

Assessment of Depression and Its Associated Factors among Dental Outpatients

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Abstract

Objective: To assess depression and its associated factors among patients coming to the dental OPD of a public and a private dental college of Karachi.

Methods: A cross-sectional study was carried out in a public and a private dental college of Karachi from November 2018 to May 2019. The inclusion criterion of the study was being 18 years of age or above whereas those who refused to give written informed consent were excluded from the study. After checking eligibility and taking written informed consent, a total of 250 participants were included in the study using systematic random sampling. These dental outpatients were interviewed by the principal investigator with the help of pretested structured questionnaire that contained questions about socio demographic information, dental risk factors and questions from Patient Health Questionnaire-9. Data were analyzed on statistical package for social sciences version 21. Inferential analysis was performed using chi-square test whereas the significance level was set at 0.05.

Results: The study results revealed that 70 (28.0%) participants had minimal depression, 99 (39.6%) had mild depression, 45 (18.0%) had moderate depression, 28 (11.2%) had moderately severe depression whereas 8 (3.2%) had severe depression. Moreover, among demographic characteristics, only monthly income ($p=0.037$) and family history of depression ($p<0.001$) were found to be significantly associated with severity of depression whereas regarding dental risk factors only frequent dental pain ($p=0.014$), increased sensitivity ($p=0.001$) and presence of any systemic morbidity ($p=0.001$) were found to be significantly associated with severity of depression.

Conclusion: The study results revealed that almost a third of the dental outpatients had moderate, moderately severe or severe depression. Moreover, low monthly income, positively family history of depression, frequent dental pain, increased sensitivity and presence of any systemic morbidity were identified as factors associated with depression among the study participants.

Keywords: Depression, risk factors, outpatients

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Introduction

World Health Organization (WHO) defines depression as "a common mental disorder, characterized by sadness, loss of interest in daily activity or

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pleasure, feeling of guilt or low self-worth, disturbed sleep or appetite, feeling of tiredness and poor concentration"¹. Usually anxiety precedes depression as biological and psychological nature of the vulnerability is same for both disorders. As per a recent World Health Organization estimate, more than 300 million people of all ages suffer from depression globally². The prevalence of anxiety and depression among dental patients in Pakistan has earlier been reported to be 11.2%³.

Different oral health conditions are known to be associated with depression such as periodontitis, facial pain, pain associated with denture, denture

erosion, caries, attrition of dentition, abrasion of dentition, night grinding, erosion related to anorexia and bulimia^{4,5}. It has been observed in the past by various studies that depression led to compromised chewing. Many patients also present with TMJ dysfunction and burning mouth syndrome, caries related to decreased tooth brushing frequency, sugary diet, fizzy drinks and alcohol/substance abuse⁶.

Literature reveals several validated questionnaires to screen for depression in different target populations. Among them the most commonly used are Clinician Rating Scale, Hamilton Depression Rating Scale (HAM-D), Montgomery-Åsberg Depression Rating Scale (MADRS), Beck Depression Inventory (BDI), Geriatric Depression Scale (GDS), Zung Self-Rating Depression Scale, Center for Epidemiologic Studies Depression Scale Revised (CESD-R) and the Patient Health Questionnaire 9 (PHQ-9). Patient Health Questionnaire is a validated, free to use and easy to administer screening tool for assessment of depression among patients which has repeatedly been used earlier². It consists of 9 items relating to presence of depression over last two weeks which are rated on a 3 point like rt scale from 0-3. A total score of 1-4 indicates minimal depression, that of 5-9 indicates mild depression, that of 10-14 indicates moderate depression that of 15-19 indicates moderately severe depression while that of 20-27 indicates severe depression².

There are different dental outcomes and effects of depression. Tooth decay, toothache, caries, periodontal diseases, gum recession, halitosis and less frequent brushing of teeth are very common findings^{7,8}. In addition decreased chewing due to bad oral conditions has a significant association with depression⁶. It can lead to noncooperation, bad mood, irritability, agitation, inconsistent behavior, bad reaction in normal situations⁴. Moreover, depression in a patient can also result in mood swings in relation to acceptance of treatment plan or non-compliance with treatment leading to poor implementation of care as planned for the patient³. Inadequate oral care and negligence in the long

term can lead to colonization of bacteria which may ultimate result in bad oral outcomes⁴. Moreover, depression can also initiate over eating of carbohydrates leading to more incidence of dental caries and periodontal abscess⁶. Facial pain and depression are known to complement each other and previous studies show about 41% to 78% reciprocation. In addition, many drugs which are used in psychogenic patients lead to varying type of side effects like xerostomia, stomatitis, glossitis, sialadenitis, gingivitis, discoloration of oral mucosa, bands formation seen in oral sub-mucous fibrosis⁴. It is interesting to note however that literature reports depression both as a risk factor as well as an outcome of poor oral health⁹.

