Title: Prioritizing Mental Health: A Cross-sectional Investigation of Depression Prevalence and Risk Factors among Medical Students in Peshawar

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Author names: Nida Gul[1], Ayaz Ali[2], Rizwanullah[3], Khayam[4], Manahil Saeed Khan[5], Faiza Gul[6], Aiysha Gul[7], Shehriyar[8], Kashif Ali[9], Syed Owais Haseeb[10].

Degrees and Affiliations:

1. 4th Year MBBS Student. Khyber Medical College, Peshawar, Kpk, Pakistan
2. 4th Year MBBS Student. Khyber Medical College, Peshawar, Kpk, Pakistan
3. 1st Year Resident Physician Internal Medicine. Hayatabad Medical Complex, Peshawar, Kpk Pakistan
4. 2nd Year Resident Physician Internal Medicine. Combined Military Hospital, Peshawar, Kpk, Pakistan
5. Final Year MBBS Student. Khyber Medical College, Peshawar, Kpk, Pakistan
6. 1st Year Resident Pediatrician. Lady Reading Hospital, Peshawar, Kpk, Pakistan
7. 1st Year Resident Obstetricians and Gynecologist. Hayatabad Medical Complex, Peshawar, Kpk, Pakistan
8. 1st Year Resident Physician Internal Medicine. Hayatabad Medical Complex, Peshawar, Kpk, Pakistan
9. 1st Year Resident Physician Internal Medicine. Ayub Teaching Hospital, Abbottabad, Kpk, Pakistan
10. 1st Year Resident Physician Internal Medicine. Hayatabad Medical Complex, Peshawar, Kpk Pakistan

ORCID (Open Researcher and Contributor Identifier):

1. https://orcid.org/0009-0001-2096-0805
2. https://orcid.org/0009-0002-5126-9555
3. https://orcid.org/0000-0002-4724-2678
4. https://orcid.org/0009-0005-3501-3922
5. https://orcid.org/0009-0009-7070-0970
6. https://orcid.org/0009-0000-8774-4288
7. https://orcid.org/0009-0009-8453-6040
8. https://orcid.org/0009-0000-1519-2912
9. https://orcid.org/0009-0001-7150-5095
10. https://orcid.org/0009-0009-5746-7844

About the author: I am a student of 4th Year MBBS (5 Years Program) at Khyber Medical College Peshawar. I have participated in numerous college level research conferences and currently have two other research projects in progress. Also participated intra and inter college level Poetry Competition.

Corresponding author email: niddakhann499@gmail.com

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  https://twitter.com/Shehriy68268142?t=6nBsbuV264KRCmQx9C4d6Q&s=09
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- **Linkedin:** https://www.linkedin.com/in/rizwan-ullah-615352175

Discussion Points: Global concern: Depression affects up to 27.2% of medical students worldwide. How can we support their mental health? Urgent call for action! Depression rates among medical students in Peshawar, Pakistan reach 19.4%. #MentalHealthAwareness#MentalHealthMatters

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ABSTRACT.

Background: Depression is a significant problem among medical students worldwide, affecting their well-being and potentially compromising patient care. This study aims to determine the prevalence of depression in medical students in Peshawar, Pakistan, and identify potential risk factors associated with it.

Methods: A cross-sectional study was conducted from April to June 2023, involving medical students from seven colleges in Peshawar. Stratified sampling was employed to distribute surveys among the students. The study collected data on socio-demographic characteristics, prevalence of depression using the Hospital Anxiety and Depression Scale (HADS), and depression risk factors. We assessed associated factors using a multivariate logistic regression clustered by university.

Results: Out of 400 distributed questionnaires, 324 were returned (response rate: 81%). The participants' mean age was 21.70 ± 1.65 years, with 53.1% being females. The prevalence of depression was 19.4% and 26.2% were borderline cases. No variables were significantly linked to depression in our multivariate regression model. However, being male, year of study, experiencing discrimination or harassment in medical school, and negative perceptions of medical school's impact on mental health had odds ratios above 1, with confidence intervals including the null value.

Conclusion: This study reveals a high prevalence of depression among medical students in Peshawar, Pakistan. It emphasizes the need to address risk factors and establish support systems to minimize the impact of depression on students' well-being and academic performance. Further studies are necessary to identify modifiable associated factors with depression in medical students.

