Research Article
The Correlation of Academic Achievement Index and Mental Health of Medical Students

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Abstract

Academic achievement and mental health are critical determinants of success in medical education and future clinical performance. Grade Point Average (GPA) is widely used as an objective indicator of academic achievement and is often assumed to reflect academic stress. However, evidence regarding its association with mental health remains inconsistent, particularly in Indonesian medical education, where psychosocial and institutional factors may play an important role. This study aimed to examine the relationship between GPA and mental health among medical students and to inform student support policies. A cross-sectional study conducted from August to December 2024 involved a sample of 132 fourth-year medical students at Syiah Kuala University, selected through simple random sampling. Academic achievement was assessed using cumulative GPA, while mental health status was evaluated using the General Health Questionnaire (GHQ-28), encompassing somatic symptoms, anxiety, social dysfunction, and depression. The median GPA was 3.30 (range 2.30–3.86), and the median GHQ-28 score was 28 (range 4–74). Mental health problems were prevalent, with 56.1% of students reporting somatic symptoms, 59.8% anxiety and insomnia, 52.3% social dysfunction, and 23.5% depressive symptoms. Correlation analysis showed no significant association between GPA and overall mental health status (p>0.05). These findings suggest that academic performance alone does not adequately capture psychological well-being among medical students. Comprehensive mental health screening and integrated student support systems that address academic stress, personal challenges, and social factors are needed to promote student well-being in medical education.
Keywords: *academic achievement, mental health, medical students, grade point average, GHQ-28.*

Pengaruh Indeks Prestasi Akademik terhadap Kesehatan Mental Mahasiswa Kedokteran

Abstrak

Prestasi akademik dan kesehatan mental merupakan faktor penentu penting dalam kesuksesan pendidikan kedokteran dan kinerja klinis lulusan di masa depan. Indeks Prestasi Kumulatif (IPK) secara luas digunakan sebagai indikator objektif prestasi akademik dan sering dianggap mencerminkan tingkat stres akademik. Namun, bukti mengenai hubungannya dengan kesehatan mental masih tidak konsisten, terutama dalam pendidikan kedokteran di Indonesia, di mana faktor psikososial dan institusional mungkin memainkan peran penting. Studi ini bertujuan untuk mengeksplorasi hubungan antara IPK dan kesehatan mental di kalangan mahasiswa kedokteran serta memberikan masukan untuk kebijakan dukungan mahasiswa. Studi potong lintang dilakukan sejak Agustus-Desember 2024 yang melibatkan 132 mahasiswa kedokteran tahun keempat di Universitas Syiah Kuala, yang dipilih melalui sampling acak sederhana. Prestasi akademik diukur menggunakan IPK kumulatif, sementara status kesehatan mental dievaluasi menggunakan General Health Questionnaire (GHQ-28), yang mencakup gejala somatik, kecemasan, disfungsi sosial, dan depresi. Median IPK adalah 3,30 (rentang 2,30–3,86), dan median skor GHQ-28 adalah 28 (rentang 4–74). Masalah kesehatan mental cukup umum, dengan 56,1% mahasiswa melaporkan gejala somatik, 59,8% kecemasan dan insomnia, 52,3% disfungsi sosial, dan 23,5% gejala depresi. Analisis korelasi menunjukkan tidak ada hubungan yang signifikan antara IPK dan status kesehatan mental secara keseluruhan (p > 0,05). Temuan ini menyarankan bahwa prestasi akademik saja tidak cukup untuk menggambarkan kesejahteraan psikologis di kalangan mahasiswa kedokteran. Penilaian kesehatan mental yang komprehensif dan sistem dukungan mahasiswa terintegrasi yang menangani stres akademik, tantangan pribadi, dan faktor sosial diperlukan untuk meningkatkan kesejahteraan mahasiswa dalam pendidikan kedokteran.
Kata kunci: *prestasi akademik, kesehatan mental, mahasiswa kedokteran, indeks prestasi kumulatif, GHQ-28.*

