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## Depression and its associated risk factors in medical and surgical post graduate trainees at a teaching hospital: a cross sectional survey from a developing country

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### Abstract

**Objectives:** To determine the frequency of depression among post graduate medical trainees in a teaching hospital of Pakistan and to explore the associated factors contributing to depression in them.

**Methods:** It's a cross-sectional study at the Aga Khan University Hospital, Karachi. It was done in June 2008 till August 2008. Zung Self-Rating Depression Scale was administered among 172 post graduate trainees. Self administered questionnaires were used to assess the associated demographic and work related risk factors. Adjusted odds ratios (OR) were calculated by logistic regression.

**Results:** The survey response rate was 172(82.69%). Depression in the overall sample was 103(59.88%), of which 58(33.66%) were moderate to markedly depressed. Multiple logistic regression analysis revealed that working hours less than 76 hours (OR 3.71; CI=1.67, 8.23) and 76-90 hours (OR 3.15; CI= 1.42, 6.97) and none or occasional peer support (OR 2.05; CI=1.01, 4.18) were independent predictors for depression among the post graduate trainees.

**Conclusion:** More than half of our sample population was depressed. Therefore, they should be encouraged to recognize and seek treatment. This study also indicates that less working hours and lack of peer support cause depression.

**Keywords:** Depression, Postgraduate trainee, Risk factors, Pakistan (JPMA 61:968; 2011).

### Introduction

Depression is widespread globally affecting around 151.2 million of the population. It is among the third most common cause of disability and is anticipated to form the top most cause worldwide by 2030.<sup>1</sup>

Worldwide possibility of developing depression is 7-12 % for men and 20-25 % for women. These rates are independent of race, education, earnings, or social status.<sup>2</sup>

Among the Pakistani population, 6% are suffering from depression. A study found that at least one family member in four families is depressed.<sup>3</sup>

Due to this significance of non communicable disease like depression, it is a challenge for developing countries to manage such a problem where infectious diseases and malnutrition are still predominant and where only a small percentage of gross domestic products is reserved for health.<sup>4</sup>

According to WHO, risk factors for depression in general population are females, separated or divorced people, family history of depression, early parental loss, negative stressful events, chronic stress, lack of social support, and living in urban areas.<sup>2</sup> Physicians are no different from the general population. Privilege of their medical training does not provide immunity from illness. Depression seems to be one of the most common disorders in physicians. Depression

in physicians not only affects their own personal and family lives, but also may have serious impacts on health of the community in general.<sup>5</sup>

Among all physicians, post graduate medical and surgical trainees have an incomparable position because of its stressful course with frequent encounters with severely ill patients, lengthy work hours and a need to study regularly to keep up to date. At the same time they are unable to continue their leisure activities and carry out home responsibilities.<sup>6</sup> Studies show that doctors who work with reduced levels of functioning can be harmful to themselves, their coworkers, and patients.<sup>7</sup>

The Institute of Medicine reported that up to 100 000 US patients die each year because of preventable errors and the stress of training, lack of sleep and leisure time, are among the most commonly identified reasons for such errors.<sup>8</sup>

Although the actual incidence of depression in physicians is unknown, several international studies demonstrate that one-fourth to one-third of residents will be clinically depressed at some point in their training.<sup>9-11</sup> Studies conducted in the western world on trainees in family practice, internal medicine, paediatrics, dentistry, emergency medicine and surgery residencies, have demonstrated that 3% to 35% were suffering from significant depression or anxiety during

their training.<sup>10,11</sup>

At its worst, depression can lead to suicide, a tragic fatality associated with the loss of about 850 000 lives every year globally.<sup>4</sup> In a Meta analysis of 25 studies from 1960 to 2003, rates of male-physician suicide were 1.4 times higher than for the average population and 2.3 times higher for female physicians.<sup>12</sup> An Indian journal reports that suicides among doctors are increasingly common due to the extended training period for specialization resulting in delay in marriage and in life settlement, prolonged financial dependence on parents and stress of getting a good job.<sup>13</sup>