Key Words: Medical student depression, Depression prevalence, Risk factors for depression, Mental health in medical students, Academic performance and depression, Impact of studies on mental health, Peshawar, Pakistan.

INTRODUCTION

A typical mental disorder is depressive disorder, usually referred to as depression. It entails a long-term sad mood or loss of enjoyment or interest in activities. We label it as depression when these symptoms last for about two weeks. Depression is characterized by anhedonia, diminished energy, guilt or low self-worth, disturbed sleep or hunger, impaired attention, and a loss of interest and pleasure.[1]

Students in higher education, particularly those in their first year, deal with difficulties in both their personal and academic lives. These unfavorable circumstances make individuals more susceptible to mental diseases like depression.[2]

Medical educators around the world are becoming increasingly concerned about medical students' depression. According to a recent systemic review, depression was present in up to 27.2% of medical students worldwide.[3] The greatest cause of years spent with a handicap and the single largest contributor to worldwide disability is depression.[4] Inability to operate in the classroom and during clinical rotations, problems brought on by stress, and declining performance are only a few of the potential drawbacks of emotional strain on medical students.[5]

The rate of depression among medical students is quite high, and when their training is complete, their levels of overall psychological discomfort are consistently higher than those of peers their own age and the general public.[6] According to a study done in India, medical students in their 2nd and 3rd years are more stressed out and consequently more prone to develop depression than those in their 1st year.[7] Struggle of medical students with depression may result in decreased quality of life and dropout rates.[8]

Depression rates among medical students varies geographically. It has been described rates from 6.0 to 66.5% in the UK, 13.10 to 76.21% in China, 40% in India, 66.6% of the men and 87.6% of the women in Saudi Arabia, 10.3% in South Korea, 70% in Karachi and 48.30% in Punjab, Pakistan.[9,10,11,12,13,14,15] Because depression might ultimately result in suicidal ideation, identifying the depression' risk factors in medical population should be primary priority. Financial strain, exam-related stress, a lengthy study period in medical schools, and other factors have all been highlighted by Quynh Anh et al. as potential risk factors for depression.[16,17] Female gender, mental illness, lack of support during stressful times, stressful life events experienced within the previous six months, dissatisfaction with socioeconomic status, lack of grade to achieve, and dissatisfaction with student's performance are independent predictors for severe and moderate depression.[18] Regular nutritional consumption, leisure and exercise time, time with a partner, friends, and family, and confiding in peers have all been connected to a reduction in depressive symptoms.[19]

To reduce depressive symptoms in medical students, lower self-esteem, self-perceived medical errors, and eventually improve the quality of patient care, factors connected to depression in medical training should be acknowledged and effectively handled[20]. In this study, we aimed to identify depression prevalence and its associated risk factors in medical students from several colleges in Peshawar, Pakistan.

METHODS

Study design

We did a cross-sectional survey-based study with medical students from all medical schools in Peshawar, Pakistan. The study was carried out from April 2023 to June 2023.

Setting

Peshawar is home to 7 medical Schools. We included all these medical Schools in our study. Five of these schools are private, while two are public. The private schools are North West School of Medicine, Pak International Medical College, Peshawar Medical College, Jinnah Medical College and Rehman Medical Institute. The public medical schools are Khyber medical college and Khyber Girls' Medical College.

Participants

Medical students from 1st to Final Year of MBBS. We Obtained informed oral consent from students. Questionnaires were filled from those who were willing to participate.

Sample size calculation

In order to determine sample size, we utilized the formula: $\mathbf{SS=Z^2.P(1-P)/D^2}$ where: SS=Sample Size, Z=1.96, D=0.05, P=Expected Prevalence or Proportion; approximately 70% from previous studies[14,15]. Hence, SS= $(1.96)^2.0.70(1-0.70)/(0.05)^2$. By inputing these values in the formula we got a sample size of 323 approximately participants.

Sampling and data collection

A stratified sampling technique was used. In contrast to other colleges, which typically accommodate 100 students, KMC boasts a larger capacity, with nearly 200 students. Consequently, our selection process involves choosing 50 students from other institutions and 100 from KMC.

