ORIGINAL ARTICLE

THE PSYCHOLOGICAL IMPACT OF THE COVID-19 PANDEMIC ON FACULTY AND MEDICAL COLLEGE STUDENTS IN KARACHI, PAKISTAN: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: This study aimed to assess the prevalence of stress, anxiety, and depression among medical students and faculty members in Karachi, Pakistan during the COVID-19 pandemic, and to explore how these psychological outcomes were associated with selected demographic factors.

Methods: A cross-sectional study was conducted between July 2021 and April 2022 using a convenient sampling method. Participants from several medical colleges in Karachi were invited to complete an online questionnaire distributed through Google Forms. The survey collected demographic information and incorporated three validated scales: Perceived Stress Scale (PSS-10) for stress, the Generalized Anxiety Disorder Scale (GAD-7) for anxiety, and the Patient Health Questionnaire (PHQ-9) for depression. Data analysis was performed using SPSS version 25.0.

Results: Three hundred complete responses were included. A substantial level of psychological distress was observed, with 78.0% reporting moderate-to-high stress, 58.3% showing moderate-to-severe anxiety, and 49.7% experiencing moderate-to-severe depression. Medical students reported significantly higher anxiety ($p < 0.05$) and depression ($p < 0.05$) compared to faculty members. Multivariable analysis revealed that being female; having student status, experiencing dissatisfaction with academic progress, and losing a close relative or friend to COVID-19 were significantly associated with higher psychological distress levels.

Conclusion: The COVID-19 pandemic contributed to significant emotional and psychological strain within the medical academic community in Karachi, particularly among students. These outcomes likely reflect academic disruption, limited clinical exposure, and pandemic-related grief. There is a clear need for structured mental health support systems, proactive counseling services, and institutional stress-management interventions to protect the well-being of students and faculty.

Keywords: COVID-19, Psychological Impact, Mental Health, Medical Students, Medical Faculty, Stress, Anxiety, Depression, Pakistan.

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INTRODUCTION

The global pandemic was triggered by the identification of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in late 2019, declared by the World Health Organization (WHO) on March 11, 2020 [1]. While the immediate global response was rightly focused on understanding the virology, transmission, and clinical management of the disease to mitigate its physical health consequences, a parallel and equally devastating crisis began to unfold regarding mental health on a global scale. The imposition of lockdowns, social isolation, and a shift to remote learning created an environment of uncertainty and fear, significantly affecting the educational sector [2]. The strategies employed to contain the virus, including nationwide lockdowns, social distancing mandates, and travel restrictions, while necessary, created an environment of profound uncertainty, isolation, and fear, disrupting the very fabric of societal and economic functioning . The educational sector worldwide faced an unprecedented challenge, with institutions shuttered and an abrupt, unplanned transition to remote learning [4].

Within this complex and challenging environment, medical education stands out as a particularly critical and high-pressure system. Medical students and faculty are already recognized as populations vulnerable to psychological morbidity due to the inherently demanding nature of their profession and training, characterized by intense academic pressure, chronic sleep deprivation, and a highly competitive environment . The pandemic acted as a potent multiplier of these pre-existing stressors. For medical students, the closure of universities and teaching hospitals meant not just a shift to online lectures, but a critical deprivation of hands-on clinical experience, practical skill development, and patient interaction, the cornerstones of medical training [7]. This led to significant anxiety about academic progression, competency development, and future career prospects, compounded by the anxieties of contracting the virus themselves or transmitting it to family members [8].

For faculty members, the challenge was twofold. Firstly, they faced the same personal fears and uncertainties as the general population. Secondly, they were tasked with the monumental duty of rapidly adapting curricula designed for in-person, hands-on learning to a remote format, often without adequate training, technical resources, or institutional support [9]. This transition demanded immense effort, innovation, and resilience, all while managing their own psychological response to the pandemic and, in many cases, juggling increased family responsibilities at home due to lockdowns [10].

A growing body of international literature has documented the severe psychological impact of the pandemic on medical students. Studies from Jordan, Turkey, Japan, and the United States have consistently reported elevated rates of anxiety, depression, and stress within this demographic [11-14]. Similarly, research within Pakistan has begun to illuminate this issue. Studies have reported heightened psychological distress among university students in general [15], and among medical students in specific regions like Punjab [15]. Research focusing on final-year medical students [16] and dental students in Pakistan has further highlighted the acute anxiety related to disrupted academics and future uncertainties.