Introduction

Academic achievement is a key outcome of higher education, commonly measured through standardized and validated assessments.[1] In medical education, the Grade Point Average (GPA) is widely used as an objective indicator of students' academic performance, reflecting cumulative learning outcomes and progression through the curriculum.[2,3] Medical students are expected to achieve high academic performance, as it is closely linked to future clinical competence, decision-making, and patient care quality.[4] Consequently, GPA is frequently used by institutions to monitor student progress and to identify those who may require academic intervention.[5]

However, academic achievement does not occur in isolation and is influenced by a complex interplay of internal and external factors.[2,6,7] nternal factors include cognitive abilities, motivation, interests, and study habits, while external factors involve physical health, psychological well-being, socioeconomic status, family support, and the learning environmen.[7] Among these determinants, mental health has gained increasing attention, particularly in medical students, who are known to experience high levels of stress, anxiety, and emotional burden due to academic demands, clinical exposure, and professional expectations.[6,8]

Despite the widespread use of GPA as a marker of student success, its relationship with mental health remains unclear.[2] Good academic performance may mask underlying psychological distress, while mental health problems may not always be reflected in academic outcomes.6 Limited evidence is available from Indonesian medical schools regarding whether GPA adequately represents students' overall well-being. Understanding this relationship is essential for developing institutional policies that move beyond academic metrics alone and incorporate comprehensive mental health support systems.[8,9] Therefore, this study aims to examine the association between academic achievement, measured by GPA, and mental health status among medical students at Universitas Syiah Kuala, with implications for student support and educational policy development.

Mental health is a crucial aspect of medical students' lives.[1,10–12] High academic pressure and the demands of clinical skills can significantly impact the mental well-being of medical students.[9,12] Being a medical student is challenging, with numerous academic demands and the extended time required to become a doctor. Many studies have shown that medical students exhibit symptoms of mental health disorders, including depression and suicidal ideation, as seen in research conducted at Chiang Mai University[13] and Australia.[14] Numerous factors can influence the mental health of medical students, one of which is academic achievement. Studies at Muhammadiyah University, Yogjakarta have revealed that academic performance is correlated with and impacts the mental health of students.[15]

There are many ways to screen for mental health issues, one of which is using the 28-item version of the General Health Questionnaire (GHQ) developed by Goldberg (1972)[10,16] and adapted into Indonesian. The questions in GHQ-28 cover four problem concepts: somatic disorders, anxiety and insomnia, social dysfunction, and depression. These four problem concepts are considered symptoms of mental health disorders.[8,9]

This study aims to analyse the mental health profile of the 2021 cohort of students at the Faculty of Medicine, Syiah Kuala University (FMUSK), explore the relationship between academic achievement and mental health among these students, and identify factors that may influence the mental health of these students.

Methods

This study used a quantitative analytical approach with a cross-sectional design. Data were collected at a single point in time between August and December 2024, without intervention or manipulation of variables, to analyse the relationship between academic achievement and mental health status.

The study population consisted of all fourth-

year undergraduate medical students enrolled in the Bachelor program at the Faculty of Medicine, Universitas Syiah Kuala (FMUSK), Banda Aceh, Indonesia. The minimum required sample size was 132 students out of a total population of 198 students, calculated using the Slovin formula. Participants were selected according to predefined inclusion and exclusion criteria. The inclusion criteria were: (1) active fourth-year medical students registered during the study period and (2) students who provided informed consent. The exclusion criteria were: (1) students who were inactive or on academic leave at the time of data collection, and (2) students who submitted incomplete questionnaires, especially those missing GPA or GHQ-28 data.

Academic achievement was assessed using cumulative Grade Point Average (GPA). GPA data were self-reported by participants through the questionnaire and reflected the most recent cumulative GPA recorded in the academic system. To minimize reporting bias, students were instructed to use their official academic records when reporting GPA. GPA was analyzed as a continuous variable and described using mean and standard deviation; no arbitrary categorical cut-offs were applied.