Survey

The survey contained socio-demographic characteristics, the Hospital anxiety and depression scale (HADS), the 9-item patient health questionnaire (PHQ-9) and questions related to risk factors of depression. The questionnaire's validity was ensured by forming a committee that included a consultant psychiatrist, a junior member, a healthcare representative, and several research committee students who reviewed and discussed the survey. Following their approval, a pilot study was conducted.

Outcome variables

The tentative diagnosis of depression was our main outcome of interest, which was evaluated using the HADS, a 14-item questionnaire, 7 questions are used for diagnosis of depression and 7 are used for diagnosis of anxiety. So, we used the 7 questions of depression for diagnosis of depression (0-7 score: Normal case, 8-10 score: Borderline case, 11-21 score: Abnormal case) and severity of depression was found out using PHQ-9, a nine-item questionnaire. The severity of depression was classified as minimal depression (1-4 score), mild (5-9 score), moderate (10-14 score), moderately severe (15-19 score) and severe depression (20-27 score).

Independent variables

The potential associations between the following factors and depression were examined: big life event (participants who had experienced the death of a close relative or friend, traffic, rape, breakups, admission to the hospital for a serious illness over the previous three months, family mental illness history, academic stress among different years of medical college, and impact of medical college on their mental health. We also identified if the students were 'day scholars' (live off-campus and commute) or 'hostellites' (live on-campus or in housing provided by the institution). In this study we also went through to dig out association of depression with discrimination (gender) and harassment in medical college using a predefined question in the survey: "Have you ever experienced any discrimination or harassment during your medical school education."

Data analysis

Data was analyzed using SPSS Version 20. Quantitative data was expressed in terms of Standard deviation and mean while qualitative was expressed in terms of frequency and percentages. Bivariate analysis included chi square test to find out relation between depression, survey-based risk factors of depression, and socio-demographic data.

We utilized logistic regression to identify factors associated with depression using Stata18® (StataCorp, TX). Initially, an exploratory analysis was conducted, employing simple logistic regressions clustered by medical school to identify study variables associated with depression (HADS score > 10), using a p-value < 0.20. Independent variables deemed significant in the exploratory analysis were subsequently included in a multivariate clustered logistic regression model to identify adjusted risk factors for depression. A p-value < 0.05 was considered statistically significant.

RESULTS.

Socio demographic characteristics of participants

400 questionnaires were given out to Peshawar's medical students, and 324 of them were returned (response rate: 81%). Participants' ages, which ranged from 21 to 27, had a mean age of 21.70 1.65 years. Among 324 participants 151 (46.6%) were male and 172 (53.1%) were female and 1 participant has not specified his/her gender. 190 (58.6%) participants were Hostellite, 134 (41.3%) were day scholar. Numbers of participants from different colleges were KMC 82 (25.3%), RMI 42 (13%), PIMS 51 (15.7%), PMC 39 (12%), JMC 50 (15.4%), NWMC 24 (7.4) and KGMC 36 (11.1%), as shown in Table 1.

Prevalence of depression

According to HADS scale 63 (19.4%) were depressed, 85 (26.2%) were borderline cases. Borderline cases mean that they are at the edge of developing depression. According to PHQ9 scale 3 (0.9) participants had minimal depression, 12 (3.7%) mild depression, 34(10.5%) moderate depression, 10 (3.1%) moderately severe depression and 4(1.2%) had Severe depression as shown in Figure 1. Depression was high among JMC (36%) students and lowest among KGMC (13.8%) students as shown in Figure 2.

Depression-related factors among medical students

Bivariate analysis revealed significant associations between depression and the following factors: female gender ($p = 0.03$), positive family history ($p < 0.01$), gender discrimination in medical school ($p = 0.01$), negative impact of studies on mental health ($p = 0.04$), and lack of family and friend support ($p < 0.01$). Conversely, year of MBBS ($p = 0.10$), experience of any traumatic event in life ($p = 0.73$), residency that is whether days scholars or hostilities (0.225) and stress due to family reasons ($p = 0.57$) were not significantly associated with depression, as shown in **Table 2**.

