.56	
Residence type		
Dormitory	106.22 ± 14.28	
With family	103.14 ± 16.21	F(3, 358) = 0.72
With roommate(s)	108.60 ± 5.00	p = 0.541
Alone	107.00	
Age		
< 22 years	100.15 ± 9.80	t = −8.15
≥ 22 years	106.15 ± 1.40	p = < 0.001
Marital status		
Single	103.64 ± 15.96	t = −0.43
Married	105.17 ± 8.47	p = 0.668

Note: Independent t-test was used for GPA, gender, age, and marital status comparisons. One-way ANOVA was used for academic stage and residence type comparisons.
Abbreviations: SD, standard deviation; GPA, grade point average; Sig. statistical significance; p, probability value.

The frequency distribution and mean scores for individual items and dimensions are presented in the appendix tables. The mean scores for all three dimensions were significantly higher than the scale midpoint ($p < 0.01$).

Figure 2 shows the frequency distribution of extracurricular activities by activity type. Sports were the most common activity, with 70.4% of students participating. Miscellaneous activities had the lowest participation rate at 2.2%.

Examination of the relationship between extracurricular activities and resilience scores showed a positive and significant correlation between total hours spent on extracurricular activities and resilience scores ($r = 0.12$, $p < 0.01$), though the correlation strength was weak. In contrast, none of the individual extracurricular activities showed a significant relationship with academic resilience (**Table 3**).

One-way ANOVA results showed no statistically significant difference in mean extracurricular activity hours across different medical academic stages. However, the mean academic resilience score was significantly higher in the internship stage compared to other stages ($p < 0.01$).

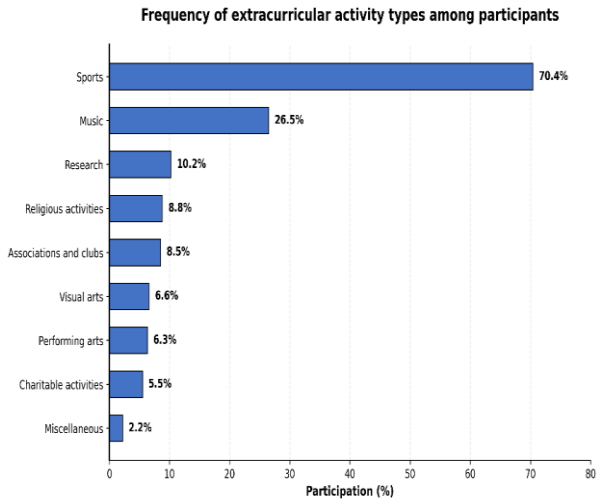

Figure 2. Frequency of extracurricular activities reported by participants by activity type
Note: Data are presented as percentage of students participating in each activity type. Participants could report multiple activities. Dashes indicate activity types where participation rates were not separately reported in the text.

Table 3. Relationship between extracurricular activities and students' resilience scores

Extracurricular Activity	Mean Hours ± SD	r	P-value
Sports	2.58 ± 5.4	0.00	0.89
Charitable activities	2.85 ± 1.49	0.26	0.28
Visual arts	2.79 ± 1.46	0.09	0.66
Performing arts	3.26 ± 1.54	-0.14	0.52
Music	3.39 ± 2.00	-0.11	0.25
Associations and organizations	2.90 ± 1.42	-0.01	0.94
Research	3.41 ± 1.57	0.00	0.98
Religious activities	2.59 ± 1.24	-0.02	0.90
Miscellaneous	1.83 ± 0.40	0.30	0.55
Total hours	6.14 ± 3.41	0.12	0.01

Note: Pearson correlation coefficient was used to examine the relationship between hours spent on extracurricular activities and academic resilience scores. Data for mean hours are presented as mean ± standard deviation.
Abbreviations: SD, standard deviation; r, Pearson correlation coefficient; p, probability value.

Discussion

This study was conducted to examine academic resilience among medical students at Isfahan University of Medical Sciences and its relationship with extracurricular activities during the 2023–2024 academic year. The findings showed that overall academic

resilience in the study population was above average, with total scores exceeding the scale midpoint. Additionally, mean scores for all three dimensions—negative affect and emotional response, reflective and adaptive help-seeking, and perseverance—were significantly higher than their respective scale midpoints. Among the three dimensions, perseverance received the highest score and was identified as a strength among students. This finding reflects students' high capacity for sustained effort and persistence when facing academic difficulties. In contrast, the negative affect and emotional response dimension received the lowest score, indicating that managing unpleasant emotions (such as anxiety, frustration, or rumination) poses a challenge for students and requires targeted interventions in this area.

