THE JOURNAL OF RESEARCH REVIEW

P-ISSN: 3006-2632	E-ISSN: 3006-2640
Vol. 3. No. 01 (Jan-March) 2026	Page 748-765

Assessing Anxiety and Future Specialty Preparation Among Medical Students and House Officers in Pakistan: A Cross-Sectional Study

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Abstract: *Background: Anxiety disorders are among the major mental health and morbidity concerns worldwide. Medical education is widely recognized as a highly demanding and stressful environment, and medical students often experience higher levels of anxiety than the general population. This study aimed to assess the prevalence of anxiety symptoms among clinical-year medical students and house officers in Central Punjab, Pakistan, and to examine their association with sociodemographic characteristics, academic performance, challenges encountered during medical training, and perceived preparedness for future medical specialties.*

A cross-sectional study was conducted at a tertiary care hospital affiliated with a medical college in Central Punjab, Pakistan, during 2025–2026. A total of 123 clinical-year medical students and house officers participated in the study. Data were collected using the Generalized Anxiety Disorder-7 (GAD-7) scale along with a detailed sociodemographic questionnaire. Data analysis was performed using SPSS version 23, including descriptive statistics, frequency distributions, and independent-samples t-tests. The reliability of the GAD-7 scale was assessed using internal consistency analysis.

Results: Overall, 48.8% (n=60) of participants reported clinically significant anxiety symptoms (GAD-7 score ≥10), while 24.4% (n=30) experienced severe anxiety symptoms. The GAD-7 demonstrated very good internal consistency (Cronbach's α = 0.912). Female participants had higher mean GAD-7 scores (M=7.475, SD=5.034) than male participants (M=5.641, SD=5.451); however, the difference was not statistically significant (p=0.072). Notably, 33.3% of participants reported experiencing psychological problems, yet only 11.5% had sought professional psychological or psychiatric support and received a formal psychiatric diagnosis.

Conclusion: Anxiety symptoms are highly prevalent among medical students and house officers in Pakistan, while a substantial proportion of those experiencing psychological difficulties do not seek professional assistance. These findings highlight the need for regular mental health screening, early identification of individuals at risk, and the provision of accessible, confidential, and supportive mental health services within Pakistani medical institutions. Strengthening institutional mental health support may help address the psychological challenges associated with medical training and improve the overall well-being of future healthcare professionals.

Keywords: *Anxiety, medical students, house officers, Pakistan*

Introduction

Mental health is an integral part of the World Health Organization (WHO) broader definition of health, which encompasses physical, mental, and social well-being rather than merely the absence of disease. Anxiety disorders are among the most prevalent mental health disorders worldwide and are associated with substantial morbidity, disability, and economic costs. The WHO 2017 report estimated that approximately 264 million people worldwide were affected by anxiety disorders, making them a major contributor to disability-adjusted life years (DALYs) globally [1]. Individuals with anxiety disorders experience excessive and distressing worries related to a range of events or activities and may present with symptoms such as restlessness, irritability, fatigue, sleep disturbances, difficulty concentrating, and muscle tension [2].

Burden of Anxiety in Medical Education Worldwide

Anxiety symptoms have become an important area of research in medical education, particularly because of their high prevalence among medical students. Numerous studies have reported that medical students experience higher levels of anxiety than students from other disciplines and age-matched individuals in the general population [3,4]. In a multicenter study comparing Canadian medical students (N=506) with age-matched controls from the general population (N=1,793), the prevalence of diagnosed anxiety disorders was significantly higher among medical students (9.6%) than among controls (4.0%). Furthermore, students in the clinical years experienced significantly higher levels of anxiety disorders than those in the preclinical years [5].

A comprehensive meta-analysis published in 2019, which included 69 studies involving 40,438 medical students worldwide, reported a pooled anxiety prevalence of 33.8% (95% confidence interval: 29.2–38.7) [6]. The findings also demonstrated significant regional variations, with the highest prevalence reported in countries of the Middle East. The considerable variation between studies was attributed to differences in measurement instruments, cultural backgrounds, and research methodologies [6].