Table 3 presents the multivariate analysis results for depression. While age exhibited a slight inverse association with depression, this association was not statistically significant, suggesting that older students may have a marginally lower risk. However, our analysis did not reveal significant impacts of gender, residence status, or additional study years on depression risk. Despite this, it is important to note that factors such as discrimination or harassment and negative perceptions regarding the impact of medical school on mental health were found to be associated with higher odds of depression, albeit not reaching statistical significance. The goodness of fit for the model was also found to be nonsignificant ($p=0.21$), indicating that while the model effectively summarizes the data, further exploration may be required to capture additional influential factors.

DISCUSSION

As much as we searched there is no study done in Peshawar the way we conducted our study. Throughout our study, we looked into the relationships between depression and other variables, including traumatic experiences, harassment and discrimination in medical school, and the effect of medical school on mental health. We also tried to corelate the depression with family problems, absence of family support and family mental illness history. We observed a higher prevalence of depression among females, individuals affected by gender discrimination, those reporting a negative impact of medical college on mental health, and participants lacking family support. Conversely, experiences of traumatic events and stress due to family issues were not significantly associated with depression. Additionally, while our multivariate model did not identify specific associated factors, it indicated areas where potential interventions and further research could be beneficial.

In our study the prevalence of depression among medical students is 19.4% which is round about similar to the prevalence of depression among medical students of Makere University of Uganda which was 21.5%.[21] They conducted their study in only a single university and also, they did not extract that much risk factors associated with depression among medical students and not association of family related issues with depression. A meta-analysis revealed that the pooled prevalence utilizing IPD among medical students was 18.1%, which is nearly identical to the frequency in our study.[22] Ours study prevalence was greater than 10.3% prevalence of depression among medical students in south Korea.[23] The prevalence of depression in our study was lower at 19.4% compared to global incidence of 33.0% among university students reported in a systemic review study.
Different methodologies, appraisal standards, measurement instruments, and cultural factors have all been cited as causes of differences of prevalence. University is a significant but fleeting era of life with unique demands in terms of academics, finances, and relationships. Going through these changes could make depression more likely. Nonetheless, the current study's high incidence rate of depression symptoms is higher than what is often observed in the general population.[24]

We conducted our study among 7 medical colleges of Peshawar and we found that depression prevalence was highest in students of Jinnah medical college and lowest among students of Khyber girls medical college. As in our research we found out that Gender discrimination is one of risk factor of Depression and Khyber girls medical college is having just girls students and no boys so there are no chances of gender discrimination that is why depression is lowest there. Our study also found a significant association of depression among female gender. A similar significant association was found among females' medical students of Karolinska Institute Medical University, Sweden[25].

Our study revealed a significant association between absence of family support and depression among students of medical college. These data imply that a lack of family support may be a factor in this population's higher prevalence of depression. It emphasizes how important it is to understand and deal with the effects of family dynamics on medical students' mental health. Our results are consistent with earlier studies that have repeatedly shown the importance of family support in mental health results. Smith et al. did a similar cross-sectional study and reported a strong associated link of medical students' elevated depression symptoms and a lack of family support.[26] Another study was conducted to find out association of depressive symptoms an social support and they found out that higher social support was associated with decreased depressive symptoms.[27] These converging findings further emphasize the importance of family support in the context of medical education.

Surprisingly, our study could not sort out a significant association among traumatic events and stress due to family issues among medical students. These results suggest that, within our study population, these specific factors may not be primary contributors to the mental health challenges faced by students at medical college or maybe it is required a deeper search among factors affecting medical students maybe using qualitative research or a bigger sample. It highlights the need to explore other potential variables that influence mental health outcomes in this context.

Our study also did not found out any association between residencies of students and depression. Our this finding was contrary to a study which found out that Hostilities are more disturbed emotionally and are more depressed as compared to days scholars.[28]

A multifaceted approach is needed to combat medical student depression, including problems like discrimination, harassment, and the perceived detrimental impact of medical school on mental health. Accessible counseling, mental health programs, and peer support groups are essential. A safe, confidential reporting mechanism and rigorous anti-discrimination and harassment policies are essential for a secure workplace. Mental health education in the curriculum raises awareness, reduces stigma, and encourages free debate. Wellness programs that teach stress management, resilience, and healthy living choices and peer mentoring can help pupils. Faculty and staff must get sensitivity training to identify and address mental discomfort and unconscious biases. Flexible academic rules can reduce academic stress, while anonymous student comments can help improve. Adapting tactics to changing requirements requires ongoing intervention efficacy research and evaluation. Community-building activities reduce isolation and establish support networks. These evidence-based therapies can dramatically reduce depression in medical students.