Mental health status was assessed using the Indonesian version of the General Health Questionnaire (GHQ-28), which has been previously validated for use in Indonesian populations, demonstrating good internal consistency (Cronbach's alpha > 0.80). The GHQ-28 consists of four subscales: somatic symptoms, anxiety/insomnia, social dysfunction, and depression. Each item was scored using the Likert method (0–3), with total scores ranging from 0 to 84; higher scores indicate poorer mental health. For descriptive purposes, subscale scores were also reported, while total GHQ-28 scores were used for correlation analysis.

Data were collected using a structured Google Form questionnaire containing sections on sociodemographic characteristics, GPA, perceived factors influencing mental health, and the GHQ-28 instrument. The questionnaire link was distributed to eligible participants via private WhatsApp messages. Prior to participation, all respondents received an informed consent statement embedded in the form.

Statistical analyses were conducted using SPSS. As the data were not normally distributed, Spearman's rank correlation test was applied to assess the relationship between GPA and GHQ-28 scores. A p-value of <0.05 was considered statistically significant. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine, Universitas Syiah Kuala (approval number : 195/ EA/ FK/ 2024).

Results

A total of 132 of fourth-year undergraduate medical students at the Faculty of Medicine, Universitas Syiah Kuala, fulfilled the inclusion criteria and were included in the analysis. At the time of data collection, all respondents had completed the academic coursework of the undergraduate medical curriculum and were in the thesis-writing phase, a period often associated with increased academic and psychological demands.

Table 1. Respondent Characteristics and Baseline Academic/Mental Health Data (n = 132)

Category	n	%
Age (years)		
≤ 20	19	14.4
21	74	56.1
22	28	21.2
> 22	11	8.3
Gender		
Male	51	38.6
Female	81	61.4
Grade Point Average (GPA), median (min-max)	3.30 (2.30–3.86)	
GHQ-28 Score, median (min-max)	28 (4–74)	

Respondent characteristics are summarized in Table 1. Most students were 21 years old (56.1%), with smaller proportions aged ≤20, 22, or >22 years. Female students comprised the majority of the sample (61,4%). All respondents were actively enrolled, and none were on academic leave, resulting in a complete dataset.

Due to non-normal data distribution, the results are reported using median and minimum–maximum values. The median GPA was 3.30, with scores ranging from 2.30 to 3.86, indicating generally good academic performance among respondents. In contrast, mental health scores measured using the GHQ-28 demonstrated considerable variability. The median GHQ-28 score was 28, with a wide range from 4 to 74 points, reflecting substantial heterogeneity in mental health status among students.

Table 2. Frequency Distribution of the Four Mental Health Problem Concepts in GHQ-28 (N=132)

Mental Health Concept	n	%
Somatic disorders		
No	58	43.9
Yes	74	56.1
Anxiety and insomnia		
No	53	40.2
Yes	79	59.8
Social dysfunction		
No	63	47.7
Yes	69	52.3
Depression		
No	101	76.5
Yes	31	23.5

The frequency distribution of the four mental health domains assessed by the GHQ-28 is summarized in Table 2. More than half of the respondents reported symptoms of somatic disorders (56.1%), anxiety and insomnia (59.8%), and social dysfunction (52.3%). In contrast, depressive symptoms were reported by a smaller proportion of respondents (23.5%), while the majority (76.5%) did not exhibit depressive symptoms. These findings suggest that subclinical distress, particularly anxiety and somatic complaints, was more prevalent than depression among the students.

The association between academic achievement and mental health status by Spearman's rank correlation analysis revealed a weak positive correlation between GPA and GHQ-28 scores (r=0.077, p=0.377), which was not statistically significant. This finding indicates that academic performance, as measured by GPA, was not significantly related to overall mental health status among the respondents.

Further analysis was conducted to identify factors other than GPA that may influence mental health status, as shown in Table 3. Several factors demonstrated statistically significant associations with mental health. Perceived GPA decline was significantly associated with poorer mental health (p = 0.006), whereas overall satisfaction with GPA was not (p = 0.680). Academic stress or academic-related problems showed a strong association with mental health status (p = 0.001), with students experiencing academic stress exhibiting a higher prevalence of mental health symptoms.