A 2024 review study by Sanjaya and colleagues examining the role of resilience in reducing burnout among medical students concluded that resilience can act as a protective factor, with burnout being a direct consequence of poor negative emotion management and chronic stress [20]. Similarly, a 2024 study by Slavin and colleagues investigating strategies for supporting mental health and strengthening resilience in medical students emphasized that structured interventions for managing negative emotions and academic stress not only improve students' psychological well-being but also enhance their resilience as a protective factor against burnout [21].

Consistent with the findings, students with GPAs above 15 had significantly higher resilience levels. This finding can be interpreted as indicating a likely bidirectional relationship between academic success and resilience; that is, higher resilience leads to better academic performance. Conversely, experiencing academic success and achieving good grades can enhance students' self-efficacy and self-confidence, which in turn strengthens their resilience. Aligned with this study, research by Yasin and colleagues [8] and Abubakar and colleagues [22] examining the relationship between academic resilience and academic performance among students found that academic resilience has a positive and significant relationship with better academic performance (higher GPA). Abubakar et al. specifically reported a positive relationship between academic resilience scores and students' Cumulative Grade Point Average (CGPA) ($r = 0.250$) and GPA ($r = 0.154$) among pharmacy students [22].

Furthermore, consistent with the findings, the significant difference in resilience across academic stages showed that internship students had higher resilience levels compared to students in earlier stages. This finding can be interpreted as indicating that practical experience in clinical settings and exposure to real treatment challenges play a substantial role in strengthening students' resilience. On the other hand, acquiring clinical skills and increasing professional competence can enhance students' psychological capacity when facing educational stressors, which in turn leads to stronger resilience.

A 2021 study by Findyartini and colleagues examining the impact of academic stages on medical students' resilience found that resilience has a positive and significant relationship with students' progression through academic stages [23]. Another 2024 study by Steel and colleagues investigating the effect of clinical experiences on medical students' resilience found that gradual exposure to real treatment environments and acceptance of clinical responsibilities significantly increases students' resilience [24].

Regarding extracurricular activities, the findings showed that sports were the most common activity type among the study population. This may reflect students' relative awareness of the physical and mental health benefits of such activities, as well as greater availability of facilities and infrastructure compared to other extracurricular options. Similarly, a 2021 study by Sepede and colleagues examining the role of extracurricular activities in reducing burnout among medical students found that sports were identified as the most popular extracurricular activity among medical students [12]. Additionally, the findings of this study indicate that the mean hours dedicated to extracurricular activities among the medical students studied were lower compared to those reported in the study by Lumley and colleagues [25].

The findings showed a positive and significant relationship between total hours spent on extracurricular activities and overall resilience scores, although the correlation strength was weak. It is also worth noting that none of the individual activity types alone showed a significant relationship with resilience. In line with this study, Fares and colleagues in 2016 examined the relationship between extracurricular activities and stress and burnout among medical students and concluded that extracurricular activities may, in some cases, lead to increased stress and burnout due to added time pressure and extra commitments [13]. In contrast, a 2008 study by Kim and colleagues investigating extracurricular activities in medical education showed that balanced participation in various activities can lead to the development of soft skills and strengthening of resilience

[11]. Another study reported that preclinical students who participated in extracurricular activities experienced less stress, anxiety, and sensitivity [12].

This study depicted the status of resilience and extracurricular activities among medical students but also faced several limitations. The data were based on self-report, which may have been influenced by personal biases. Another limitation was the greater participation of male students due to the convenience sampling method, the researcher's gender, and their presence in male-dominated environments.

Although a weak correlation was found between resilience and extracurricular activities, the high frequency of sports participation among students suggests that easy access to facilities and the ability to choose preferred activities may encourage student engagement. It is also recommended that senior students with higher resilience levels serve as mentors to support and guide new students, which would not only transfer valuable experiences but also strengthen mentors' sense of responsibility and competence.

For future research, several valuable areas of investigation are suggested: longitudinal studies tracking changes in resilience and extracurricular activity participation patterns over time; examining the role of mediating variables such as time management skills, social support, and self-efficacy in the relationship between extracurricular activities and academic resilience; conducting comparative studies to compare these findings with results from other universities with different cultural contexts and facilities; and finally, implementing interventional programs and evaluating their effectiveness in enhancing resilience.

