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Mental health status of post graduate medical and engineering students in Pakistan

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Abstract

Objectives: *This study aimed to estimate the prevalence of depression, anxiety and stress among postgraduate medical and engineering students and explored predicting factors.*

Methods: *This is descriptive, cross sectional study. A sample of total 422, 211 medical and equal number of engineering students were selected from postgraduate medical and engineering institutions in Lahore. DASS-21 were used to collect data, t-test was applied to see difference between mental health of two groups and logistic regression analysis to rule out predicting factors.*

Results: *Overall prevalence of depression, anxiety and stress among post graduate students was 59.2%, 73.3% and 51.4% respectively. In respect to medical postgraduate students, depression was 48.8%, anxiety 70.1% and stress 50.7%. Prevalence of depression was 69.7%, anxiety 77.3% and stress 52.1% found in engineering postgraduate students. Marital status, employment and exercise were*

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statistically significant associated with all three mental health conditions.

Conclusion: *Further studies are needed to explore the causal factors of depression, anxiety, and stress among postgraduate students in Pakistan. Educational institutions and community based mental health screening, promotion and prevention programs are recommended to prevent and reduce the mental illness among these groups.*

Keywords: mental health, depression, anxiety, stress, postgraduate students

INTRODUCTION

The World Health Organization defines mental health as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, fruitfully, and is able to make a contribution to his or her community." (1) Healthy mind is important throughout the life course of an individual as sound mental health includes social, emotional, and psychological wellbeing of a person. Person with good mental health can cope with life stressors, make informed choices, helpful and productive for his/herself and to nation. (2) About 34% people in developing countries suffer from mental health disorder. (3)

Mental health crises in Pakistan are on rise due to poverty, violence, growing insecurity, terrorism, political and economic instability, stressful working environment, gender discrimination, unemployment and other social problems resulting in increased rates of suicides and mental illness. (4) According to the latest available information, anxiety disorder, depression and alcohol use disorders are increasing in the country 3.82%, 3.33% and 1.53% respectively. (5)

Mental health is determined by a large array of social, psychological, and biological factors, it includes stressful work conditions, gender discrimination, fast change in social institutions, sedentary lifestyle, physical disease, social isolation and violations of human rights also negatively impact mental health of people. (6)

In Pakistan it is a dream of almost every parent to make their at least one child a doctor or engineer because these professions are

viewed as prestigious. (7) Resultantly country is producing too many engineers without creating appropriate job market for them, and students are mostly under utmost pressure (8) which increases the chances of an engineer suffering from depression and anxiety. (9)

Many studies in the world revealed that the prevalence of stress among post graduate students is very high. As in Indian post graduate medical school, the prevalence was 52% (10), 54% among international postgraduate students (11), and high prevalence of depression in Pakistani undergraduate engineering students. (12) Furthermore, research on undergraduate engineering, social sciences and medical students in Pakistan found depression 25%, anxiety 32% and stress 20% in engineering students. Similarly, medical students have 25% depression, 34% anxiety and 23% stress. On the other hand, 21% social sciences students have depression, 30% anxiety and 17% stress. According to same study medical students experienced relatively more psychological distress than engineering and social science students. (13) Moreover, a study on undergraduates' physiotherapy students revealed frequency of depression, anxiety, and stress as 48.0%, 68.54% and 53.2%, respectively. (14)

Post-graduation consists of education to determine pathway toward specialization. While after paying substantial amount of fees engineers end up with unemployment or very low wages. Suicide of a student from well reputed engineering university raised many questions on engineering status in Pakistan. Professions like medical and engineering are associated with high responsibilities and obligations that impact the professionals psychologically and compromising their mental health. In Pakistan, studies on prevalence of mental health among postgraduate students is scarce and there is a need to build epidemiological data about mental disorders. Therefore, this study was conducted to estimate the prevalence of mental disorders (depression, anxiety, and stress) among postgraduate medical and engineering students in Lahore, Pakistan, to rule out socio-demographic, lifestyle and behavioral factors associated with mental disorders and to rule out the difference between these two groups.