However, a critical gap in the existing literature remains. While students have been the focus of several studies however, the faculty members who are the pillars of the medical education system have been comparatively overlooked. Furthermore, many studies focus on a single psychological parameter or a specific sub-group (e.g., final-year students). There is a lack of thorough investigation that assesses the trio of stress, anxiety, and depression collectively across the entire medical and academic community encompassing both students across all years and faculty members within a defined metropolitan context.

Karachi, as Pakistan's most populous city and a major epicenter of the COVID-19 pandemic in the country, presents a critical setting for such an investigation. Therefore, this study aims to fill this

knowledge gap by assessing the prevalence and severity of stress, anxiety, and depression among both medical students and faculty members across various medical colleges in Karachi. The outcomes of this research may offer foundational evidence to inform institutional policies, design targeted mental health support programs, and develop effective crisis intervention strategies to safeguard the well-being of those who are entrusted with the nation's future healthcare.

METHODOLOGY:

This study investigation was carried out using a cross-sectional, convenient framework over ten months (July 2021 - April 2022) across multiple medical and dental colleges in Karachi, Pakistan. Sample size was calculated using OpenEpi online calculator which was found to be 319. The target population included both faculty members (teaching MBBS, BDS, Pharm D, or DPT programs) and students enrolled in MBBS/BDS programs. Participants were invited to participate via online platforms (WhatsApp, Facebook) and through paper-based forms distributed in person. A structured questionnaire was administered in English via Google Forms. It comprised four sections: A digital consent form was presented first. Age, gender, and marital status, vaccination status, occupation (student/faculty), academic year, designation, living situation, family dynamics, lifestyle habits (sleep, exercise, internet use, smoking), and personal exposure to COVID-19 (illness or death in family/friends).

A 10-item scale measuring perceived stress over the previous month. Scores range from 0-40, categorized as low (0-13), moderate (14-26), or high (27-40) stress (Reis *et al*., 2010). Furthermore, a 7-item scale screening for anxiety over the last two weeks. Scores range from 0-21, categorized as minimal (0-4), --mild (5-9), moderate (10-14), or severe (15-21) anxiety. A 9-item scale assessing depression over the last two weeks. Scores range from 0-27, categorized as minimal (0-4), mild (5-9), moderate (10-14), moderately severe (15-19), or severe (20-27) depression [17].

Ethical approval was obtained from Jinnah Medical and Dental College. Participation was voluntary, anonymous, and informed consent was obtained from all participants at the beginning of the online survey.

Statistical Package for the Social Sciences (IBM SPSS) Version 25.0 was utilized for all analyses. Continuous variables are expressed as mean ± standard deviation, and categorical variables are described using number (n) and percentage (%). The Chi-square test was used to determine associations between categorical demographic variables and the categorized outcomes of stress, anxiety, and depression. A p-value of <0.05 was considered statistically significant.

RESULTS

Table 1 summarizes the demographic profile of the participants. Marital status differed significantly between faculty and students ($p < 0.0001$); most faculty members were married (72.5%, n=116), whereas the majority of students were single (97.1%, n=136). COVID-19 vaccination status also showed a significant difference ($p = 0.003$), with 98.8% (n=158) of faculty vaccinated compared with 91.4% (n=128) of students. Living arrangements varied markedly between the groups ($p < 0.0001$): 67.5% (n=108) of faculty lived with their spouse, while 90.7% (n=127) of students lived with their parents. Family structure also differed significantly ($p = 0.014$), with nuclear families reported more frequently among students (75.7%, n=106) than faculty (62.5%, n=100). Additionally, faculty members more commonly belonged to smaller households of fewer than five members (63.7%, n=102) compared with students (47.1%, n=66), a difference that was statistically significant ($p = 0.004$)