Physical health problems were also significantly related to mental health (p < 0.001), as were financial difficulties (p = 0.001) and family-related problems (p = 0.001). Interpersonal factors, including friendship issues (p = 0.001) and

Table 3. Analysis of Factors Influencing Mental Health

Factor	n	%	p-value
Satisfaction with GPA			
Not satisfied	82	62.1	0.680
Satisfied	50	37.9	
GPA condition			
Decreased	52	39.4	0.006
Increased	80	60.6	
Stress/academic issues			
No	61	46.2	0.001
Yes	71	53.8	
Health issues			
No	107	81.1	<0.001
Yes	25	18.9	
Financial problems			
No	104	78.8	0.001
Yes	28	21.2	
Family problems			
No	120	90.9	0.001
Yes	12	9.1	
Friendship issues			
No	113	85.6	0.001
Yes	19	14.4	
Issues with lecturers			
No	119	90.2	0.025
Yes	13	9.8	
reason for choosing medicine			
Personal choice	97	73.5	0.304
Parents	32	24.2	
Followed friends	3	2.3	
Studying medicine is the right decision			
No	19	14.4	0.000
Yes	113	85.6	

problems with lecturers (p = 0.025), were similarly associated with mental health status. While the initial reason for choosing medicine was not significantly associated with mental health (p = 0.304), students who perceived studying medicine as an inappropriate career decision demonstrated a significantly higher prevalence of mental health problems (p < 0.001). Overall, these findings indicate that mental health among medical students is influenced by a complex interplay of academic stressors, personal health situation, financial, family circumstances, and interpersonal relationships, rather than academic achievement index alone.

Discussion

This study examined the relationship between academic achievement and mental health among fourth-year medical students at the Faculty of Medicine, Universitas Syiah Kuala. The demographic profile, dominated by 21-year-old and female students, reflects the typical composition of Indonesian medical cohorts. At the time of data collection, all respondents were engaged in thesis writing—a period recognized as both academically demanding and psychologically stressful.

Despite relatively strong academic performance (mean GPA 3.27), the mean GHQ-28 score (30.12) indicated that many students experienced mild psychological distress. This underscores that academic success does not necessarily equate to psychological well-being.

Analysis of the GHQ-28 subscales revealed that psychological distress predominantly manifested as anxiety and insomnia, somatic symptoms, and social dysfunction, while depressive symptoms were less frequent. This

pattern is consistent with previous studies among medical students in Indonesia[15] and other countries[10,11], which have reported that stress-related and anxiety-related symptoms are more prevalent than depression, particularly during academically intensive phases.[13,17]

Somatic symptoms were reported by more than half of respondents, a substantially higher prevalence than that reported by Hahn, et al[18] among students at a university in Germany.. This discrepancy may reflect cultural differences in the expression of psychological distress, where emotional strain is often experienced and communicated through physical complaints.[1,18] In medical students, heightened awareness of bodily symptoms and frequent exposure to health-related information may further amplify somatic reporting. These findings highlight somatization as a clinically relevant manifestation of distress in medical education.[2,7]

Anxiety emerged as the most prevalent mental health problem, affecting nearly 60% of respondents. This finding aligns with previous research by Alrashed et al[19] and Lili et al[3], which reported even higher levels of anxiety among medical students. Although the prevalence observed in this study was slightly lower, anxiety remains markedly elevated compared with non-medical student populations. The thesis-writing period, academic competition, and uncertainty regarding future clinical training or career pathways may collectively contribute to sustained anxiety. From a stress–coping perspective, anxiety may represent an early psychological response to prolonged academic pressure, potentially preceding more severe mental health outcomes if left unaddressed.[3,18]

Social dysfunction was also common, affecting more than half of respondents, consistent with findings reported by Mahdavi et al[20] among medical students in Kurdistan University, Iraq. Medical education often demands extensive time commitment, which may limit opportunities for social interaction and strain interpersonal relationships.[20]