Regional Evidence from the Middle East and South Asia

Several studies have reported a high prevalence of anxiety among medical students in the Middle East. A cross-sectional study conducted at Fayoum University in Egypt among 442 medical students found that 64.3% experienced anxiety symptoms, with higher levels reported among female students, those older than 20 years, and single students [7]. Similarly, a study involving 350 medical students using the Beck Anxiety Inventory (BAI) found that 51% experienced anxiety symptoms, which were more common among female students and those who had repeated an academic year [8]. In Lebanon, Talih et al. assessed 176 medical students using the GAD-7 scale and found that 22.7% reported anxiety symptoms [9]. Similarly, research conducted at Jazan University in Saudi Arabia using the DASS-21 instrument reported a high prevalence of psychological distress among participants [10].

The Pakistani Context

The situation in Pakistan is similarly concerning and, in some cases, may be even more severe. An early study conducted in Karachi reported that 70% of medical students experienced anxiety, while 60% experienced depression [11]. Another study found a high prevalence of anxiety and depression among family practitioners in Karachi, suggesting that psychological difficulties may persist beyond medical school and into professional practice [12]. Furthermore, physicians have been reported to have approximately twice the risk of depression and suicidal ideation compared with the general population, highlighting the potential long-term mental health implications for individuals working in the medical profession [13].

More recent findings from Pakistan continue to demonstrate this concerning trend. A study conducted among medical students at a private medical college reported that 19% of participants experienced moderate-to-severe anxiety symptoms based on the Beck Anxiety Scale [14]. In another cross-sectional study conducted across five medical colleges in Punjab using the DASS-21 scale, 61.4% of medical students reported anxiety symptoms. Female students were more affected than male students (65.2% vs. 55.1%, $p \leq 0.03$) [15].

Medical Education as an Environment of Risk and Stress

Anxiety among medical students may arise from multiple academic, personal, and professional factors. Medical education represents a significant transition from secondary education to an adult learning environment that requires greater independence and limited supervision [8]. Commonly reported stressors include information overload, financial difficulties, limited leisure time, academic workload, and uncertainty regarding future career decisions [16,17]. The transition from preclinical to clinical education has been identified as one of the most stressful periods of medical training, as students begin interacting directly with patients and may encounter challenging clinical situations, including patient deterioration and death [18].

The competitive environment of medical colleges, combined with competition for postgraduate training and future employment opportunities, may further contribute to psychological distress [8]. In addition to academic factors, other potential risk factors include female gender, a family history of depression or anxiety, the recent loss of a close relative, and substance use [11].

Future Specialty Preparation and Career Decisions

Upon completion of their medical education, medical students in Pakistan must make important decisions regarding their future careers. Options may include entering local postgraduate residency programs, pursuing Master's or Doctoral degrees in preclinical disciplines, or working as general practitioners. Postgraduate residency programs in Pakistan are highly competitive and are administered by the College of Physicians and Surgeons Pakistan (CPSP) and various universities [19]. Admission processes may involve assessment of applicants' curricula vitae (CVs), academic performance, grade point averages (GPAs), and National Licensing Examination (NLE) scores. The competitive nature of this selection process may increase stress and anxiety related to future career planning.

Anxiety may also influence medical students' decisions regarding their choice of specialty. Higher levels of anxiety may contribute to avoidance of specialties perceived as highly demanding or involving greater responsibility, such as surgery or emergency medicine,

potentially influencing long-term career pathways and job satisfaction [20]. Therefore, understanding the relationship between anxiety and preparation for future specialty selection is important for developing appropriate interventions and career-support mechanisms for medical students and house officers.

Research Gap and Study Objective

Although several studies have examined anxiety among medical students in Pakistan, important gaps remain in the existing literature. Limited attention has been given to the relationship between anxiety symptoms and preparation for future medical specialization in the Pakistani context. Furthermore, clinical-year medical students and house officers may experience distinct academic, clinical, and career-related stressors that differ from those encountered during earlier stages of medical education.

This study aims to address these gaps by investigating the prevalence of anxiety symptoms and their association with sociodemographic characteristics, academic performance, challenges experienced during medical training, and perceived preparedness for future specialties among clinical-year medical students and house officers in Central Punjab, Pakistan.

Methods

Study Setting and Design

A cross-sectional study was conducted at a tertiary care hospital affiliated with a medical college in Central Punjab, Pakistan, during 2025–2026. The study setting was selected to include medical students undergoing clinical education and house officers engaged in clinical practice or postgraduate training.