Table-01: Demographic Characteristics of Participants

Demographic Variable		Faculty (N=160)	Students (N=140)	p-value
Marital Status	Single	41 (25.6%)	136 (97.1%)	<0.0001
	Married	116 (72.5%)	4 (2.9%)	
	Divorced	3 (1.9%)	0 (0%)	
Vaccinated against Covid-19	Yes	158 (98.8%)	128 (91.4%)	0.003
	No	2 (1.3%)	12 (8.6%)	
Living Situation	Alone	8 (5.0%)	10 (7.1%)	<0.0001
	With Spouse	108 (67.5%)	3 (2.1%)	
	With Parents	44 (27.5%)	127 (90.7%)	
Family Type	Nuclear	100 (62.5%)	106 (75.7%)	0.014
	Joint	60 (37.5%)	34 (24.3%)	
Number of Family Members	< 5	102 (63.7%)	66 (47.1%)	0.004
	> 5	58 (36.3%)	74 (52.9%)	

The internet browsing habits of faculty and students showed distinct patterns (Figure 1a & 1b). Among faculty members, the most common duration was 5-6 hours per day. In contrast, medical students reported 2-4 hours per day as their most frequent browsing duration. A significant portion of both groups engaged in extended internet use, with a combined 46.4% of faculty and 36.4% of students browsing for 5 hours or more daily.

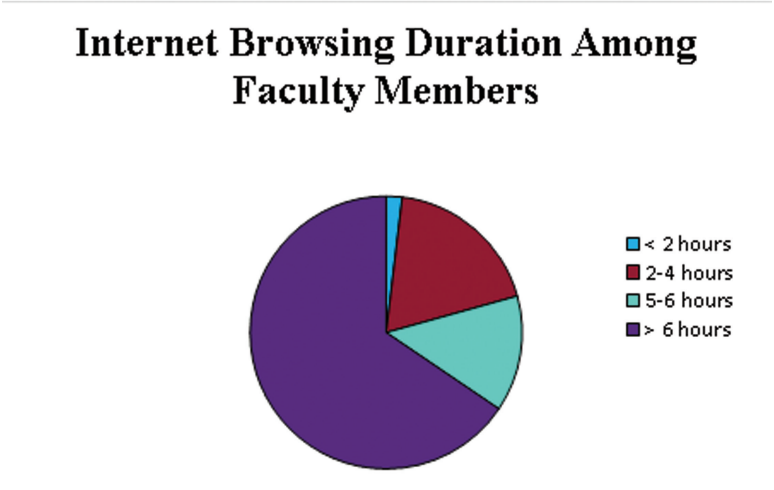

Figure-1(a) Internet Browsing Duration Among Faculty Members

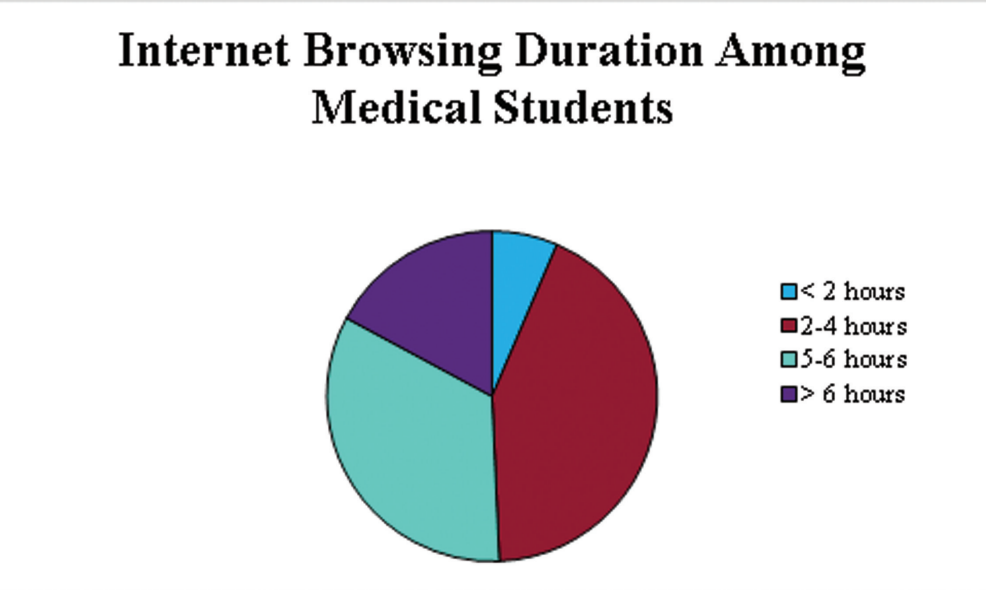

Figure-1(b) Internet Browsing Duration Among Medical Students

Both groups exhibited concerning sleep patterns, but faculty members were significantly more affected (Figure 2). An overwhelming majority of faculty (78%) reported getting less than 7 hours of sleep per night. This was notably higher than the already high percentage of students (65.7%) in the same category. Adequate sleep (7-9 hours) was reported by only 20% of faculty compared to 32.9% of students. Prolonged sleep (>9 hours) was rare in both groups.