Conclusion

The findings of this study showed that overall academic resilience among the study population was above average. The perseverance dimension received the highest score, while the negative affect and emotional response dimension received the lowest score. Students with higher GPAs and those in advanced academic stages had significantly higher resilience levels. Sports were the most common extracurricular activity among participants, although no significant difference in extracurricular activity hours was found across academic stages. A weak but significant positive correlation was observed between total hours spent on extracurricular activities and resilience, whereas none of the individual activity types alone showed a significant relationship with resilience.

Ethical considerations

This study adhered to the ethical principles outlined in the Declaration of Helsinki. Approval was obtained from the Ethics Committee of Isfahan University of Medical Sciences (IR.ARI.MUI.REC.1401.214) prior to commencement. Full confidentiality of research data was assured. All participants received comprehensive information regarding the study's objectives and significance, and they voluntarily joined the research after providing both written and oral consent. Participants were explicitly informed of their right to withdraw from the study at any point.

Artificial intelligence utilization for article writing

No artificial intelligence tools were used in the preparation of this manuscript.

Acknowledgment

The authors express their sincere appreciation to the students of Isfahan University of Medical Sciences, Iran for their active participation in this study.

Conflict of interest statement

The authors report no actual or potential conflict of interest.

Author contributions

HS, FJ, and MA contributed to the conceptualization and initial design of the study. HS, FJ, and MA participated in data collection and analysis. HS, FJ, and MA were involved in the original drafting of the manuscript and its critical revision. All authors reviewed and approved the final version of the manuscript and take responsibility for the accuracy and integrity of the work.

Funding

This study was supported by Isfahan University of Medical Sciences as part of a professional doctorate thesis in medicine (Grant No. 3401389).

Data availability statement

All data supporting the findings of this study are available within the article.

References

1. Kumar S, Shamyar A, Kumar J, Murugesan R, Petrosyan T. Mental health challenges in medical education: prevalence of depression and stressors