Study Population and Sample

The target population included medical students in their fourth, fifth, and sixth clinical years, as well as house officers. Fourth-year students were included because this stage represents the transition to clinical training, which has been identified as a potentially stressful period in medical education. Students in the fifth and sixth years were included to capture experiences across different stages of clinical training. House officers were also included to assess anxiety beyond the undergraduate medical education period.

The sample size was calculated using an estimated anxiety prevalence of 33.8%, based on the global meta-analysis conducted by Kivallikum et al. [6], with an alpha level of 0.05 and a precision of 5%. The minimum required sample size was estimated to be 85 participants. Participants were recruited through convenience sampling. Eligible students and house officers who provided informed consent were recruited until the required sample size was achieved. Although convenience sampling may limit the generalizability of the findings, it was considered appropriate given the practical challenges associated with data collection during clinical rotations and the limited timeframe available for the study.

Inclusion Criteria

* Medical students enrolled in the 4th, 5th, and 6th clinical years at the study institution.

* House officers working at the tertiary care hospital affiliated with the medical college.

* Participants willing to provide written informed consent.

* Participants able to complete the self-administered questionnaire in English, the language of instruction at the medical college.

Exclusion Criteria

Students or house officers with a previously diagnosed psychiatric disorder that could potentially influence the study results, based on self-report.

Students or house officers who were absent from the institution during the data collection period.

Participants who submitted incomplete questionnaires.

Data Collection Tool

Data were collected using a structured, self-administered questionnaire consisting of several sections.

Sociodemographic Section: This section collected information regarding participants' age, gender, academic level, marital status, and place of residence.

Academic Factors Section: This section gathered information about GPA on a 5-point scale, history of academic failure, preferred future specialty, preparation of a curriculum vitae (CV), and participation in research activities. GPA was categorized as ≤3.50, 3.51–4.00, 4.01–4.50, and >4.50.

Perceived Problems Section:

Participants were asked whether they had experienced various difficulties during their medical education, including family problems, financial problems, social problems, psychological problems, diagnosed medical conditions, and diagnosed psychiatric conditions. Responses were recorded as categorical variables (Yes/No).

Perceived Readiness Section:

Participants' perceived preparedness for their future medical specialty was assessed using a five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

Anxiety Assessment Section:

Anxiety symptoms were assessed using the Generalized Anxiety Disorder-7 (GAD-7) scale, a widely used and validated screening instrument for assessing anxiety symptoms in clinical and research settings [21]. The GAD-7 consists of seven items that assess the frequency of anxiety-related symptoms experienced during the previous two weeks. Each item is scored from 0 to 3: 0 = "not at all," 1 = "several days," 2 = "more than half of the days," and 3 = "nearly every day." The total score ranges from 0 to 21. Scores of 0–4, 5–9, 10–14, and 15–21 represent minimal, mild, moderate, and severe anxiety, respectively. A GAD-7 score of 10 or higher has demonstrated optimal sensitivity (89%) and specificity (82%) for identifying anxiety cases and is considered an appropriate cut-off for clinically significant anxiety [21]. In the present study,

participants with a GAD-7 score below 10 were classified as having no clinically significant anxiety symptoms, whereas those with a score of 10 or higher were considered to have clinically significant anxiety symptoms.

Data Collection Procedure and Ethical Considerations

The research team individually approached medical students from each academic year and house officers to invite them to participate in the study. The questionnaire was paper-based and administered in English, which is the medium of instruction at the medical college. The researchers explained the purpose of the study to participants and assured them that participation was voluntary and that they would not experience any negative consequences for choosing not to participate. Participants were also assured of the confidentiality of their information and that the collected data would be used solely for research purposes.

The study was approved by the Institutional Review Board (IRB) of the respective medical college and affiliated hospital. Written informed consent was obtained from all participants before data collection. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 23.0 (Armonk, NY: IBM Corp.). Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations (SDs). The internal consistency of the GAD-7 scale was assessed using Cronbach's alpha coefficient. Independent-samples t-tests were used to compare mean GAD-7 scores between male and female participants. Cohen's d, Hedges' correction, and Glass's delta, along with 95% confidence intervals, were used to estimate effect sizes. For all statistical analyses, a two-sided p-value of <0.05 was considered statistically significant.