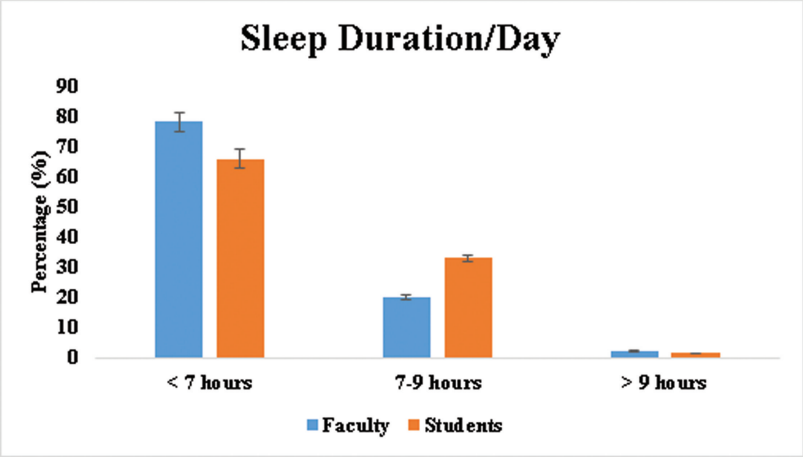

Figure-2: Sleep Duration Among Faculty Members & Medical Students

Table-2 highlighted a significant pandemic impact on health behaviors and mental health risks of academic community. Faculty members reported a higher prevalence of smoking and were more likely to have experienced the loss of a family member or friend to COVID-19 compared to students. Both groups showed high levels of sleep dissatisfaction and COVID-19 exposure in their social circles, though direct bereavement was more common among faculty.

Table-2: Impact of Lifestyle Factors and COVID-19 Exposure Among Faculty and Medical Students

Variable	Category	Faculty (N=160)	Students (N=140)	p-value
Sleep Satisfaction	Yes	50 (31.3%)	56 (40.0%)	0.114
	No	110 (68.8%)	84 (60.0%)	
Smoking Status	Yes	38 (23.8%)	7 (5.0%)	<0.0001
	No	122 (76.3%)	133 (95.0%)	
Relative/Acquaintance had COVID-19	Yes	140 (87.5%)	106 (75.7%)	0.008
	No	20 (12.5%)	34 (24.3%)	
Family Member/Friend Died from COVID-19	Yes	103 (64.4%)	44 (31.4%)	<0.0001
	No	57 (35.6%)	96 (68.6%)	

Stress (PSS-10): 78.0% (n=234) of participants reported moderate to high levels of stress. Anxiety (GAD-7): 58.3% (n=175) of participants reported moderate to severe anxiety. Depression (PHQ-9): 49.7% (n=149) of participants reported moderate to severe depression (table 3).

Table-03: Prevalence of Psychological Morbidity

Condition	Severity	Frequency (n)	Percentage (%)
Stress	Low (0-13)	66	22.0
	Moderate (14-26)	154	51.3
	High (27-40)	80	26.7
Anxiety	Minimal (0-4)	125	41.7
	Mild (5-9)	72	24.0
	Moderate (10-14)	63	21.0
	Severe (15-21)	40	13.3
Depression	Minimal (0-4)	151	50.3
	Mild (5-9)	62	20.7
	Moderate (10-14)	45	15.0
	Moderately Severe (15-19)	30	10.0
	Severe (20-27)	12	4.0

Statistical analysis revealed several significant associations between demographic factors when $p<0.05$. Medical students reported significantly higher rates of moderate-to-severe anxiety (67.1% vs. 50.6% in faculty, $p<0.01$) and depression (57.9% vs. 42.5% in faculty, $p<0.01$). Females reported higher levels of moderate-to-severe stress (82.1% vs. 70.5% in males, $p<0.05$). Participants who were

dissatisfied with their academic progress showed significantly higher rates of stress, anxiety, and depression ($p<0.001$ for all). Those who lost a family member or friend to COVID-19 had significantly higher rates of depression ($p<0.05$).