The study limitations include the cross-sectional design, as it cannot prove causality between identified factors and depression. Due to potential bias, self-reported questionnaires may not fully reflect feelings or experiences. Since the sample was limited to Peshawar medical schools, findings may not apply to other demographics. The study could not account for all potential confounding variables, such as personal coping techniques or challenges that may affect depression risk. To better understand medical student depression, longitudinal designs, greater geographic sampling, and more complete assessments of contributory factors should be used in future studies.

In this study we provide valuable insights into the prevalence and risk factors associated with depression among medical students. The findings shed light on the significant mental health challenges faced by this population and the associated factors.

SUMMARY - ACCELERATING TRANSLATION

This study conducted in Peshawar, Pakistan aimed to determine the prevalence of depression among medical students and identify potential risk factors associated with it. The cross-sectional study involved students from seven medical colleges, and data was collected using surveys. Out of the 400 questionnaires distributed, 324 were returned, resulting in an 81% response rate. The mean age of the participants was 21.70 ± 1.65 years, with 46.6% males and 53.1% females.

The prevalence of depression, assessed using the Hospital Anxiety and Depression Scale (HADS), was found to be 19.4%. Additionally, 26.2% of the students were identified as borderline cases. Several factors were significantly associated with depression, including being female, having a positive family history of insanity, experiencing gender discrimination within medical school, perceiving a negative effect of studies on mental health, and lacking support from family and friends.

The study concludes that there is a high prevalence of depression among medical students in Peshawar, Pakistan. It highlights the importance of addressing these risk factors and establishing support systems to mitigate the impact of depression on students' well-being and academic performance. The findings emphasize the need for interventions to enhance mental health support and improve the overall quality of medical education in the region.

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FIGURES AND TABLES.

Figure 1. Distribution of Depression Severity Levels Among Surveyed Medical Students in Different Colleges in Peshawar.

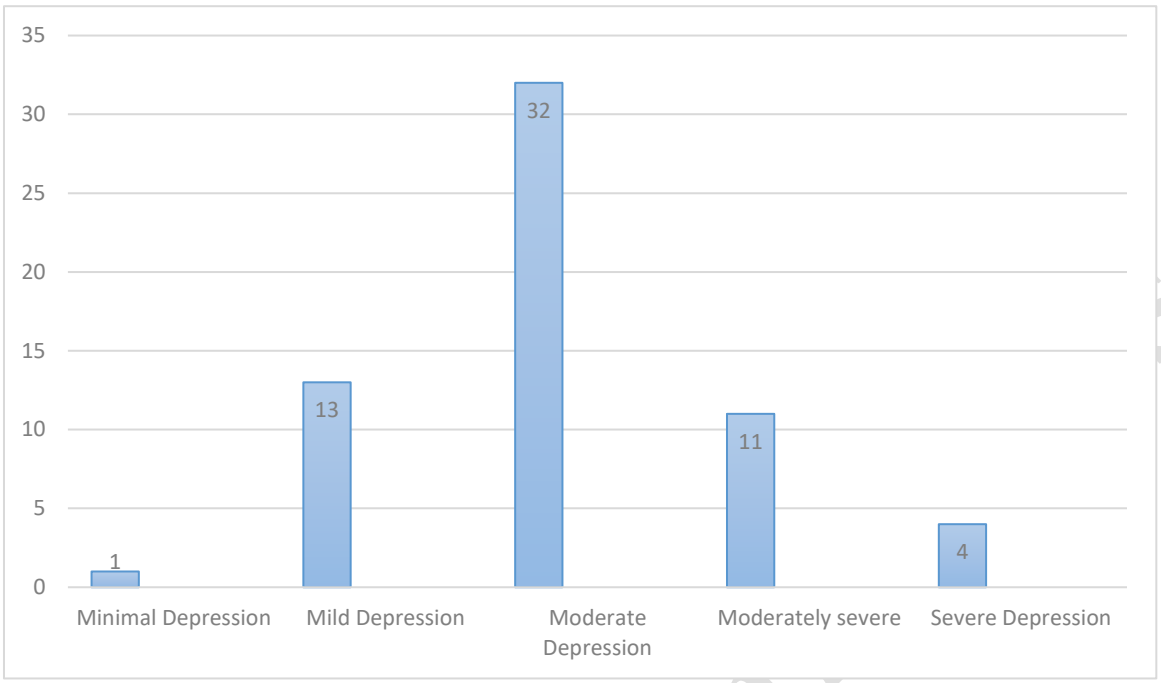

Figure 2. Severity of Depression Among Medical Students Across Different Colleges in Peshawar.