METHODS

Study design:

This was cross sectional study and carried out in August 2019.

Study participants and sample size:

The study population included students of both sexes (age from 25-40 years) enrolled in any postgraduation medical or engineering course in public universities of Lahore. Two-stage random cluster sampling was used to select participants. In the first stage, 2 postgraduate medical and 2 postgraduate engineering universities were randomly selected. In the second stage, students were randomly selected from each of the university, all students in these universities were eligible to participate.

Sample size for this study was calculated at assumed 50% prevalence by using Kish and Leslie formula for descriptive study. Selecting $\alpha = 0.05$ and keeping in view of 10% non-response rate researcher round off sample size to 422 respondents in total, and 211 from each profession to nominate equal distribution of postgraduate medical and postgraduate engineering students.

Data collection tool:

DASS- 21 was used to assess mental health of respondents. It is 21-item self-reported measure of anxiety, depression, and stress. DASS-21 has three subscales; each subscale contains 7 items. It has been widely used in research conducted on Pakistani population. [13] Cronbach alpha was 0.83 and 0.834 in studies conducted in Pakistan. [8]

Statistical analysis:

SPSS version 23 was used for data analysis. Frequencies and percentages were calculated for the categorical variables. Continuous numerical data were summarized as mean and standard deviation (SD). Score on each subscale of DASS-21 was added and multiplied by 2 and then categorized. T. test was applied to measure difference of mental health between two professional groups of students. Binary Logistic regression analysis was used to determine the independent predictors; socio-demographic, lifestyle and behavioral characteristics

with Depression, Anxiety and Stress. P < 0.05 was considered statistically significant.

Ethical considerations:

The ethical issues in present study required careful consideration because mental health is sensitive topic. It involves considerable stigma and carries social taboo in traditional and conservative society of Pakistan. Participation in study was voluntarily and questionnaire divided among study participants after verbal consent. Study participants were assured for anonymity and confidentiality of their participation.

Researcher declares no conflict of interest.

RESULTS

Response rate was 100%. Mean age of respondents was 29.4± 3.28, varied from 25- 40 years. Sample was almost equally divided between male and female as 219 (51.9%) and 203 (48.1%) respectively. Frequencies of sociodemographic and lifestyle and behavioral characteristics are shown in table 1.

Table 1: **Socio-demographic and lifestyle characteristics of postgraduate students (N=422)**

Variables	Frequency	Percent
Age		
25-30	243	57.6%
31-35	153	36.3%
36-40	26	6.2%
Sex		
Male	219	51.9%
Female	203	48.1%
Marital status		
Unmarried	272	64.5%
Married	143	33.9%
Divorced/separated	4	0.9%
Widowed	3	0.7%
Current living place		
Hostel within university	135	32.0%
Private hostel	89	21.1%
Home	161	38.2%
Rented place	37	8.8%
Employment status		
Yes	197	46.6%
No	225	53.3%

Satisfied with postgraduate studies		
Satisfied	142	33.6%
Neither satisfied nor dissatisfied	220	52.1%
Dissatisfied	60	14.2%
Gender based discrimination in educational institution		
Yes	92	21.8%
No	330	78.2%
Smoking status		
Nonsmoker	338	80.1%
Current smoker	57	13.5%
Ex-smoker	27	6.4%
Substance abuse		
None	342	81.0%
Niswar	8	1.9%
Paan	17	4.0%
Gutka	23	5.5%
Alcohol	23	5.5%
ICE	5	1.2%
Any other	4	0.9%
Exercise		
No	229	54.3%
Have joined a gym	34	8.1%
Only walk	110	26.1%
Jog only	49	11.6%
Have pets		
Yes	21	5.0%
No	401	95.0%
Confide with anyone		
Yes	231	54.7%
No	191	45.3%

Mental health issues and gender variations in each group are summarized in table 2. The findings shows that mild depression was almost equal in both sexes, and maximum students were suffering in moderate level of depression. While gender wise analysis shows that moderate level of stress was four times higher and extremely severe depression was three times higher in male medical students in comparison to female student in the same professional group. Severe level of depression was double 12.1% in female medical students. Female postgraduation engineering students have five times higher rate of extremely severe depression in comparison to male engineering students.