DISCUSSION:

The present study reveals a profoundly alarming prevalence of psychological distress among the medical academic community in Karachi during the COVID-19 pandemic. Our findings indicate that a staggering 78.0% of participants reported moderate-to-high levels of stress, 58.3% reported moderate-to-severe anxiety, and nearly half (49.7%) reported moderate-to-severe depression. These figures are substantially higher than those reported in pre-pandemic studies of similar populations , unequivocally demonstrating that the pandemic served as a significant catalyst for a severe mental health crisis within this group.

The significantly higher levels of anxiety and depression observed among medical students compared to faculty members are a pivotal finding of this study. This disparity aligns with research conducted in Lahore, which found clinical-year students to be particularly susceptible to these morbidities [18] and with international studies [19,20]. This can be attributed to the distinctive combination of stressors, faced via students. Beyond the generic fears of the virus, their academic and professional futures were thrown into disarray. The loss of clinical rotations, a cornerstone of medical training, led to anxieties about skill degradation and unpreparedness for future responsibilities as doctors, a concern echoed in a UK study [21]. Furthermore, the challenges of remote learning, including technological barriers, diminished peer interaction, and the perceived inadequacy of online instruction for a practice-based field, created a prevailing sense of academic dissatisfaction, which our analysis confirmed as a strong predictor of poor mental health.

Despite demonstrating more favorable mental health outcomes than their student counterparts, faculty members nonetheless reported a clinically significant prevalence of psychological distress. The etiologies of their distress, however, were distinctly occupational. The precipitous transition to remote instruction necessitated a rapid adaptation of pedagogical methods, acquisition of technical proficiencies, and navigation of eroded work-life boundaries as domestic and professional spaces merged [22,23]. This responsibility to maintain educational continuity, frequently while managing personal pandemic-related anxieties and potential bereavement, constituted a substantial cognitive and emotional burden.

The data reveals a severe public health issue, with sleep deprivation alarmingly prevalent among both groups but critically higher in faculty (78% vs. 65.7% of students getting <7 hours), a finding consistent with global reports of eroded work-life boundaries during the pandemic [24]. This deficit is directly linked to the pandemic's disruption, where for faculty, prolonged digital work hours and high cognitive load from the sudden shift to online teaching led to increased stress and screen time, a phenomenon extensively documented as a key driver of sleep disturbances [25]. For students, academic stress and the screen-based nature of remote learning disrupted natural sleep patterns, a correlation strongly supported by studies linking excessive screen time to delayed melatonin production and poor sleep quality [26]. These factors intertwine in a vicious cycle: a high workload demands more time online, which increases stress, leading to poorer sleep quality, which in turn reduces cognitive function and productivity, creating a need to work even longer hours to compensate [26]. This cycle has dire implications, as chronic sleep deprivation is a well-established risk factor for the burnout, anxiety, depression, and stress measured in this study, ultimately impairing the cognitive function and emotional regulation essential for both effective teaching and learning.

The association between female gender and higher stress levels is consistent with the broader global literature on mental health, which consistently shows women reporting higher levels of psychological

distress. This could be influenced by a complex interplay of biological, socio-cultural, and psychosocial factors, including a greater tendency to internalize stress and to report symptoms. Furthermore, the finding that personal bereavement (loss of a family member or friend to COVID-19) was significantly linked to higher rates of depression underscores the direct traumatic impact of the virus. It highlights that beyond the anxieties of the pandemic, the experience of actual loss was a profound driver of psychological morbidity, adding a layer of grief to an already stressful situation [27].

The near-universal vaccination rate (95.3%) among participants is a positive finding, reflecting the high level of health awareness and access within this community. However, it also starkly illustrates that even high levels of biomedical protection could not shield individuals from the pervasive psychological repercussions of the pandemic environment. It is one of the first in Pakistan to simultaneously investigate all three core dimensions of psychological distress i.e., stress, anxiety, and depression in both medical students and faculty using validated, internationally recognized instruments (PSS-10, GAD-7 and PHQ-9). The adequate sample size and high response rate enhance the reliability of the findings.