Results

Table 1 *Sociodemographic Characteristics of the Participating Medical Students and House Officers (N=123)*

Characteristic	Category	N	%
Age Group	1	30	24.4
	2	33	26.8
	3	30	24.4
	4	30	24.4
Sex	Female	82	66.7

Characteristic	Category	N	%
	Male	41	33.3
Marital Status	Single	114	92.7
	Married	9	7.3
Living Arrangements	With parents	4	3.3
	With spouse	58	47.2
	With relative	10	8.1
	Alone	46	37.4
	With friend	4	3.3
	Student accommodation	1	0.8

Table showed that the sociodemographic characteristics of participants are presented in Table 1. The majority of participants were female (66.7%, n=82), single (92.7%, n=114), and living with parents (47.2%, n=58). The age distribution was relatively even across the four categories, with 30 respondents (24.4%) in each of the lower and higher age groups, and 33 respondents (26.8%) in the second category. The sample was predominantly female, with 82 respondents (66.7%) identifying as female and 41 respondents (33.3%) identifying as male. This gender distribution reflects the typical enrollment pattern in Pakistani medical colleges, where female students often constitute the majority.The vast majority of respondents were single (92.7%, n=114), with only 9 respondents (7.3%) reporting being married. This is consistent with the expected demographic profile of medical students in Pakistan, where marriage is typically deferred until after completion of medical education.Regarding living arrangements, the most common arrangement was living with parents (47.2%, n=58), followed by living alone (37.4%, n=46). Smaller proportions reported living with spouse (8.1%, n=10), living with friends (3.3%, n=4), living with relatives (3.3%, n=4), or in student accommodation (0.8%, n=1).

Academic Characteristics The academic characteristics of the sample are presented in Table 2. Among the 119 respondents who reported their GPA, the majority had a GPA of 2 (47.9%, n=57), followed by GPA of 3 (27.7%, n=33). Academic failure was reported by 34.1% (n=42) of students. Regarding career preparation, 51.6% (n=63) had chosen their future specialty, while only 23.0% (n=28) had prepared their CVs. Research participation was relatively high at 75.4% (n=92). The majority of students (82.9%) agreed or strongly agreed that they were ready for their future specialty.

Table 2 *Academic Characteristics and Career Preparation of the Participating Medical Students and House Officers (N=123)*

Characteristic	Category	n	%
GPA out of 5*	1	23	19.3
	2	57	47.9
	3	33	27.7
	4	6	5.0
Ever Failed in Module	Yes	42	34.1
	No	76	61.8
	Maybe	5	4.1
Chosen Future Specialty**	Yes	63	51.6
	No	32	26.2
	Still Indecisive	27	22.1
Prepared CV**	Yes	28	23.0
	No	82	67.2
	Not Sure	12	9.8
Research Participation**	Yes	92	75.4
	No	30	24.6

Characteristic	Category	n	%
Ready for Future Specialty	Strongly Agree	31	25.2
	Agree	71	57.7
	Neutral	17	13.8
	Disagree	4	3.3

*Note: n=119 for GPA; **n=122 for career preparation variables.*

Problems Experienced During Study of Medicine

Table 3 presents the problems experienced by participants. Social problems were the most commonly reported (47.2%, n=58), followed by psychological issues (33.3%, n=41) and family problems (31.7%, n=39). Notably, while 33.3% of students reported psychological issues, only 11.5% (n=14) had been diagnosed with psychiatric problems, indicating a substantial treatment gap of 21.8 percentage points.

Table 3 *Problems Experienced by Students During Study of Medicine (N=123)*

Problem Type	Yes (n)	Yes (%)	No (n)	No (%)
Family Problems	39	31.7	84	68.3
Financial Problems	30	24.4	93	75.6
Social Problems	58	47.2	65	52.8
Psychological Issues	41	33.3	82	66.7
Diagnosed Medical Problems*	32	26.2	90	73.8
Diagnosed Psychiatric Problems*	14	11.5	108	88.5

Note: n=122 for diagnosed medical and psychiatric problems due to missing data.