Table 2: **Prevalence of depression, anxiety and stress by profession and gender among postgraduate students (N=422)**

	Medical*			Engineering**			Both***		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Depression									
Normal	40.5	57.6	51.2	35.7	19.7	30.0	19.4	21.3	40.8
Mild	16.5	18.9	18.0	11.4	12.7	11.8	6.9	8.1	14.9

Moderate	24.1	6.8	13.3	37.1	35.2	36.5	16.8	8.1	24.9
Severe	6.3	12.1	10.0	10.7	7	9.5	4.7	5	9.7
Extremely severe	12.7	4.5	7.6	5.0	25.4	11.8	4.0	5.7	9.7
Total	**100.0 (N=79)**	**100.0 (N=132)**	**100.0 (N=211)**	**100.0 (N=140)**	**100.0 (N=71)**	**100.0 (N=211)**	**51.9 (N=219)**	**48.1 (N=203)**	**100.0 (N=422)**
*Chi-square= 19.99, df =4, p. value <.00001, **Chi-Square= 21.22, df =4, p. value <.00001, ***Chi-Square= 14.44, p.value= .006									
Anxiety									
Normal	22.8	34.1	29.9	26.4	15.5	22.7	13.0	13.3	26.3
Mild	0.0	13.6	8.5	9.3	11.3	10.0	3.1	6.2	9.2
Moderate	35.4	28.0	30.8	26.4	14.1	22.3	15.4	11.1	26.5
Severe	5.1	9.1	7.6	15.0	33.8	21.3	5.9	8.5	14.5
Extremely severe	36.7	15.2	23.3	22.9	25.4	23.7	14.5	9.0	23.5
Total	**100.0(N=79)**	**100.0 (N=132)**	**100.0 (N=211)**	**100.0 (N=140)**	**100.0 (N=71)**	**100.0 (N=211)**	**51.9 (N=219)**	**48.1 (N=203)**	**100.0 (N=422)**
*Chi-square = 24.717 df = 4 p.value <.00001, ** Chi-square= 13.818, p.value=.008, *** Chi-square=13.97, p.vlaue .007									
Stress									
Normal	41.8	53.8	49.0	49.3	45.1	47.9	24.2	24.4	48.6
Mild	19.0	14.4	16.1	32.1	33.8	32.7	14.2	10.2	24.4
Moderate	26.6	18.2	21.3	11.4	7.0	10.0	8.8	6.9	15.6
Severe	0.0	13.6	8.5	7.1	14.1	9.5	2.4	6.6	9.0
Extremely severe	12.7	0.0	4.7	0.0	0.0	0.0	2.4	0.0	2.4
Total	**100.0 (N=79)**	**100.0 (N=132)**	**100.0 (N=211)**	**100..0 (N=140)**	**100.0 (N=71)**	**100.0 (N=211)**	**51.9 (N=219)**	**48.1 (N=203)**	**100.0 (N=422)**
*Chi-square = 31.212, df = 4, p.value <.00001, **Chi-square 3.520, df=3, p. value.318 ***Chi-Square 21.731, p.value=< .00001									

When it comes to anxiety, largest number of medical students 30.8% have moderate level of anxiety, on the other hand maximum number of engineering students 23.7% have extremely severe anxiety. Maximum students were suffering in mild stress. Association between these mental health conditions and gender were statistically significant except stress in engineering students that was statistically non-significant. Depression, anxiety, and stress were high in male postgraduate medical students than female. While these three mental health conditions were found higher in female postgraduate engineering students than their male counterpart.

Table 3 summarizes that statistically significant difference was found between both group of professionals and depression and anxiety.