CONCLUSION:

The COVID-19 pandemic contributed to significant emotional and psychological strain within the medical academic community in Karachi, particularly among students. These outcomes likely reflect academic disruption, limited clinical exposure, and pandemic-related grief. There is a clear need for structured mental health support systems, proactive counseling services, and institutional stress-management interventions to protect the well-being of students and faculty.

Future prospects: Future research should employ longitudinal designs to track the long-term mental health outcomes of this population and to quantitatively assess the effectiveness of the mental health interventions implemented in response to these findings in order to ensure that mental well-being of medical students and faculty is not just an ethical concern, it is fundamental for building a skilled, adaptable, and sustainable healthcare workforce in Pakistan.

Recommendations: Present study recommends that medical colleges:

- Integrate mandatory mental health screening using validated tools like the PHQ-9 and GAD-7 into student and faculty health services.
- Establish and promote accessible, confidential, and free counseling services within institutions.
- Develop and implement wellness programs and workshops focused on building resilience, stress management, and coping strategies.
- Foster a supportive academic environment that acknowledges these challenges and provides flexibility and support.

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Author's Contribution:

SHQ: Concept & design, manuscript writing, responsible for integrity of research.
HS: Editing of manuscript, review and final approval of manuscript
JR: Data collection, manuscript writing and statistical analysis
DS: Data collection and manuscript writing

REFERENCES:

1. Ahmed M, Hamid R, Hussain G, Bux M, Ahmed N, Kumar M. Anxiety and depression in medical students of Sindh province during the Covid-19 pandemic. Rawal Med J. 2020;45(4):947-50. DOI: https://www.rmj.org.pk/?mno=123902.
2. Bashir TF, Hassan S, Maqsood A, Khan ZA, Issrani R, Ahmed N, et al. The psychological impact analysis of novel COVID-19 pandemic in health sciences students: a global survey. European J dentistry. 2020;14(01):91-6. DOI:

10.1055/s-0040-1721653
3. Bohong L, Taresh SM. Mental Health Challenges Among Teachers In China During Covid-19: The Mediating Influence Of Psychological Climate And Online Teaching Fatigue. Sci Conservation Archaeolog. 2024;36(3):327-32. DOI: http://sci-arch.org/index.php/wwbhen/article/view/156.
4. Cheung RY. Patient health questionnaire-9 (PHQ-9). InHandbook of assessment in mindfulness research 2025 Jul 3 (pp. 1837-1848). Cham: Springer Nature Switzerland. DOI: https://doi.org/10.1007/978-3-031-47219-0_63.
5. Choi B, Jegatheeswaran L, Minocha A, Alhilani M, Nakhoul M, Mutengesa E. The impact of the COVID-19 pandemic on final year medical students in the United Kingdom: a national survey. BMC med educat. 2020;20(1):206-209. DOI: https://doi.org/10.1186/s12909-020-02117-1
6. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J health and social behavior. 1983:385-96. DOI: https://doi.org/10.2307/2136404
7. de Lima Nardin K. Digital Burnout: The Effect of Screen Workloads on Mental Health and Quality of Life. EC Psychology and Psychiatry. 2025;14:01-14. DOI: 10.31080/ECPP. 2025. 14. 01149
8. Dhahri AA, Arain SY, Memon AM, Rao A, Khan MM, Hafeez G, et al. The psychological impact of COVID-19 on medical education of final year students in Pakistan: A cross-sectional study. Annals of Medicine and Surgery. 2020;60 (1):445-50. DOI: https://doi.org/ 10.1016/ j.amsu.2020.11.025
9. Ghazawy ER, Ewis AA, Mahfouz EM, Khalil DM, Arafa A, Mohammed Z, et al. Psychological impacts of COVID-19 pandemic on the university students in Egypt. Health Promotion Int. 2021 ;36(4):1116-25. DOI: https://doi. org/ 10.1093/heapro/daaa147.
10. Grover S, Sahoo S, Mehra A, Avasthi A, Tripathi A, Subramanyan A, et al. Psychological impact of COVID-19 lockdown: An online survey from India. Indian J psychiatry. 2020 ;62(4):354-62. DOI: 10.4103/ psychiatry. Indian JPsychiatry_427_20
11. Hassnain S, Ahmad A, Qayyum MS, Farrukh MG, Nawaz UA, Ahmad H. Effects of COVID-19 Lockdown on mental health of medical students in Lahore, Pakistan. Bangladesh J Medical Sci. 2021:125-30. DOI: https://doi.org/10.3329/bjms.v20i5.55406
12. Imran N, Haider II, Mustafa AB, Aamer I, Kamal Z, Rasool G, et al. The hidden crisis: COVID-19 and impact on mental health of medical students in Pakistan. Middle East Current Psychiatry. 2021 ;28(1):45. DOI: https://doi.org/10.1186/s43045-021-00123-7
13. Junaid Tahir M, Tariq W, Anas Tahseen Asar M, Irfan Malik M, Kamal Akhtar F, Malik M, et al. Psychological impact of COVID-19 on doctors and medical students of Punjab, Pakistan: a logistic regression analysis. J multidisciplinary healthcare. 2022:1297-308. DOI: https://doi. org/10.2147/JMDH.S369452
14. Junça-Silva A, Kulyk M, Caetano A. The impact of morning meditation and sleep quality on affective and health outcomes in healthcare workers. Int J Environment Res Pub Healt. 2025;22(4):592. DOI: 10.3390/ijerph22040592
15. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J general internal med. 2001;16(9):606-13. DOI: https://doi.org/10.1046/j.1525-1497.2001. 016009606.x
16. Liu R, Qiu Q, Ye B. The relationship between COVID-19 stress and test anxiety in art students: the chain mediating roles of intolerance of uncertainty and sleep quality. BMC Public Health. 2024;24(1):1163. DOI: https://doi. org/10.1186/s12889-024-18684-7
17. Meneo D, Baldi E, Benz F, Fabris MA. A biopsychosocial approach to sleep health during puberty: Individual and contextual aspects and the role of gender differences. A narrative review. Cogent Mental Health. 2025;4(1):1-59. DOI: https://doi.org/10.1080/28324765.2025.2541697
18. Menzies RE, Neimeyer RA, Menzies RG. Death anxiety, loss, and grief in the time of COVID-19. Behaviour Change. 2020;37(3):111-5. DOI: https://doi.org/10.1017/bec.2020.10