Reliability Analysis of the GAD-7 Scale

Table 4 *Reliability Statistics for the GAD-7 Scale*

Statistic	Value
Cronbach's Alpha	.912
N of Items	7

The GAD-7 scale demonstrated excellent internal consistency, with a Cronbach's alpha coefficient of 0.912 (Table 4). This indicates that the seven items of the GAD-7 scale are highly correlated and collectively measure the same underlying construct of generalized anxiety with remarkable reliability. The analysis included 119 respondents (96.7% of the sample), with 4 cases (3.3%) excluded due to missing data using listwise deletion.

Prevalence and Severity of Anxiety Symptoms

Item-Total Statistics: Corrected item-total correlations ranged from .684 to .803, with "Not being able to stop or control worrying" showing the strongest correlation (r = .803). The Cronbach's alpha if item deleted remained above .891 for all items, confirming that no single item was detrimental to scale reliability. The scale mean was 6.87 (SD = 5.223).

Table 5 *Distribution of Anxiety Severity Levels Using GAD-7 Scores (N=123)*

Severity Level	GAD-7 Score Range	n	%
Minimal Anxiety	0-4	30	24.4
Mild Anxiety	5-9	33	26.8
Moderate Anxiety	10-14	30	24.4
Severe Anxiety	15-21	30	24.4
Clinically Significant Anxiety	**≥10**	**60**	**48.8**

Gender Differences in Anxiety

Independent samples t-test was conducted to compare GAD-7 scores between male and female participants (Table 5. Female students (n=80) had higher mean GAD-7 scores (M = 7.475, SD = 5.034) compared to male students (n=39, M = 5.641, SD = 5.451). However, this difference did not reach statistical significance at the conventional level, t(117) = 1.815, p = .072, two-tailed.Levene's test for equality of variances was not significant, F(1, 117) = 0.525, p = .470,

indicating that the assumption of equal variances was met. The mean difference was 1.834 (95% CI [-.167, 3.835]).

Table 6 *Gender Differences in GAD-7 Scores: Descriptive Statistics, Independent Samples t-Test, and Effect Sizes*

Variable	Sex	n	M	SD	t (df)	P	Mean Diff [95% CI]	Cohen's d [95% CI]
GAD-7 Score	Female	80	7.475	5.034	1.815 (117)	.072	1.834 [-.167, 3.835]	.355 [-.032, .739]
	Male	39	5.641	5.451				

*Note. GAD-7 = Generalized Anxiety Disorder-7 scale; M = mean; SD = standard deviation; CI = confidence interval. Equal variances were assumed for the t-test (F = 0.525, *p* = .470). Cohen's d uses the pooled standard deviation*

In order to see if there were any difference in GAD-7 scores between males and females, a GAD-7 independent samples t-test was performed (see Table 6). Female students (n = 80) had higher mean GAD-7 scores (M = 7.475, SD = 5.034) compared to male students (n = 39, M = 5.641, SD = 5.451). However this difference between the two groups was not conventional in terms of being significant, t(117) = 1.815, p = .072 (two tailed). The assumption of homogeneity of variances was not violated by the Levene's test for equality of variances which was not significant, F(1, 117) = 0.525, p = .470. The mean difference was 1.834 (95% CI [-.167, 3.835]).The effect size for gender differences was small (Cohen's d = .355, 95% CI [-.032, .739]). Confidence interval included 0 which meant that the true population effect size was uncertain.

DISCUSSION

The present study found a high prevalence of anxiety symptoms among clinical-year medical students and house officers, with 48.8% of participants reporting clinically significant anxiety and 24.4% experiencing severe anxiety. This prevalence is considerably higher than the 33.8% reported in the global meta-analysis by Quek et al. (2019) and also exceeds the 31.7% prevalence reported by AlShamlan et al. (2020) in Saudi Arabia using the same GAD-7 instrument. The relatively high prevalence observed in the present study may be explained by several factors. First, medical education in Pakistan is characterized by considerable academic pressure, high-stakes examinations, and highly competitive postgraduate training programs. The selection process for postgraduate education, particularly programs governed by the College of Physicians and Surgeons Pakistan (CPSP), is highly competitive and may contribute significantly to students' stress and anxiety.