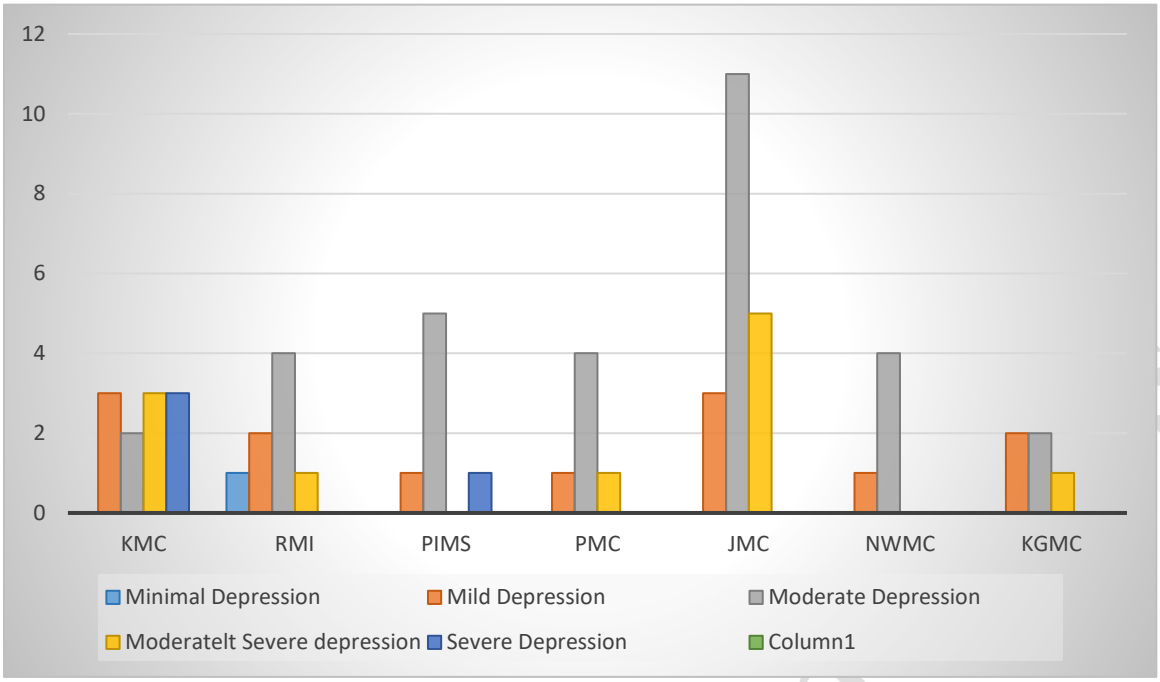

Table 1. Participant's Socio-demographic Attributes

Variables	n (324)	Males (151)	Females (172)	p-value
Age in years	21.7 (21.70±1.65)			
Level of studies				0.105
1st year MBBS	58(17.9%)	25(43.1%)	33(56.9%)	
2nd year MBBS	68(21%)	29(42.7%)	39(57.3%)	
3rd year MBBS	68 (21%)	35(51.4%)	33(48.6%)	
4th year MBBS	82(25.3%)	38(46.3%)	44(53.7%)	
5th year MBBS	47(14.5%)	24(51%)	23(49%)	
Medical Colleges				0.001
KMC	82(25.3%)	34(41.4%)	48(58.6%)	
KGMC	36(11.1%)		36(100%)	
RMI	42(13.0%)	24(57.1%)	18(42.9%)	
PIMS	51(15.7%)	31(60.7%)	20(39.3%)	
JMC	50(15.4%)	28(56%)	22(44%)	
PMC	39(12%)	24(61.5%)	15(38.5%)	
NWMC	24(7.4%)	10(41.6)	14(58.4%)	
Residency				
Hostellite	190(58.6%)	85(44.7%)	105(55.3%)	0.491
Day scholar	134(41.3%)	65(48.5%)	69(51.5%)	
Major life events				
Have you experienced any traumatic event in life	169(52%)	71(42%)	97(58%)	0.738
Have experienced any discrimination during medical school education	81(25%)	41(50.6%)	39(49.4%)	0.011
Medical school has negatively affected your mental health	144(44.4%)	68(47.2%)	78(52.8%)	0.040
Regards family				
Family history of mental illness	80(24.7%)	35(43.8%)	44(56.2%)	0.105
Feel stressed due to family issues				0.521
Rarely	75(23.1%)	39(52%)	36(48%)	
Sometime	90(27.8%)	38(42.2%)	52(47.8%)	
Often	63(19.4%)	23(36.5%)	40(63.5%)	
Always	59(18.25)	32(54.2%)	26(45.8%)	
Feel supported by family and friends				0.002
Rarely	34(10.5%)	17(50%)	17(50%)	
Sometime	67(20.7%)	29(43.2%)	38(56.8%)	
Often	71(21.9%)	30(42.2%)	41(57.8%)	
Always	138(42.6%)	69(50.8%)	68(49.2%)	

Legend: n=total number of participants, KMC=Khyber medical college, KGMC=Khyber girls medical college, RMI=Rehman medical institute, PMC=Peshawar medical college, PIMS=Pak international medical school, JMC=Jinnah medical college, NWMC=North west medical college,

Table 2. Analysis of Depression Prevalence and Associated Factors Among Medical Student.