19. Nishimura Y, Ochi K, Tokumasu K, Obika M, Hagiya H, Kataoka H, et al. Impact of the COVID-19 pandemic on the psychological distress of medical students in Japan: cross-sectional survey study. J med Internet Res. 2021;23(2):e25232. DOI:
20. Pries S. Communication of the COVID-19 Pandemic by the WHO Analysing the Flow of Information from Organisational Communication to Media Reporting. DOI: http://hdl. handle. net/10230/48009
21. Reis RS, Hino AA, Añez CR. Perceived stress scale. J. health Psychol. 2010;15(1):107-14. DOI: 10.1177/1359105309346343
22. Salman M, Asif N, Mustafa ZU, Khan TM, Shehzadi N, Tahir H, et al. Psychological impairment and coping strategies during the COVID-19 pandemic among students in Pakistan: a cross-sectional analysis. Disaster medicine and public health preparedness. 2022;16(3):920-6. DOI: https://doi.org/10.1017/dmp.2020.397
23. Saraswathi I, Saikarthik J, Kumar KS, Srinivasan KM, Ardhanaari M, Gunapriya R. Impact of COVID-19 outbreak on the mental health status of undergraduate medical students in a COVID-19 treating medical college: a prospective longitudinal study. PeerJ. 2020;8:e10164. DOI: https://doi.org/10.7717/peerj.10164.
24. Seetan, Khaled, Mohammad Al-Zubi, Yousef Rubbai, Mohammad Athamneh, Almu'atasim Khamees, et al. "Impact of COVID-19 on medical students' mental wellbeing in Jordan."Ê*Plos one. 2021;*Ê16(6): e0253295. DOI: https://doi.org/10.1371/ journal. pone.0253295
25. Silva AA, Vieira BA, Santos JC. The relationship between sleep deprivation and the worsening of mood disorders in health professionals working night shifts. Dementia & Neuropsychologia. 2025;19(1):e20240186. DOI: https://doi.org/10.1590/1980-5764-DN-2024-0186
26. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Archives of internal medicine. 2006;166(10):1092-7. DOI: 10.1001/archinte.166.10.1092
27. Torun F, Torun SD. The psychological impact of the COVID-19 pandemic on medical students in Turkey. Pak J med sci. 2020;36(6):1355. DOI: 10.12669/pjms.36.6.2985