The idea of medical training is to prepare proficient and skilled doctors that can take care of ill people and endorse health of society. Unfortunately, studies suggest the current training may have an unintentional negative effect on trainee's mental health predisposing to depression.<sup>14</sup>

Unfortunately, data on depression among post graduate medical and surgical trainees in Pakistan is considerably insufficient. One study in Pakistan reported 39 % of family practitioners were suffering from anxiety and depression that was more in female physicians younger than 35 years age and in those who work for more than 48 hours in a week.<sup>15</sup>

During our literature search, we encountered a dearth of local and international studies with regards to the demographic variables, personality characteristics, and surrounding environment that relate to depression among post graduate trainees. Therefore in this study we tried to find associations with these factors to depression among population of post graduate trainees.

## Patients and Methods

It is a cross sectional study, conducted in the Aga Khan University Hospital (AKUH), Karachi, Pakistan. It was selected as a study site as AKUH is a Joint Commission International Accredited tertiary care hospital in Karachi, Pakistan. Its training programme is the largest one in the country with trainees from all over the country. This programme ensures recognition internationally and by the College of Physicians and Surgeons, Pakistan.

Our sample size calculation was based on findings from a previous study that found prevalence of depression among post graduate trainees in emergency medicine to be 12%.<sup>11</sup> A sample size of 172 was calculated at a 95% confidence interval and 5% sample error, assuming a 50% variance. A total of 250 individuals out of 339 residents were approached for this survey. Of these 30 percent were trainees and were approached to reach this size as we assumed most of the trainees would not participate due to their busy schedule. Convenience sampling was used in

order to draw the sample.

All residents and fellows registered with the Postgraduate Medical Education (PGME) programme of the AKUH who gave written consent were included in inclusion criteria. Data was collected from June 2008 till August 2008. The principal investigators went to all departments of the hospital where residents work including the wards, clinics, operation room, emergency room, intensive care unit, laboratory, radiology, and seminar halls, and distributed a self-administered questionnaire among the trainees whenever and wherever convenient during the three month period. A meeting of the investigators was held prior to the administration of the questionnaire in order to maintain uniformity in its administration; hence reducing chances of interviewer's bias in the study. All participants were contacted individually. In the one-to-one meetings with them, they were explained the purpose of the study and handed over the study questionnaire after obtaining consent. A timeframe of two weeks was given to all residents to fill the questionnaire. All residents were reminded to complete and return the form after one week and those who did not respond after one reminder were considered as non responders.

## Independent variables included were:

Gender, age, ethnicity, marital status, respondents present position, rotation type, living status, peer and supervisor support hours worked per week, work related hours at home, time spent for teaching and research, enough time for academics, smoking or alcohol, and if satisfied with pay corresponding to work.

## Dependent variables were:

Depression status (present or absent) measured by Zung Self-Rating Depression Scale. This is a 20- item self-report questionnaire that is widely used as a screening tool for depression recommended by WHO, covering affective, psychological and somatic symptoms associated with depression according to all nine DSM-IV symptoms.<sup>16</sup> It has similar diagnostic accuracy to other scales like Beck Depression Inventory, Center for Epidemiologic Studies Depression, and Hopkins Symptom questionnaires for detecting clinical depression.<sup>17</sup>

Data was entered, validated and analyzed using Statistical Package for the Social sciences (SPSS) version 16. Descriptive statistics were estimated while associations were assessed using Pearson Chi -square test or Fisher's exact test as appropriate. Crude odds ratio and their 95% confidence interval (95% CI) were computed through logistic regression model developed for each independent variable. Variables with a significant P value 0.25 in univariate analysis were considered for inclusion in the multivariable model to get more numbers of variables.<sup>18</sup> As a further step, we also

determined the goodness-of-fit of the model to measure how well it described our response variable (adequacy of knowledge) by using Hosmer-Lemeshow test.<sup>18</sup>