Characteristics	Without Depression	Borderline	With Depression	p-valve
Gender of participant				0.030
Male	72	50	29	
Female	104	34	34	
Current year of MBBS				0.105
1st year MBBS	25	18	15	
2nd year MBBS	37	14	17	
3rd year MBBS	38	23	7	
4th year MBBS	50	20	12	
5th year MBBS	26	9	12	
Medical Colleges				
KMC	51	20	11	0.019
KGMC	26	5	5	
RMI	20	14	8	
PIMS	29	12	10	
JMC	23	9	18	
PMC	18	15	6	
NWMC	9	10	5	
Residency				
Hostellite	97	57	36	0.225
Day scholar	76	28	27	
Major life events				
Have you ever experienced any traumatic events in your life?				0.738
Yes	90	44	35	
No	84	41	28	
Do you have a history of mental illness in your family?				0.000
Yes	29	24	27	
No	147	61	36	
Have you ever experienced any discrimination in medical school education?				0.011
Yes	37	19	25	
No	139	66	38	
Do you feel that medical School has negatively affected your mental health?				0.040
Yes	65	43	36	
No	110	42	27	
How often do you feel stressed due to family issues?				0.570
Never	25	6	6	
Rarely	41	19	15	
Sometime	51	24	15	
Often	27	21	15	
Always	32	15	12	
How often do you feel supported by your family and friends?				0.002
Never	5	3	6	
Rarely	8	13	13	
Sometime	37	21	9	
often	42	18	11	
Always	84	30	24	

Table 3. Risk Factors for Depression Among Medical Students: Analysis of Unadjusted and Adjusted Odds Ratios.

Characteristic	Unadjusted Odds Ratio	95%CI	Adjusted Odds Ratio	95%CI	p-value
Age (continuous)	0.84	0.74-0.95	0.72	0.51-1.02	0.068
Sex: Female	(ref)				
Male	0.96	0.51-1.81	1.09	0.56-2.13	0.806
Residence: Hostellite	(ref)				
Day scholar	1.11	0.97-1.27	0.93	0.68-1.28	0.668
Year (continuous)	0.9	0.76-1.07	1.26	0.79-2.01	0.34
Family history of mental illness	2.94	1.14-7.62	0.42	0.14-1.26	0.123
Medical school effects					
Experienced discrimination/harassment	2.41	0.94-6.20	2.03	0.70-5.91	0.193
Negative effect of medical school	1.88	0.06-3.31	1.39	0.80-2.38	0.239

Legend: 95%CI: 95% confidence interval.