According to the biopsychosocial model, impaired social functioning may both contribute to and result from psychological distress, creating a negative feedback loop that further undermines well-being.[15,20]

In contrast, depressive symptoms were less prevalent, with the majority of tudents classified as non-depressed. his finding is consistent with studies by Nsengimana Nsengimana et al[21] and Aziz et al[22], which reported lower depression rates compared with anxiety. Protective factors such as peer support, family involvement, and a sense of accomplishment near graduation may partially explain this pattern. Nonetheless, the presence of depressive symptoms in nearly one-quarter of respondents remains clinically significant.[21,22]

One of the most important findings of this study is the absence of a significant relationship between GPA and mental health status. Although GPA is commonly used as an indicator of academic success, the lack of association suggests that academic performance alone does not adequately capture students' psychological well-being. In the context of medical education, students may sustain high academic performance despite distress, motivated by resilience, achievement drive, or fear of academic consequences. GPA represents a cumulative academic outcome, whereas mental health is dynamic and sensitive to current stressors.

Additionally, the time gap between grade announcements and completion of the questionnaire may have reduced the immediate emotional impact of GPA on mental health. Differences from studies by Mahdavi et al[20] in Kurdistan University and Lili et al[3] in Muhammadiyah Yogyakarta University, Indonesia, which reported significant associations between academic performance and mental health, may be explained by variations in curriculum structure, assessment timing, academic culture, and institutional support systems.[3,20]

Importantly, while GPA itself was not associated with mental health, academic stress and perceived academic problems were significantly related to psychological distress. Students who reported academic stress were more likely to experience mental health symptoms, consistent with findings by Ramadianto et al[23] and Ekawati et al.[24] From the

that students' subjective appraisal of academic demands, rather than objective academic outcomes, plays a central role in determining psychological well-being.[1,23,24] Academic environments characterized by heavy workloads, high expectations, and competition—particularly during thesis preparation—may therefore increase vulnerability to mental health problems, even among academically successful students.[2,4]

Beyond academic factors, this study demonstrates that mental health among medical students is strongly influenced by personal, social, and environmental stressors. Health problems, financial difficulties, family issues, conflicts with peers or lecturers, and doubts about the decision to study medicine were all significantly associated with poorer mental health. These findings are consistent with the biopsychosocial framework, which conceptualizes mental health as the result of interactions between biological conditions, psychological processes, and social contexts. Students facing multiple stressors may experience cumulative psychological burden, increasing the risk of mental health disorders. Interpersonal difficulties and lack of social support may further exacerbate feelings of isolation, anxiety, and emotional distress.[2,12,13]

The practical implications of these findings are substantial for medical education. The absence of a relationship between GPA and mental health underscores the limitations of relying on academic performance as a proxy for student well-being. Medical schools should implement comprehensive mental health strategies that include routine screening, accessible counselling services, academic mentoring, and early identification of academic and non-academic stressors.[7,25] Interventions aimed at reducing academic stress, strengthening peer and faculty support, and addressing financial and personal challenges may be more effective in promoting student well-being[26] than strategies focused solely on academic outcomes.[5,8] Creating supportive, inclusive, and psychologically safe learning environments is essential for fostering both academic success and mental health.[4,27]

Several limitations of this study should be acknowledged. The cross-sectional design precludes causal inference, as relationships between variables were assessed at a single point in time. Mental health status and GPA were self-reported, which may introduce recall bias or social desirability bias. The study was conducted at a single institution and included only one cohort of medical students, limiting generalizability to other settings or stages of medical education. Additionally, other potentially relevant factors, such as coping strategies, personality traits, and social support networks, were not assessed. Future longitudinal and multi-center studies incorporating objective academic data and broader psychosocial variables are needed to better elucidate the complex relationship between academic achievement and mental health in medical education.