Table 3: **Difference in the level of depression, anxiety, and stress between medical and engineering postgraduate students (N=422)**

		Mean	*SD*	*t*	*p. value*
Depression	Medical	10.87	8.63	-4.24	< 0.001
	Engineering	14.50	8.05		
Anxiety	Medical	12.17	7.615	-2.267	.024
	Engineering	13.79	7.06		
Stress	Medical	16.13	7.89	1.52	.129
	Engineering	15.08	6.22		

Table 4 shows that the factors predicting the likelihood of experiencing mental health issues were somewhat different across different types of mental health issues. In present study, male students were more likely to perceive mental health issues in comparison to female students, i.e. Depression (OR=1.33, 95% CI= 0.902- 1.96), Anxiety (OR= 1.13, 95% CI=0.74-1.75) and stress (OR=1.18, 95 % CI=0.80-1.73). Students between 31-35 years of age were 83% more likely to suffer from depression, 10% anxiety and 89% stress than students younger and older than this age group. Unmarried students were less likely to develop mental health conditions than ever married students i.e., Depression (OR=0.615, 95% CI=0.41- 0.93), Anxiety (OR= 0.52, 95% CI= 0.32-0.84) and stress (OR= 0.60, 95% CI= 0.40-2.45).

Students residing within university and private hostels and home have less odd ratio of developing depression and anxiety than students living in rented places, while students residing in private hostels were 14% more likely to suffer from stress than others. Students who were employed were less likely to have all types of mental health issues than job less students. Students satisfied with their postgraduate studies and showed neutral behavior were less likely to have mental health conditions than unsatisfied students. Postgraduate students faced gender-based discrimination were more likely to suffer from depression, anxiety, and stress as OR= 1.22, 95% CI= 0.76-1.94, OR= 1.17, 95% CI= 0.68=2.01, and OR=1.07, 95% CI=0.67-1.70, respectively.

Doing exercise and having pets were less likely to develop any understudy condition of mental health i.e., depression (OR= 0.64, 95% CI= 0.43- 0.96), anxiety (OR= 0.49, 95% CI= 0.31- 0.76), stress (OR= 0.53, 95% CI= 0.36-0.78) and depression (OR= 0.40, 95% CI= 0.16-0.99), anxiety (OR= 0.88, 95% CI= 0.33- 2.34), and stress (OR= 0.09, 95% CI= 0.02- 0.39) respectively.

Meanwhile students who smokes, substance abusers and confide with someone have higher odd ratio to develop depression, anxiety, and stress. It can be used as coping strategies as well.

Table 4: **Factors associated with perceived prevalence mental health versus non prevalence of mental health issues-simple binary logistic regression analysis employed separately with each type of mental health issues**

Respondents' characteristics		Mental health issues		
		Depression OR (95% CI)	Anxiety OR (95% CI)	Stress OR (95% CI)
Gender				
	Male	1.33 (0.902- 1.96)	1.13 (0.74-1.75)	1.18 (0.80-1.73)
	Female	1	1	1
Age				
	25-30	1.31 (0.58- 2.95)	1.00 (0.40-2.51)	1.66 (0.73- 3.82)
	31-35	1.83 (0.79- 4.23)	1.1 (0.42- 2.75)	1.89 (0.80-4.44)
	36-40	1	1	1
Marital status				
		0.615 (0.41- 0.93)	0.52 (0.32-0.84) 0.009	0.60 (0.40-2.45) 0.016
	Un-married	.022		
	Ever married	1	1	1
Living place				
	Hostel within university	0.67 (0.29- 1.37	0.92 (0.39-2.14)	0.81 (0.39-1.68)
	Private hostel	0.77 (0.34- 1.75)	0.87 (0.36- 2.11)	1.14 (0.52-2.46)
	Home	0.65 (0.31- 1.39)	0.88 (0.38- 2.01)	0.84 (0.41-1.71)
	Rented place	1	1	1
Employment status				
	Employed	0.21 (0.08- 0.54)	0.33 (0.14- 0.76)	0.29 (0.11- 0.75)
	Unemployed	1 (0.001)	1 (0.009)	1 (0.011)
Satisfaction with postgraduation studies				
	Satisfied	0.31 (0.16-0.62) 0.001	0.26 (0.10-0.66) 0.004	0.74 (0.48-1.13)
	Neutral	0.46 (0.24-0.88) 0.019	0.27 (0.11-0.67) 0.005	0.91 (0.49-1.67)
	Unsatisfied	1	1	1
Gender based discrimination				
	Yes	1.22 (0.76-1.94)	1.17 (0.68-2.01)	1.07 (0.67- 1.70)
	No	1	1	1
Smoking				
	Smoker	1.67 (0.87-3.18)	1.13 (0.19-0.43)	2.27 (1.25-4.12)
	Nonsmoker	1	1 (0.001)	1 (0.007)
Substance abuse				
	Yes	2.42 (1.37- 4.28)	2.07 (1.09- 3.92)	1.35 (0.82-2.21)
	No	1 (0.002)	1 (0.02)	1
Exercise				
	Yes	0.64 (0.43- 0.96)	0.49 (0.31-0.76)	0.53 (0.36-0.78)
	No	1 (0.03)	1 (0.002)	1 (0.002)
Confide				
	Yes	1.36 (0.92- 2.02)	1.15 (0.74- 1.76)	1.37 (0.93- 2.01)
	No	1	1	1
Pets				
	Yes	0.40 (0.16- 0.99)	0.88 (0.33- 2.34)	0.09 (0.02-0.39)
	No	1 (0.04)	1	1 (0.001)