Second, the sociocultural environment in Pakistan may contribute to increased psychological pressure among medical students. In addition to the usual challenges associated with medical

education, students may experience family pressures, financial difficulties, and broader social and cultural stressors. The findings of the present study support this possibility, as 47.2% of participants reported social problems and 33.3% reported psychological problems. Third, students in the clinical years may face challenges specific to the healthcare environment in Pakistan. High patient volumes, limited resources, difficult working conditions, and the emotional demands associated with caring for patients may further increase anxiety among clinical-year students and house officers.

The prevalence observed in this study is consistent with previous research conducted in Pakistan. Khan (2006) reported that 70% of medical students in Karachi experienced anxiety, while Azad (2017) found that 19% of medical students experienced moderate-to-severe anxiety. Differences in measurement instruments, sampling methods, study populations, and research settings may account for variations in reported anxiety prevalence across studies conducted in Pakistan.

Gender Differences

The present study found no statistically significant difference in mean GAD-7 scores between male and female participants ($p=0.072$). However, female participants had higher mean anxiety scores than males, which is consistent with findings reported in international studies (Moreira de Sousa et al., 2018; Mahroon et al., 2018; AlShamlan et al., 2020). The effect size (Cohen's $d=0.355$) was small, suggesting that although a difference existed between male and female participants, its magnitude was relatively limited in this study population.

Several factors may explain the absence of a statistically significant gender difference. First, the sample included a relatively smaller number of male participants (n=39, 33.3%), which may have reduced the statistical power to detect differences between the two groups. Second, anxiety levels were relatively high among both male and female participants, potentially reducing the observable difference between the groups. Third, many of the stressors experienced by medical students may be common to both genders rather than gender-specific. Both male and female medical students face substantial academic demands, clinical responsibilities, and pressures related to future career planning.

Reliability of the GAD-7

The GAD-7 demonstrated high internal consistency in the present study (Cronbach's $\alpha=0.912$), supporting its reliability for assessing anxiety symptoms among medical students in Pakistan. This finding is comparable to the internal consistency reported by Spitzer et al. (2006) in the original validation study ($\alpha=0.92$). Although AlShamlan et al. (2020) did not report reliability data for the GAD-7 in their Saudi Arabian study, the instrument was successfully applied in their research.

The high internal consistency observed in the present sample indicates that the GAD-7 consistently measures symptoms associated with generalized anxiety among medical students. All item-total correlation values were relatively high, ranging from 0.684 to 0.803, suggesting that each item contributed meaningfully to the overall scale. The item related to difficulty stopping or controlling worry demonstrated the highest correlation ($r=0.803$), which is consistent with a central feature of generalized anxiety disorder. This finding suggests that

excessive and uncontrollable worry may be particularly prominent among medical students experiencing anxiety and could represent an important area for targeted intervention.

Mental Health Treatment Gap

One of the important findings of this study was the considerable gap between reported psychological problems and formal psychiatric diagnosis. While 33.3% of participants reported experiencing psychological problems, only 11.5% reported having received a formal psychiatric diagnosis or professional support. This 21.8 percentage-point difference is concerning and may indicate substantial barriers to accessing or utilizing mental health services.

This finding is consistent with research conducted in other countries. Morena et al. (2018) reported that approximately 60% of Portuguese university students experiencing anxiety did not seek professional mental health services. A similar pattern was reported in Saudi Arabia by AlShamlan et al. (2020), who found a difference between students reporting psychological problems (21.4%) and those with diagnosed mental health conditions (4.4%).

Several factors may contribute to this treatment gap in Pakistan. First, mental health remains a sensitive and stigmatized issue in many parts of Pakistani society. Individuals may avoid seeking professional assistance because of concerns about social stigma, reputational consequences, or potential negative perceptions affecting themselves or their families.

Second, medical students may not always recognize the severity of their own symptoms or may not consider them serious enough to require professional intervention (Moreira de Sousa et al., 2018). Another possible factor is the phenomenon known as "medical student syndrome," in which students may become overly concerned that they have diseases or conditions that they encounter during their medical education.

Third, students may fear that seeking mental health support could negatively affect their academic performance or future career opportunities. In a highly competitive medical education environment, students may perceive any indication of psychological difficulty as a potential disadvantage.