Conclusion

Academic achievement, as measured by GPA, showed no significant correlation with mental health among fourth-year medical students. Despite strong academic performance, many students experienced anxiety, somatic symptoms, and social dysfunction, demonstrating that academic metrics alone are insufficient for assessing psychological well-being. These findings highlight the need for medical schools to integrate comprehensive mental health support into training programs, ensuring that medical graduates are not only academically competent but also psychologically resilient for clinical practice.

Ethics Statement

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine, Universitas Syiah Kuala (approval number: 195/ EA/ FK/ 2024).

Consent for Publication

Information presented in this article has been approved.

Conflict of Interest

There is no any conflict of interest.

Authors' Contributions

TMY; study design and manuscript preparation, HK; data collection and analysis, MS; language editing, ZZ; writing review, MM; data analysis.

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Availability of Data and Materials

The data used in this study can be obtained upon request by correspondence with the author.

References

1. Abdulghani HM, AlKanhal AA, Mahmoud ES, Ponnamperuma GG, Alfaris EA. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. J Heal Popul Nutr. 2011;29:516–22. doi: 10.3329/jhpn.v29i5.8906
2. mandal a, ghosh a, sengupta g, bera t, das n, mukherjee s. factors affecting the performance of undergraduate medical students: a perspective. Indian J Community Med. 2012;37:126–9. doi: 10.4103/0970-0218.96104
3. Lili R, Molodynski A, Farrell SM, Citraningtyas T, Kloping NA. Wellbeing and mental health among medical students in Indonesia: a descriptive study. Int J Soc Psychiatry. 2022;68:1277–82. doi: 10.1177/00207640211057709
4. Miller S, Langston M. Identifying stressors and coping mechanisms for residents in the ICU: A mixed-method work system study. Hum Factors Healthc. 2025;7:100097. doi: 10.1016/j.hfh.2025.100097
5. Gilavand A, Shooriabi M. Investigating the relationship between mental health and academic achievement of dental students of Ahvaz Jundishapur University of Medical Sciences. Int J Med Res Heal Sci. 2016;5:328–33.
6. Al-Rouq F, Al-Otaibi A, AlSaikhan A, Al-Essa M, Al-Mazidi S. Assessing physiological and psychological factors contributing to stress among medical students: implications for health. Int J Environ Res Public Health. 2022;19:16822. doi: 10.3390/ijerph192416822
7. Mohammed HE, Bady Z, Abdelhamid ZG, Elawfi B, AboElfarh HE, Elboraay T, et al. Factors influencing stress and resilience among Egyptian medical students: a multi-centric cross-sectional study. BMC Psychiatry. 2024;24:393. doi: 10.1186/s12888-024-05820-1
8. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. Mayo Clin Proc. 2005;80:1613–22. doi: 10.4065/80.12.1613
9. Broks VMA, Stegers-Jager KM, van der Waal J, Van den Broek WW, Woltman AM. Medical students' crisis-induced stress and the association with social support. PLoS One. 2022;17:e0278577. doi: 10.1371/journal.pone.0278577
10. Moreta-Herrera R, Rodríguez-Lorenzana A, Mascialino G, Castro-Ochoa F, Narváez-Pillco V, Caycho-Rodríguez T, et al. Psychometric properties of the 28-item General Health Scale (GHQ-28). analysis from the classical test and item response theories in Ecuadorian University students. Psychol Hub. 2024;41:43–54. doi: 10.13133/2724-2943/18460
11. Guerrero-López JB, Monterrosas AM, Reyes-Carmona C, Guerrero AA, Navarrete-Martínez A, Morones FF, et al. Factors related to academic performance in medical students. Salud Ment. 2023;46:193–200. doi: 10.17711/SM.0185-3325.2023.024
12. De la Cerda-Vargas MF, Stienen MN, Campero A, Pérez-Castell AF, Soriano-Sánchez JA, Nettel-Rueda B, et al. Burnout, discrimination, abuse, and mistreatment in Latin America neurosurgical training during the coronavirus disease 2019 pandemic. World Neurosurg. 2022;158:e393–415. doi: 10.1016/j.wneu.2021.10.188
13. Joompathong N, Bunrayong W, Chupradit S. Effect of a stress management program on the stress and occupation of Chiang Mai University Students. Open Public Health J. 2022;15. doi: 10.2174/18749445-v15-e2206270
14. Varshney K, Patel H, Panhwar MA. Risks and warning signs for medical student suicide mortality: a systematic review. Arch Suicide Res. 2024;28:1058–76. doi: 10.1080/13811118.2024.2310553
15. Shofiah V, Taruna R, Asra YK, Rajab K, Sa'ari CZ. Academic self-efficacy as a mediator on the relationship between academic motivation and academic achievement of college students during the online learning period. Int J Islam Educ Psychol. 2023;4:154–68. doi: 10.18196/ijiep.v4i1.1824
16. Oliveira TAA, Gouveia VV, Ribeiro MGC, Oliveira KG, Melo RLP de, Montagna E. General Health Questionnaire (GHQ12): new evidence of construct validity. Cien Saude Colet. 2023;28:803–10. doi: 10.1590/1413-81232023283.09452022
17. Manchri H, Sanagoo A, Jouybari L, Sabzi Z, Jafari SY. The relationship between mental health status with academic performance and demographic factors among students of university of medical sciences. J Nurs Midwifery Sci. 2017;4:8–13. doi: 10.18869/acadpub.jnms.4.1.8
18. Hahn S, Nestoriuc Y, Kirchhof S, Toussaint A, Löwe B, Pauls F. Time-dynamic associations between symptom-related expectations, self-management experiences and somatic symptom severity in everyday life: an ecological momentary assessment study with university students. BMJ Open. 2025;15:e091032. doi: 10.1136/bmjopen-2024-091032
19. Alrashed FA, Alsubiheen AM, Alshammari H, Mazi