DISCUSSION

Mean age of study participants was very similar to a study conducted in Karachi on postgraduate residents. [15] Students from 31-35 years of age group were more likely to develop mental health conditions than younger and elder to this age group. While a study on undergraduate students shows declining in anxiety and depression with increasing in study years because gradual adaptation to the study course and environment. [16] Due to variability of our study population, it can be explained that mostly students are starting their families at this age, personal and professional life balance, family expectations and financial constraint can result in elevation of mental illness.

The proportion of female gender in medical was higher and in engineering was lower than their counterparts. Sample was reflective of overall universities population and general educational pattern across country. Female ratio in medical is high and low in engineering. According to Pakistan Medical and Dental Council number of registered male doctors are 39645 and female 43323. (17) In the field of engineering women are underrepresented as only 1 female for every 17 male counterparts. (18) In many south Asian countries and UK women's participation in higher education has surpassed men but this trend is not reflective in STEM subjects.

Majority of students in the current study were unmarried where mean age was 29.4 years. This interesting finding were consistent with a study conducted on medical residents where more than half respondents were unmarried at this age and engineering students in Karachi. (19) According to current study unmarried students were less likely to get mental disorders, and it was significantly associated, these results were similar to a study (20) and in contrast to another where single students were more susceptible to depression. (21) Hence, it can be argued that married couples have more burden and responsibilities to support a family and divide time between study, job, and parenthood.

Our study found students living in private hostel was 14% more likely to suffer from stress. This might be due to loss of the traditional social support, supervision, and economic pressure.

More than half (52.8 %) postgraduate students were unemployed and employed students were less likely to develop any under study mental condition, in addition, this association was significant. A study took place in working population of Sweden revealed same findings that economically difficult time leads to depression. (22)

Significant association was found between dissatisfaction with postgraduation program and depression and anxiety in students, students satisfied with their studies have less likelihood of depression, anxiety and stress, these findings were almost in line with another study in Pakistan where 92 (91.8%) of respondents linked their stress with residency program. (16) Likewise, another study in Pakistan supports the findings that student's dissatisfaction with study program is associated with increased depression. (23) This can be explained by

ineffective student-teacher, administrative staff relationship or academic course content. This is just guessed as baseline data on mental illnesses at time of admission in postgraduate colleges was not available. It needs to conduct further studies to understand it in a better way.