Another contributing factor may be the limited availability of mental health facilities and services within medical institutions. Students may not know where to seek professional assistance or may have limited access to confidential psychological support. The underutilization of mental health services may therefore partly reflect the lack of accessible and institutionally integrated mental health resources.

Finally, some medical students may attempt to manage their psychological difficulties independently or rely on self-treatment rather than seeking professional help. This may be particularly problematic because medical knowledge alone does not necessarily enable students to accurately assess or manage their own mental health conditions.

Social and Psychological Problems

Social problems were the most frequently reported difficulty, affecting 47.2% of participants, while 33.3% reported psychological problems. The high prevalence of social difficulties may reflect the demanding nature of medical education, which can contribute to social isolation,

limited time for relationships and leisure activities, and difficulties maintaining healthy social connections.

There may also be a reciprocal relationship between social and psychological problems. Social difficulties may contribute to psychological distress, while psychological problems may, in turn, negatively affect social functioning. This interaction highlights the importance of developing comprehensive interventions that address both the social and psychological dimensions of student well-being.

Career Preparation and Future Specialty Selection

An important finding was that 67.2% of participants had not prepared their curriculum vitae (CV), despite the importance of a strong CV in competitive postgraduate residency programs. Research participation, GPA, National Licensing Examination performance, and CV development may all contribute to the postgraduate selection process associated with the College of Physicians and Surgeons Pakistan (CPSP).

The lack of CV preparation may represent an important aspect of the career readiness gap and could contribute to anxiety regarding future career preparation. Students who have not developed their CVs may experience uncertainty about their academic and professional competitiveness, which may further increase anxiety. This finding is also relevant to the observation that 22.1% of participants had not yet selected their preferred specialty.

On the other hand, the proportion of students involved in research activities was relatively high (75.4%), which is encouraging because research experience may strengthen postgraduate residency applications and contribute to professional development. However, there appears to be a notable mismatch between research participation (75.4%) and CV preparation (23.0%). This suggests that many students may be engaging in valuable academic activities but are not adequately documenting these achievements for their professional development and future career applications.

Comparison with International Evidence

The findings of this study are broadly consistent with the international literature regarding anxiety among medical students, while also highlighting the comparatively high prevalence observed in Pakistan. Quek et al. (2019) reported a global prevalence of anxiety of 33.8%, with the highest prevalence observed in Middle Eastern countries. The prevalence of 48.8% identified in the present study is higher than the global average and also exceeds the prevalence reported in Saudi Arabia by AlShamlan et al. (2020), suggesting that medical students in Pakistan may experience a particularly high level of anxiety.

Several factors may contribute to this increased risk. First, postgraduate medical education in Pakistan is highly competitive, with a limited number of training positions available relative to the number of applicants. Students must also complete important examinations and meet various requirements following medical school. In addition, the sociocultural environment may introduce further stress through economic difficulties, family expectations, and limited access to mental health services.

The finding that 24.4% of participants experienced severe anxiety is particularly concerning and indicates the need for targeted interventions for students experiencing the greatest psychological burden. This proportion is higher than the 14.3% reported by AlShamlan et al. (2020) in Saudi Arabia and also exceeds the prevalence reported in some international studies (20.0%).

Implications for Medical Education and Policy

The findings of this study have several important implications for medical education and policy in Pakistan.

First, regular mental health screening using validated instruments such as the GAD-7 should be considered within Pakistani medical institutions. Screening at important transition points, including entry into clinical training, completion of the final year, and the beginning of house jobs, may help identify students at increased risk and facilitate early intervention.

Second, medical institutions should ensure the availability of accessible, confidential, and appropriately designed mental health services. Students should be clearly informed about the availability of these services and assured that seeking professional support will remain confidential.

Third, medical institutions should actively work to reduce the stigma associated with mental health problems. This may be achieved through mental health literacy programs, integration of mental health awareness into medical education, and the promotion of positive experiences of individuals who have successfully sought psychological support.

Fourth, the apparent relationship between anxiety and career preparedness highlights the potential value of faculty mentorship programs. Such programs could provide students with guidance regarding future specialty options, postgraduate training pathways, and the requirements for successful residency applications.

Fifth, structured support should be provided for CV development, career planning, and residency applications. This support could be delivered through workshops, individual mentoring sessions, or peer-mentoring programs.