SI, Al-Saud SA, Alayoubi S, et al. Stress, anxiety, and depression in pre-clinical medical students: Prevalence and association with sleep disorders. Sustainability. 2022;14:11320. doi: 10.3390/su141811320

20. Mahdavi P, Valibeygi A, Moradi M, Sadeghi S. Relationship between achievement motivation, mental health and academic success in university students. Community Heal Equity Res Policy. 2023;43:311–7. doi: 10.1177/0272684X211025932

21. Nsengimana A, Mugabo E, Niyonsenga J, Hategekimana JC, Biracyaza E, Mutarambirwa R, et al. Sleep quality among undergraduate medical students in Rwanda: a comparative study. Sci Rep. 2023;13:265. doi: 10.1038/s41598-023-27573-9

22. Aziz F, Khan MF. Association of Academic Stress, acne symptoms and other physical symptoms in medical students of King Khalid University. Int J Environ Res Public Health. 2022;19:8725. doi: 10.3390/ijerph19148725

23. Ramadianto AS, Kusumadewi I, Agiananda F, Raharjanti NW. Symptoms of depression and anxiety in Indonesian medical students: association with coping strategy and resilience. BMC Psychiatry. 2022;22:92. doi: 10.1186/s12888-022-03745-1

24. Ekawati FM, Kusnanto H, Lestari P, Vidiawati D, Novitasari DA, Widyahening IS, et al. The health and wellbeing of undergraduate students in Indonesia: descriptive results of a survey in three public universities. Sci Rep. 2025;15:11731. doi: 10.1038/s41598-025-90527-w

25. Mirzaei A, Jamshidian S, Haghani F. Identification of Residents' Stressors: A Review Study. Strides Dev Med Educ J. 2023;20:58–65. doi: 10.22062/sdme.2023.198353.1176

26. Multahada E, Hidayati PM, Nuraqmarina F, Kurnia P. Beyond the surface : a screening-based analysis of family health, psychological well-being, and social support in student mental health. An-Nafs Kaji Penelit Psikol. 2025;10:72–91. doi: 10.33367/psi.v10i1.6525

27. Atienza-Carbonell B, Balanzá-Martínez V. Prevalence of depressive symptoms and suicidal ideation among Spanish medical students. Actas Esp Psiquiatr. 2020;48:154–62.