Literature shows that people with depression have more incidence of dental fear¹⁰. Assessment of the psychological status of a dental patient for presence of fear, anxiety and dental phobia with the help of professional guidelines is imperative as it can later influence the treatment plan and long-term care. It may also act as a barrier between the doctor and patient relationship culminating in a communication gap that can result in misdiagnosis or under diagnosis of various dental conditions ultimately leading to overburdening of already stretched healthcare resources and system. It is therefore very important that such patients are diagnosed early and referred to a psychiatrist for treatment and are offered complete dental care.

Even though the prevalence of depression among dental patients has been evaluated earlier, a thorough literature search by the authors revealed that the existing local literature on this topic is limited at best². This study was therefore planned to assess depression and its associated factors among patients coming to the dental OPD of a public and a private dental college of Karachi.

Subjects and Methods

After taking ethical approval, a cross-sectional study was carried out in a public and a private dental college of Karachi. The data collection for the study was spanned over 2 months, from January

2019 to February 2019. Using the percentage prevalence of depression in dental patients to be 11.2%, with 95% confidence level and 5% precision, the minimum required sample size was calculated to be 153 participants.

Out of a list each of all public and private dental colleges of Karachi two were randomly selected namely Liaquat College of Medical and Dentistry and Karachi Medical and Dental College. From each of these dental colleges 125 patients, 250 in total, were included in the study using systematic random sampling after checking their eligibility. The inclusion criterion of the study was being 18 years of age or above whereas those who refused to give written informed consent were excluded from the study.

After taking their written informed consent, the participants were interviewed by the principal investigator with the help of a structured pre-tested questionnaire developed specifically for the study after a thorough literature review. It contained questions about socio-demographic information, dental risk factors and questions from Patient Health Questionnaire-9 (PHQ-9) for the assessment of depression.

The questions on dental risk factors were pre-tested on 10 patients, checked for face validity and reliability and were found to have a Cronbach's alpha value of 0.751 showing an acceptable level of internal consistency. The total scores of PHQ-9 questionnaire are categorized as follows: 1-4 indicating minimal depression, 5-9 mild indicating mild depression, 10-14 indicating moderate depression, 15-19 indicating moderately severe depression and 20-27 indicating severe depression.

The data were entered and analyzed on statistical package for social sciences version 21. Descriptive analysis such as frequencies and percentages were executed for categorical variables while means and standard derivations were calculated for continuous variables. Inferential analysis was performed using chi-square test whereas the significance level was set at 0.05.

Results

A total of 250 participants were included in the study with a response rate of 95%. The mean age of the study participants was 37.26 ± 14.9 years, of which 151(60.4%) were <40 years old, 136 (54.4%) were females, 142(56.8%) were married, 236(94.4%) were Muslim, 54(21.6%) were intermediate while 77(30.8%) were graduate, 95(38.0%) were dependent while 73(29.2%) had monthly income <25000 rupees whereas 60(24.0%) had positive family history of depression (Table 1).

The study results further showed that 138 (55.2%) of the patients suffered from dental pain, 127(50.8%) were suffering from increased dental sensitivity, 80(35.2%) had swollen gums, 92 (36.8%) had broken tooth, 70(28.0%) had diastima, 107(42.8%) felt bad about their teeth esthetics whereas 55(22.0%) had any systemic morbidity (Table 2). Moreover, it was also seen that 70 (28.0%) participants had minimal depression, 99 (39.6%) had mild depression, 45(18.0%) had moderate depression, 28(11.2%) had moderately severe depression whereas 8(3.2%) had severe depression (Fig 1).

The study results further showed that only monthly income ($p=0.031$) and family history of depression ($p<0.001$) were significantly associated with severity of depression where those who had monthly income <25000 Rs were more likely to have moderate depression than those who were dependent or had monthly income 25000 Rs or above (20.5% vs. 14.9% and 19.5% respectively) and those who were dependent were more likely who have moderately severe/severe depression than those who had monthly income <25000 Rs or 25000 Rs or above (20.2% vs. 4.1% and 17.1% respectively) whereas those who had positive family history of depression were more likely to have moderate and moderately severe/severe depression than those who did not (29.3% vs. 12.6% and 20.7% vs. 11.4% respectively) (Table 3).