Ethical considerations, such as informed consent and confidentiality of the subject were ensured. Confidentiality of subjects was maintained by giving option of whether to write or not to write their identification. For this reason limited demographic information was collected to ensure the anonymity of the respondents and to encourage participation and honest reporting. All efforts were made in this study to

fulfill the ethical considerations in accordance with the 'Ethical principles for medical research involving human subjects' of Helsinki Declaration.<sup>19</sup>

## Results

Of the 250 doctors, 42 (16.8%) declined to participate in the study. Of the remaining 208, complete information was missing in 36 participants (response rate of 82.69%). In all 172 respondents completed full interviews which were used for primary analysis.

**Table-1: Association of Sociodemographic factors with depression.**

Variable	n (%)	Depression Present n (%)	Depression Absent n (%)	OR (95% CI)	P-Value
<b>Age</b>					
< 30 years	104 (70.3)	55 (65.5)	49 (76.6)		
≥ 30 years	44 (29.7)	29 (34.5)	15 (23.4)	1.722 (0.828,3.584)	0.146*
Not responded	24 (14.0)				
<b>Gender</b>					
Male	111 (64.5)	63 (61.2)	48 (69.6)		
Female	61 (35.5)	40 (38.8)	21 (30.4)	1.451(0.759,2.775)	0.26
<b>Religion</b>					
Muslim	155 (90.1)	89(86.4)	66(95.7)		
Non-Muslim	17 (9.9)	14(13.6)	3(4.3)	3.461(0.956,12.534)	0.059*
<b>Ethnicity</b>					
Urdu speaking	96 (55.8)	62(60.2)	34(49.3)	1.557(0.841,2.880)	0.159*
Other	76 (44.2)	41(39.8)	35(50.7)		
<b>Marital status</b>					
Unmarried	80 (46.5)	44(42.7)	36(52.2)		
Married	92 (53.5)	59(57.3)	33(47.8)	1.463(0.793,2.700)	0.224*
<b>Living Status</b>					
With family	136 (79.1)	85(82.5)	51(73.9)	1.667(0.795,3.493)	0.176*
Not with family	36 (20.9)	18(17.5)	18(26.1)		
<b>Specialty</b>					
Medicine	24 (14.0)	17(16.5)	7(10.4)	3.238(0.817,12.828)	
Allied Medicine	84 (48.8)	46(44.7)	38(56.7)	1.649(0.527,5.165)	0.134*
Allied Surgery	46 (26.7)	32(31.1)	14(20.9)	3.143(0.919,10.745)	
Surgery	16 (9.3)	8(7.8)	8(11.9)		
<b>Working hours per week</b>					
<76 hours	58(33.7)	41(40.2)	17(24.6)	3.316(1.532,7.177)	
76 - 90 hours	56(32.6)	37(36.3)	19(27.5)	2.678(1.248,5.744)	0.004*
> 91 hours	57(33.1)	24(23.5)	33(47.8)		
<b>Colleagues support</b>					
Yes	114(63)	64(62.1)	50(72.5)		
No	58(33.7)	39(37.9)	19(27.5)	1.604(0.828,3.107)	0.162*
<b>Supervisor support</b>					
Yes	74(43)	40(38.8)	34(50.0)		
No or Occasionally	98(57)	63(61.2)	34(50)	1.575(0.848,2.924)	0.150*
<b>Enough time for academics</b>					
Yes	54(31.4)	38(36.9)	16(23.2)	1.937(0.974,3.852)	0.060*
No	118(68.6)	65(63.1)	53(76.8)		
<b>Satisfied with pay</b>					
Yes	47(27.3)	25(24.3)	22(31.9)		
No	125(72.7)	78(75.7)	47(68.1)	1.460(0.742,2.876)	0.273
<b>Smoking status</b>					
Yes	12(07)	4(3.9)	8(11.6)		
No	160(93)	99(96.1)	61(88.4)	3.246(0.938,11.238)	0.063*
<b>Profession by own choice</b>					
Yes	159(92.4)	97(94.2)	62(89.9)	1.825(0.586,5.685)	0.299
No	13(7.6)	6(5.8)	7(10.1)		