Our study indicated Depression and anxiety was also triggered by gander-based behaviors in our study, these was consistent with a survey carried out in medical students of Karachi. (24) Our study also indicated that 23.0% of postgraduate students were smokers and 81.0% students were not abusing any kind of substance. This number was quiet low from a study conducted on 500 College students where 73.0% male and 75.0% female were drug users. On the other hand, male (24.0%) and female (14.0%) were smokers. (25)

Smoking and substance abuse was another predicting factor of mental illnesses in post graduate students, this supports the concept that nicotine causes depression (26) while a study describes drug abuse as one of the main hazards of depression. (27) It can be coping strategies to relieve frustration, anger and to cope with daily activities. (28)

More than half of respondents in this study were not doing any exercise and these findings were align with a study conducted in Pakistan where students were aware about benefits of exercise but not doing extra efforts to do exercises. (29) This can be explained by shortage of time or poor time management. On the other hand, gym culture is also less prevalent in Pakistan. The association between mental illnesses and exercise was significantly associated, students taking any exercise were less prone to develop any mental illness. A study conducted on general population in USA shows same findings. (30)

Moreover, current study explored that students having pets were 60%, 12% and 90% less likely to develop depression, anxiety, and stress respectively, this result was in line with a meta-analysis that pets provide benefits to those with mental health conditions through the intensity of connectivity with their owners and the contribution they make to emotional support in times of crises together with their ability to help manage symptoms when they arise. (31)

Overall, 59.2%, 73.7% and 51.4% postgraduate students have depression, anxiety, and stress respectively. Prevalence of depression, anxiety and stress in postgraduate medical students was 48.8%, 70.1% and 50.7% respectively. Prevalence of depression in this study was in

line with a study conducted on applied medical sciences students in Saudi Arabia investigated by Beck Depression Inventory (BDI), where 47.0% medical students have depression. (32) While another study conducted on 354 university staff in Ethiopia shows the prevalence of depression, anxiety, and stress was found to be approximately 22.9%, 19.2%, and 28.2%, respectively by using same scale (DASS-21). (33) Outcome of current study is higher than other studies on medical students. (34) These variations in rate of depression could be due to different measuring instruments, cultural and economic factors, study population and difference in curriculum being taught to medical students.

Prevalence of anxiety and stress in current study was similar to a study conducted in Islamabad by using DASS-42. (35) In this study prevalence of depression was 69.7%, anxiety 77.3% and stress 52.1% in postgraduate engineering students. Depression rate was concurrent with a study conducted on engineering undergraduate students in Karachi. (28)

Another study conducted on 258 engineering students in Lahore reported a lower rate of depression 22.5%, (23) similarly a study on physiotherapy students explored same level of stress although lower depression and anxiety (14). Possible reason for this lower rate can be different scale used in former study and research population.

Moving to difference between two groups regarding depression, anxiety and stress, this study found significant difference among postgraduate medical and postgraduate engineering students in terms of depression and anxiety. Many other researches have same results, a study conducted in Karachi on 300 medical, engineering and social sciences students by using DASS-21. This study reported that depression, anxiety, and stress was significantly higher in engineering and social sciences students than medical students. (8) However, another study found medical students were more psychological distress than engineering and social sciences students. (13)

Although our study was limited to medical and engineering postgraduate in Lahore and research design reduces its credibility but still this study shed light on facts related to poor mental health of postgraduate medical and their counterpart engineering students. Furthermore, these results are based on self-reported scale not on any

clinical diagnostic investigation. There is a need to further explore personal and educational predictors in detail.

Study limitations

This study carries all limitations inherent to a cross-sectional study. Researcher used self-reported instrument in this study, hence, participant's response may have been over or under reported and results are not based on any clinical diagnostic investigation. These results are not indicating that certain mental condition is due to any occupational factor.

CONCLUSION

A large number of postgraduate medical and engineering students were suffering from mental health issues and anxiety was most prevalent. Marital, employment status and exercise were statistically significant associated with all three mental health conditions, satisfaction with postgraduation studies, substance abuse, were statistically significant with depression and anxiety. While smoking was statistically significant associated with anxiety and stress, and pets with depression and stress. Mental health is highly stigmatized subject in Pakistan. Findings of this study can be used for proactive advocacy at multiple levels to direct attention and funds toward mental health needs of postgraduate students. Further comparative studies on mental health and its predictors across different disciplines would be valuable.

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