among medical students in Armenia. *J Chem Health Risks*. 2025 Feb 18;15(1):677–81. https://doi.org/10.52783/jchr.v15.i1.7496
2. Aljuwaiser S, Brazzelli M, Arain I, Poobalan A. Common mental health problems in medical students and junior doctors – an overview of systematic reviews. *J Ment Health*. 2024 Nov;33(6):779–815. https://doi.org/10.1080/09638237.2023.2278095
3. Wang Z, Wu P, Hou Y, Guo J, Lin C. The effects of mindfulness-based interventions on alleviating academic burnout in medical students: a systematic review and meta-analysis. *BMC Public Health*. 2024 May 27;24(1):1414. https://doi.org/10.1186/s12889-024-18938-4
4. Ensz J, Mohiyeddini C. Resilience and burnout among medical students: the role of difficulties with emotion regulation as a mediator. *OBM Integr Complement Med*. 2023;8(3):1–21. https://doi.org/10.21926/obm.icm.2303038
5. Saad S, Ali S. Academic resilience in medical students: exploring students' perception of social support provided by peers and teachers to help at-risk students for the successful academic journey. *BMC Med Educ*. 2025 Feb 19;25(1):271. https://doi.org/10.1186/s12909-025-06858-9
6. Abbas A, Zahra S, Shahid S, Kashif M, Raza S. Academic resilience, psychological well-being and suicidal ideation among medical and non-medical students. *J Health Rehabil Res*. 2024 Jan 11;4(1):76–82. https://doi.org/10.61919/jhrr.v4i1.321
7. Bhamani S, Faisal AB, Malik HM, Allana AA. Resilience among medical students: a cross-sectional study in medical education. *Health Prof Educ J*. 2025 Jun 30;8(1):6–10. https://doi.org/10.53708/hpej.v8i1.3725
8. Yasin M, Khan B, Ahmad NA, Hassan SA. Relationship between academic resilience and academic performance of university students. *Int J Acad Res Bus Soc Sci*. 2025 Feb 6;15(2):323–9. https://doi.org/10.6007/IJARBSS/v15-i2/24716
9. Turki M, Sahnoun F, Guermazi A, Elleuch O, Bennaceur F, Halouani N, et al. Relationship between self-esteem, self-efficacy and academic procrastination among medical students. *Eur Psychiatry*. 2023 Mar;66(S1):S554–S554. https://doi.org/10.1192/j.eurpsy.2023.1169
10. Aryal MS. Beyond the books: role of extracurricular activities in medical students. *J Nepal Med Assoc*. 2024 May 31;62(274):414–5. https://doi.org/10.31729/jnma.8613
11. Kim S, Jeong H, Cho H, Yu J. Extracurricular activities in medical education: an integrative literature review. *BMC Med Educ*. 2023 Apr 22;23(1):278. https://doi.org/10.1186/s12909-023-04245-w
12. Sepede JC, Petrides J, Collins PB, Jones MC, Cantor N, Boyd L. The role of extracurricular activities and lectures in mitigating medical student burnout. *J Osteopath Med*. 2021;121(7):617–23. https://doi.org/10.1515/jom-2020-0311
13. Fares J, Saadeddin Z, Al Tabosh H, Aridi H, El Mouhayyar C, Koleilat MK, et al. Extracurricular activities associated with stress and burnout in preclinical medical students. *J Epidemiol Glob Health*. 2016 Jan 1;6(3):177–85. https://doi.org/10.1016/j.jegh.2015.10.003
14. Cortez CSM, Montes JN. Extracurricular arts: effects on creativity and academics. *J Creat*. 2025 Apr 1;35(1):100094. https://doi.org/10.1016/j.yjoc.2025.100094
15. Thouin É, Dupéré V, Dion E, McCabe J, Denault AS, Archambault I, et al. School-based extracurricular activity involvement and high school dropout among at-risk students: consistency matters. *Appl Dev Sci*. 2022 Apr 3;26(2):303–16. https://doi.org/10.1080/10888691.2020.1796665
16. Qiu W, Huang C, Xiao H, Nie Y, Ma W, Zhou F, et al. The correlation between physical activity and psychological resilience in young students: a systematic review and meta-analysis. *Front Psychol*. 2025 Apr 29;16:1557347. https://doi.org/10.3389/fpsyg.2025.1557347
17. Cassidy S. The Academic Resilience Scale (ARS-30): a new multidimensional construct measure. *Front Psychol*. 2016;7:1787. https://doi.org/10.3389/fpsyg.2016.01787
18. Ramezanpour A, Kouroshnia M, Mehryar A, Javidi H. Psychometric evaluation of the Academic Resilience Scale (ARS-30) in Iran. *Iran Evol Educ Psychol J*. 2019;1(3):144–50. [Persian] https://doi.org/10.29252/ieepj.1.3.144
19. Sodani M, Ghasemi Jobaneh R. Validity and reliability of the Academic Resilience Scale in undergraduate students of Ahvaz universities. *J Med Educ Dev*. 2020;15(2):107–15. [Persian] https://doi.org/10.18502/jmed.v15i2.4230
20. Sanjaya A, Mianto NA, Wijayanto KR, Edwin C. Resilience: a panacea for burnout in medical

students during clinical training? A narrative review. *Medicine (Baltimore)*. 2024 Dec 6;103(49):e40794. https://doi.org/10.1097/MD.0000000000040794

21. Slavin SJ, Schindler DL, Chibnall JT. Medical student mental health 3.0: improving student wellness through curricular changes. *Acad Med*. 2014 Apr;89(4):573–7. https://doi.org/10.1097/ACM.0000000000000166 https://doi.org/10.6007/IJARBSS/v15-i2/24716
22. Abubakar U, Azli NASM, Hashim IA, Kamarudin NFA, Latif NAIA, Badaruddin ARM, et al. The relationship between academic resilience and academic performance among pharmacy students. *Pharm Educ*. 2021 Nov 19;21:705–12. https://doi.org/10.46542/pe.2021.211.705712
23. Findyartini A, Greviana N, Putera AM, Sutanto RL, Saki VY, Felaza E. The relationships between resilience and student personal factors in an undergraduate medical program. *BMC Med Educ*. 2021 Feb 18;21(1):113. https://doi.org/10.1186/s12909-021-02547-5
24. Steel A, Karunaratne N, Exintaris B, James S, Al-Juhaishi A, Don A, et al. The impact of resilience on academic performance with a focus on mature learners. *BMC Med Educ*. 2024 Oct 7;24(1):1105. https://doi.org/10.1186/s12909-024-06099-2
25. Lumley S, Ward P, Roberts L, Mann JP. Self-reported extracurricular activity, academic success, and quality of life in UK medical students. *Int J Med Educ*. 2015 Sep 19;6:111–7. https://doi.org/10.5116/ijme.55f8.5f04