Moreover, it was seen that only frequent dental pain ($p=0.014$), increased sensitivity ($p=0.001$) and

presence of any systemic morbidity ($p=0.001$) were significantly associated with severity of depression where participants who were suffering from frequent dental pain were less likely to have moderate but more likely to have moderately severe/severe depression than those who did not (17.5% vs. 18.8% and 20.4% vs. 7.1% respectively), participants who were suffering from increased sensitivity were more likely to have moderate and moderately severe/severe depression than those who did not (21.4% vs 14.6% and 22.2% vs 6.5% respectively) whereas participants who had any systemic morbidity were more likely to have moderate and moderately severe/severe depression than those who did not (23.6% vs 16.5% and 29.1% vs 10.3% respectively) (Table 4).

Discussion

This study was carried out with the aim of assessing depression and its associated factors among patients coming to dental outpatient departments. The study results revealed that more than half of the patients were suffering from dental pain, over half of them were suffering from increased dental sensitivity while 35.2% had swollen gums, 36.8% had broken tooth, 28% had diastima, 42.8% felt bad about their teeth esthetics whereas 22% had any systemic morbidity. Moreover, 28% of them had minimal depression, 39.6% had mild depression, 18% had moderate depression, 11.2% had moderate severe depression whereas 3.2% had severe depression.

The study results further revealed that among demographic characteristics only monthly income and family history of depression were significantly associated with severity of depression whereas among dental risk factors only frequent dental pain, increased sensitivity and presence of any systemic morbidity were significantly associated with severity of depression.

In this study 28% of the patients had minimal depression, 39.6% had mild depression, 18% had moderate depression, 11.2% had moderate severe depression whereas 3.2% had severe depression.

Khan MA in 2015 reported that 11.2% of the patients interviewed using hospital anxiety and depression scale (HADS) had depression³. The difference observed in our study compared to previous data may be attributed to the use of different screening tools of depression in both studies i.e. PHQ-9 vs HADS.

The study results further showed lower monthly household income to be positively associated with greater severity of depression. Likewise, Alkan A et al., in 2015 reported individuals with lower income level to have higher depression scores¹¹.

Moreover, the study findings revealed a significant association between frequent dental pain and severity of depression. Hexem K et al., in 2014 though reported major depressive disorder to be associated with generalized pain⁴. Moreover, the study results showed a positive association between increased dental sensitivity and severity of depression. Likewise, Verma A et al., in 2011 also reported an association between bad oral hygiene leading to dental sensitivity with depression among dental patients¹². Similarly, Datta D et al., in 2018 reported positive association between periodontal disease, swelling of gums and depression¹³. This may be a result of periodontal colonization of bacteria impairing the immune system and thereby leading to depression.

The study results revealed a positive association between low monthly income and severity of depression. Likewise, Hexem K et al., in 2014 reported major depressive disorder to be positively associated with low socioeconomic status⁴. Such a finding was not unexpected, as along with physical health lack of living resources can also negatively influence an individual's mental health.

The study result showed the percentage of depression to be 70.7% among patients aged 40 or above. Likewise, Kohli S in 2018 reported the percentage of depression to be 59.9% in patients aged 70 years or above¹⁴. This difference in finding could be attributed to different age composition of the

Table 1. Participants Profile

Variables (n= 250)	Frequency (%) / Mean ± S.D.
Age in Years	37.26 ± 14.91
Age Group	
<40 Years	151(60.4)
40 Years or Above	99(39.6)
Gender	
Male	114(45.6)
Female	136(54.4)
Marital Status	
Unmarried	94(37.6)
Married	142(56.8)
Divorced/Separated	7(2.8)
Widowed	7(2.8)
Religion	
Muslim	236(94.4)
Non-Muslim	14(5.6)
Educational Status	
Illiterate	19(7.6)
Able to read and write	13(5.2)
Primary	19(7.6)
Secondary	34(13.6)
Intermediate	54(21.6)
Graduate	77(30.8)
Post Graduate	34(13.6)
Monthly Income in Rupees	
Dependent	95(38.0)
<25000	73(29.2)
25000-75000	54(21.6)
>75000	28(11.2)
Family history of depression	
Yes	60(24.0)
No	190(76.0)

Table 2. Frequency of Dental Risk Factors of Depression

Variables (n= 250)	Frequency (%)
Are you suffering from frequent dental pain?	
Yes	138(55.2)
No	112(44.8)
Are you suffering from increased dental sensitivity?	
Yes	127(50.8)
No	123(49.2)
Do you have swollen gum?	
Yes	80(35.2)
No	162(64.8)
Do you have broken tooth?	
Yes	92(36.8)
No	158(63.2)
Do you have diastema?	
Yes	70(28.0)
No	180(72.0)
Do you feel bad about your teeth esthetics?	
Yes	107(42.8)
No	143(57.2)
Do you have any systemic morbidity?	
Yes	55(22.0)
No	195(78.0)