Sixth, the high prevalence of reported social problems suggests the need for interventions that promote social connection and peer support. Medical institutions could consider peer-support programs, social activities, and group-based interventions to strengthen students' social networks.

Finally, the transition to clinical training appears to represent an important period of increased psychological pressure. Medical institutions should consider providing specific support during this transition, including orientation programs, clinical skills training, stress-management resources, and accessible academic and psychological guidance.

Strengths and Limitations

Strengths

This study has several strengths. First, it contributes to the limited literature in Pakistan by specifically examining the relationship between anxiety and preparation for future

specialization. Second, the study used the well-validated and reliable GAD-7 screening instrument, which has established psychometric properties. Third, the study examined a broad range of factors, including sociodemographic characteristics, academic performance, personal challenges, and career preparedness. Fourth, the GAD-7 demonstrated high internal consistency in the present sample (α=0.912), supporting its suitability for assessing anxiety symptoms among medical students in Pakistan. Finally, the inclusion of both clinical-year medical students and house officers provided insight into anxiety across different stages of medical education and training.

Limitations

Several limitations should also be considered when interpreting the findings. First, the study was conducted at a single medical institution, which may limit the generalizability of the results to other medical institutions across Pakistan. Second, the data were collected through self-administered questionnaires, creating the possibility of recall and social desirability bias. Third, family, financial, social, and psychological problems were assessed based on participants' self-perceptions rather than objective clinical assessments. Fourth, the cross-sectional design does not allow causal relationships or the direction of associations to be established. Fifth, although the sample size was adequate for the analyses conducted, it was not sufficiently large to perform multivariable logistic regression and adjust for potential confounding variables. Finally, psychiatric disorders were not independently assessed before the study, which may have influenced the findings.

Recommendations for Future Research

Based on the findings and limitations of the present study, several areas for future research are recommended.

Longitudinal studies:Future research should use longitudinal designs to examine changes in anxiety levels throughout different stages of medical education and to determine whether anxiety persists or changes over time. Longitudinal research could also assess the effectiveness of mental health interventions.

Qualitative research: Qualitative studies could provide a deeper understanding of the lived experiences of medical students experiencing anxiety and identify specific barriers that prevent students from seeking professional mental health support in the Pakistani context.

Multicenter studies: Studies involving multiple medical institutions across different regions of Pakistan are needed to determine whether the findings of the present study are applicable to broader student populations.

Intervention studies: Future research should evaluate the effectiveness of targeted mental health interventions in reducing anxiety and improving students' academic and career-related outcomes.

Comparative studies:Comparative research could examine anxiety levels among medical students studying in public and private institutions and among students from urban and rural settings to identify contextual factors associated with psychological well-being.

Mixed-methods research: Combining quantitative and qualitative research approaches may provide a more comprehensive understanding of anxiety among medical students and the complex factors influencing mental health and help-seeking behavior.

Conclusion

The findings of the present study indicate a high prevalence of clinically significant anxiety symptoms (48.8%) among clinical-year medical students and house officers in Central Punjab, Pakistan, with a substantial proportion (24.4%) experiencing severe anxiety. The GAD-7 demonstrated high internal consistency (α=0.912), supporting its reliability for assessing anxiety symptoms in this population. Female participants reported higher mean GAD-7 scores than male participants, although the difference was not statistically significant.

The findings also highlight a considerable gap between psychological difficulties and professional mental health support, as only 11.5% of participants reported having received a formal psychiatric diagnosis or professional assistance, despite 33.3% reporting psychological problems. Furthermore, career preparedness remains an important concern, with 67.2% of participants reporting that they had not prepared their CVs. The high prevalence of social problems (47.2%) and psychological problems (33.3%) further demonstrates the need for comprehensive approaches to student well-being.

Overall, the findings emphasize the importance of implementing regular mental health screening programs, identifying students at increased risk, and ensuring easy access to confidential and supportive mental health services within Pakistani medical institutions. Greater attention should also be given to reducing mental health stigma, strengthening faculty mentorship, supporting career planning, and assisting students during major transitions in medical education. Future research using longitudinal, qualitative, multicenter, and mixed-methods approaches may provide a deeper understanding of anxiety among medical students and contribute to the development and evaluation of effective interventions in Pakistan.

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