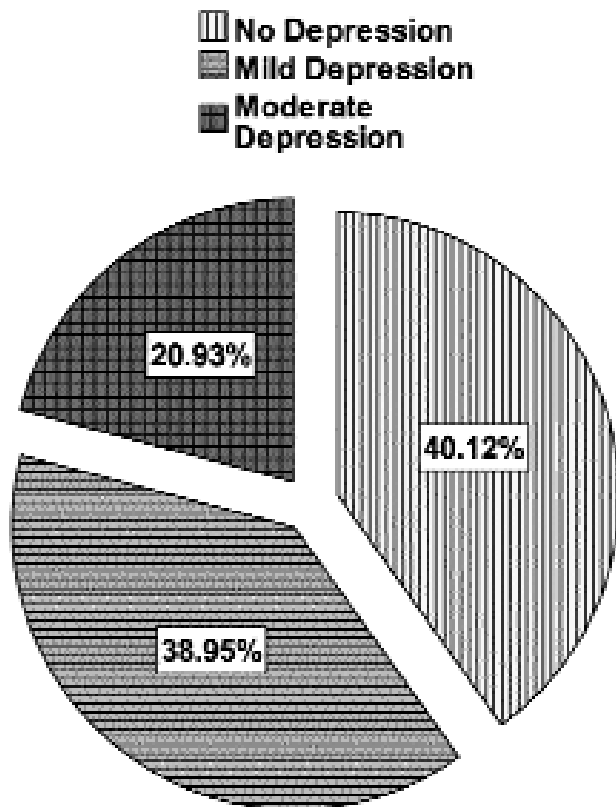
\* Significant p value (<0.25).

Table-1 describes the socio-demographic characteristics of our study population (n = 172). Males, age <30 years, married, living with family and belonging to specialty of allied medicine were in the majority. Figure shows the distribution of depression severity among these respondents.

Doctors who worked for less than 91 hours per week were more likely to be depressed than those who worked more than 91 hours per week (OR 3.316; CI=1.532, 7.177).

**Table-2: Multiple logistic regression for associated factors of depression.**

Variables	Adjusted OR	95% CI	P-Value
<b>Working hours/week</b>			
< 76 hours	3.716	1.677, 8.233	0.002
76-90 hours	3.150	1.422, 6.976	
≥ 91 hours			
<b>Colleagues support</b>			
Yes			0.048
None or Occasionally	2.053	1.007, 4.186	



**Pie chart showing distribution of depression severity among the respondents.**

Figure: Among all 172 post graduate medical and surgical trainees 40.12% were not depressed and 59.88% were found to be depressed with 38.95% and 20.93% mild and moderate depression respectively. None was severely depressed.

Age, religion, ethnicity, marital status, living status, specialty, colleagues support, supervisor support, enough time for academics, and smoking status were also associated with depression. Major part of the depression among trainees was in the faculty of Internal Medicine followed by Allied Surgery, Allied Medicine and General Surgery.

Table-2 show the results of the multiple regression analysis which included: 'number of working hours' and 'colleagues support'. The significant (p < 0.25) independent predictors of depression among post graduate trainees were working hours less than 76 hours (OR 3.716; CI=1.677, 8.233) and 76-90 hours (OR3.150; CI= 1.422, 6.976). In colleagues support taking the option of "yes" as a reference category the odds of none or occasional support (OR 2.053; CI=1.007, 4.186) was associated with depression.