Table 3. Association between Demographic Characteristics and Severity of Depression

Variables (n= 250)	Minimal Freq.(%)	Depression Mild Freq.(%)	Severity Moderate Freq.(%)	Moderately Severe/Severe Freq.(%)	P
Age Group					
<40 Years	41(27.2)	64(42.7)	31(20.7)	15(10.0)	0.058
40 Years or Above	29(29.3)	35(35.4)	14(14.1)	21(21.2)	
Gender					
Male	36(31.6)	47(41.2)	21(18.4)	10(8.8)	0.126
Female	34(25.0)	52(38.5)	24(17.8)	26(19.3)	
Marital Status					
Unmarried/ widow/ divorced/ separated	23(21.3)	48(44.4)	24(22.2)	13(12.0)	0.079
Married	47(33.1)	51(36.2)	21(14.9)	23(16.3)	
Monthly Income					
Dependent	21(22.1)	41(43.6)	14(14.9)	19(20.2)	0.037
<25000 Rs	22(30.1)	33(45.2)	15(20.5)	3(4.1)	
25000 Rs or Above	27(32.9)	25(30.5)	16(19.5)	14(17.1)	
Educational Status					
Primary or less	16(31.4)	20(40.0)	7(14.0)	8(16.0)	0.931
Secondary/ Intermediate	21(23.9)	37(42.0)	17(19.3)	13(14.8)	
Graduate/ Post Graduate	33(29.7)	42(37.8)	21(18.9)	15(13.5)	
Family History of Depression					
Yes	14(16.9)	28(34.1)	24(29.3)	17(20.7)	<0.001
No	56(33.5)	71(42.5)	21(12.6)	19(11.4)	

Table 4. Association between Dental Risk Factors and Severity of Depression

Variables (n= 250)	Minimal Freq.(%)	Depression Mild Freq.(%)	Severity Moderate Freq.(%)	Moderately Severe/Severe Freq.(%)	P
Are you suffering from frequent dental pain?					
Yes	40(29.0)	46(33.6)	24(17.5)	28(20.4)	0.014
No	30(26.8)	53(47.3)	21(18.8)	8(7.1)	
Are you suffering from increased sensitivity?					
Yes	30(23.6)	42(33.3)	27(21.4)	28(22.2)	0.001
No	40(32.5)	57(46.3)	18(14.6)	8(6.5)	
Do you have swollen gums?					
Yes	18(20.5)	37(42.0)	16(18.2)	17(19.3)	0.173
No	52(32.1)	62(38.5)	29(18.0)	19(11.8)	
Do you have broken tooth?					
Yes	22(23.9)	34(37.0)	20(21.7)	16(17.4)	0.368
No	48(30.4)	65(41.4)	25(15.9)	20(12.7)	
Do you have diastema?					
Yes	23(32.9)	26(37.1)	12(17.1)	9(12.9)	0.761
No	47(26.1)	73(40.8)	33(18.4)	27(15.1)	
Do you feel bad about your teeth esthetics?					
Yes	26(24.3)	46(43.4)	20(18.9)	15(14.2)	0.676
No	44(30.8)	53(37.1)	25(17.5)	21(14.7)	
Do you have any systemic morbidity?					
Yes	12(21.8)	14(25.5)	13(23.6)	16(29.1)	0.001
No	58(29.7)	85(43.8)	32(16.5)	20(10.3)	