## Discussion

The aim of this study was to determine the frequency of depression in medical and surgical post graduate trainees in a teaching hospital of Pakistan and examined the relationship of depression with demographics and occupational environment. To our knowledge, our study is the first one that is on depression among post graduate trainees in Pakistan with a good survey response rate.

Our study found higher frequency of depression in our medical and surgical post graduate trainees. Overall frequency of depression in this study was 59.88% which is higher than the Washington study that shows frequency of depression as 12% among emergency medicine residents in 2003 to 2004.<sup>11</sup>

This high frequency could be due to the possible reason that some of the trainees who responded to us were experiencing more depression than the trainees who neither responded nor participated. Another reason could be due to the fact that we collected the data in June, July and August near the end of the training year that is most stressful due to annual exams for promotion into the next training year.

Among our depressed trainees we found 66.34% to be minimally to mildly depressed and 33.66% were moderately depressed. None of the trainees was severely depressed.

An interesting finding of this study was that working hours of less than 91 per week as reported by 114(66.3%) post graduate trainees was positively associated with depression than those who worked 91 or more hours per week as reported by 57(33.1%) post graduate trainees. This is in contradiction to a local Pakistani study where the level of depression reported increased progressively with long working hours >45 per week among family practitioners.<sup>15</sup>

The stated results favour various other studies that were done to evaluate doctor's performances and effects on behavioural disorder after implementation of WHL in United

States that reducing working hours does not decrease prevalence of depression and it may increase medical errors and compromise patient continuity care. WHL also decreases the academic attendances of postgraduate trainees.<sup>6,7</sup>

Our results suggest that despite the fact that prevalence of depression among our study population is significantly high, long working hours are not a contributing factor. One possible reason could be that the trainee's long working hours help them develop coping strategies to counter stress, get more satisfied with their continuity of care and get more time to study during working hours at the hospital. It is also possible that some of the trainees who did not respond to questions may be working for long hours and experiencing more depressive symptoms.

Another associated factor for depression found in our study was of poor peer or colleagues support as reported by 58 (33.7%) post graduate trainees. This result is consistent with the previous study on coping strategies to reduce stress in which it was found that trainees most often turned to family and friends when they needed help during stress to cope with the difficult situation.<sup>20</sup>

With regards to smoking as a causal factor for depression, our study shows that those trainees who did not smoke were more depressed. This is against the recent concept that nicotine causes depression.<sup>21</sup> It is a possibility that smoking is used as a coping mechanism for non depressed trainees but this result is not significant at the end of our analysis.

No significant gender association was found with depression in this study, as has been reported in other studies.<sup>11</sup>

### **Strengths and limitations:**

Convenience sampling was used to draw the sample; which is inferior to probability sampling in representation of the population, and this limits the external validity of the study. However, efforts were made to include respondents from different departments of the hospital to provide better overall representation. As the study was carried out in only one institute it cannot be generalized.

Some potential confounding variables were not evaluated. For example, it is possible that any recent stressful event like death in the immediate family or preparing for exams in the near future or presence of any co morbid condition could possibly result in depression.

The survey was done in the summer and did not ask about seasonal depressive effects. Therefore surveying trainees at a different time of the year could have resulted in different rates of depression. Although we used the validated tool for the assessment of depression, recommended by WHO for study purposes, it is not yet validated in Pakistani population. The reason for not using a validated tool was

because no tools for measuring depression only have been validated in Pakistan. Validating the tools was not in the scope of this study. This could have lead to imprecise measure of some outcome variables and leaves room for further more comprehensive studies.

### **Conclusion**

Results from this study show that depression is a major problem faced by post graduate trainees. Therefore we suggest prospective cohort, multicenter studies to provide valid, generalizable information on this issue and suggest further studies to determine its effects on patients care also.

This worrisome frequency means that there is also an urgent need to develop programmes for screening of medical and surgical post graduate trainees for detecting depression earlier and take appropriate actions to manage this morbid condition.

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