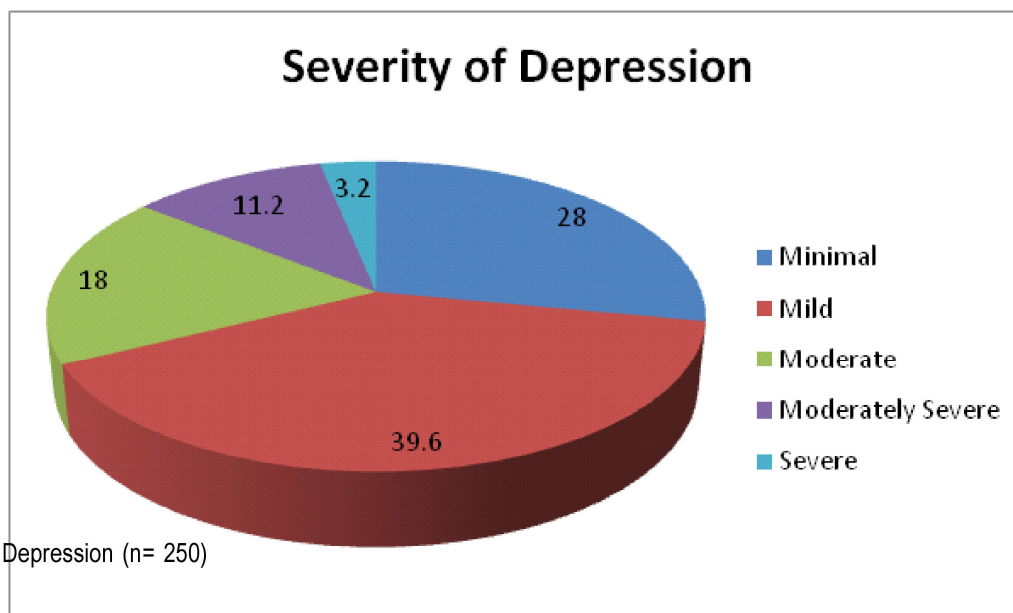


Fig. 1. Severity of Depression (n= 250)

study populations and use of different assessment tools of depression in both the studies.

The study result revealed that 37.1% of the female participants had moderate/moderately severe/severe depression. Likewise, Kohli S in 2018 reported 32.2% of females to have depression¹⁴. Moreover, the gender of the outpatients was not found to be significantly associated with depression. Unlike the study results though, Takiguchi T et al., in 2016 reported gender to be significantly associated with depression¹⁵. Such a difference in findings can be explained by differences in the age distribution and the scales used for assessing depression in both the studies.

Furthermore, the study results did not reveal any significant association between educational status and depression. Unlike the study finding though, Peyrot WJ et al., in 2008 reported a significant association between low educational level and depression¹⁶. This difference in findings could be attributed to the difference in study settings and methodologies as the later study was conducted in Europe using the data of 10 cohort studies.

As per study findings, frequent dental pain was found to be significantly associated with severity of depression. Likewise, Park SJ et al., in 2014 reported toothache to be significantly associated with

depression (AOR = 1.18, 95 percent CI 1.01-1.39)¹⁷. Yang SE et al., in 2016 also reported dental pain to be significantly associated with depression¹⁸. This was a finding well expected beforehand as it is a common observation that dental pain, particularly if severe, is a source of continuous discomfort and causes agony to an extent that the sufferer can hardly concentrate at any task any at hand, or relax for that matter.

The study results did not show swollen gums to be significantly associated with severity of depression in the outpatients studied. Araújo MM et al., in 2016 published a systematic review and meta-analysis that did not report any significant association between depression and gum disease¹⁹. Similarly, Viana LR et al., in 2013 did not report any association between depression and gum disease²⁰. Delgado-Angulo EK et al., in 2015 did not report any significant association of gum disease with depression as well²¹. Solis AC et al., in 2014 also did not find any association between depression and gum disease²². Careful evaluation is recommended before reading too much into this finding though, as it has been reasoned that comorbidities commonly associated with alter the onset and progression of gum disease²³. Hsu CC et al., in 2015 also found periodontitis to be an independent risk factor for depression in patients, except for

comorbidities of diabetes mellitus, cancer, and alcohol abuse⁵. Similarly, Khambaty T & Stewart JC found panic disorder to be significantly associated with gum disease, though tobacco use partially mediated this relationship²⁴. Kumar A et al., in 2015 also found a significant association between depression and gum disease²⁵.

Unfortunately, with regard to the study findings about frequency of broken tooth, diastema and bad feeling about teeth esthetics; and association of positive family history of depression and presence of any systemic morbidity with depression, a meaningful comparison could not be made with the previous literature as a thorough literature search did not reveal any pertinent published data.

It is acknowledged that being a cross sectional study, the study result may have suffered from limitation in recall of the study participants.

Conclusion

The study results revealed that almost a third of the participants had moderate, moderately severe or severe depression. Moreover, low monthly income, positively family history of depression, frequent dental pain, increased sensitivity and presence of any systemic morbidity were identified as factors associated with depression among the study participants. In light of the high prevalence of depression found in this study, serious and urgent efforts on part of all stakeholders are needed to devise effective intervention strategies such as raising public awareness, training physicians to promptly identify high risk population groups, and increasing public and private sector spending in order to effectively address the identified demographic and dental factors associated with depression.

Conflict of Interests

Authors have no conflict of interests and received no grant/funding from any organization.

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